

**Dynamics in Metaphor Comprehension**  
**— A Cross-cultural Web-based Experiment on**  
**Understanding Teacher Metaphors**

**Von der Fakultät für Ingenieurwissenschaften,  
Abteilung für Informatik und Angewandte Kognitionswissenschaft,  
Fachgebiet Allgemeine Psychologie: Kognition  
an der  
Universität Duisburg-Essen**

**zur Erlangung des akademischen Grades einer  
Doktorin der Philosophie (Dr. phil.)**

**genehmigte Dissertation**

**von  
Zhou, Dehui  
aus  
Wuhan, China**

**Referent: Prof. Dr. Edgar Heineken  
Koreferent: Drs. Rogier Crijns  
Tag der mündlichen Prüfung: 30.01.09**

## Acknowledgements

Through my five-year stay in Germany, I have not only acquired new knowledge in applied cognitive psychology, but also earned precious experiences of living in a foreign culture. It is with great joy and a sense of gratitude that I recall all those people without whose friendly supports from various aspects I could not have started and finished this dissertation.

The greatest credit should be granted to my thesis supervisor, Prof. Dr. Edgar Heineken, who has not only offered me this precious opportunity to study in Germany but also guided me throughout the whole empirical research and acquainted me with Cowan's working memory theory, which greatly inspired the formulation of the dynamic view of metaphor comprehension. In addition, his generosity in furnishing me an ideal working environment is much appreciated and his constant patient guidance and valuable comments on my work are highly esteemed. I would like to express my sincere thanks to Drs. Rogier Crijns at the Radbound University Nijmegen, Holland for his valuable comments on this work. I want to thank Mr. Carsten T. Vala for improving the English language in this work.

I am very grateful to Dr. Andreas Huber who fostered my interest in metaphor with his own insightful research and literature that he shared with me. I feel indebted to Mr. Guo Xu who used his experience in experimental design to benefit my research at an embryonic stage.

For the successful implementations of the empirical work, high respect is particularly due once again to my supervisor, Prof. Dr. Heineken and my other dear colleagues, Dipl. päd. Frank Schulte and Dr. Heike Ollesch. They have not only developed the Lab. OR, the online experiment authoring system that greatly facilitated the design, implementation, and data record of my own experimental research, but also provided me constant supports whenever help was needed. My thanks go especially to Mr. Schulte who patiently taught me how to carry out my experiments at Lab. OR, acquainted me with relevant literature of online psychological experiments, and helped me to solve the technical problems.

Moreover, I am also much obliged to the generous help of Dr. Yu Ding at Nanjing Normal University, Ms. Liping Zhang at Jiangnan University in China, Prof. Dr. Peter Vogel and Ms. Simone Dulinski at the University of Dortmund, and Ms. Sabine Kronemeyer at the University of Duisburg-Essen for helping me to recruit Chinese

and German participants. Of course, my sincere thanks are due to all the students who participated in the experiments on a voluntary basis. Their friendly cooperation and effort enabled me to attain reliable data sets for the research.

Gratitude should also be expressed to PD. Dr. Lothar Krempel, from whose seminar on network analysis I have gained many insights and who also patiently helped me to use the software *Pajek* to generate the bipartite network graphs, an important aspect for the feature analysis of my experimental data.

Moreover, it is a great pleasure to acknowledge intellectual and emotional supports from all my colleagues and my friends. I am grateful for sharing an office with my colleague Ms. Cordula Yallaho, whose kindness and warmth always created a feeling of home and eased my nerves when I worked at my dissertation. I would like to thank my friend Christoph Noack and my colleague Julia Zimmerman for revising the German version of the experimental text. I would like to thank Xia Wang and all members of the Chinese Bible Group Duisburg for their constant prayers for me and my family.

High respect is due to my loving father Jinhai Zhou and mother Zhaohua Zhang whose great love and care have allowed me to grow up in a warm and supportive family. I am greatly indebted to my sister Demei Zhou and my brother-in-law Bo Xiong who took full responsibility to take care of my sick parents in China, which enabled me to do years of research in Germany.

Much debt is owed to the spiritual and material support of my dear husband Mankit Yau. It is his love, understanding, care and encouragement that made the hard work of writing my dissertation more bearable. Also, I would like to thank my seven-year old daughter Yuantian and my ten-month-old baby Kaying for the many sweet moments that they have brought to me.

Above all, I am grateful that I came to know Jesus Christ in Germany. Through him, I can pray to my heavenly father, the almighty God and seek for His support during the whole process of my dissertation composition. From all my heart, I want to praise His name for accompanying me in my emotional ups and downs, for promising me hopes when no hope was foreseen, for providing me strength when I was weak, and for loving me so much despite all my sins and faults.

## Abstract

This work is dedicated to exploring the process of metaphor comprehension. There are a number of cognitive theories addressing this issue, including the conceptual metaphor theory (Lakoff and Johnson, 1980), the salience imbalance theory (Ortony, 1979), the structure mapping theory (Gentner, 1983), the domain-interaction theory (Tourangeau and Sternberg, 1982), the attributive categorization theory (Glucksberg and Keysar, 1990) and the conceptual blending theory (Fauconnier and Turner, 1998, 2002). A critical review of these theories and their supportive empirical studies have revealed that all of them are in a degree applicable to explaining the comprehension of certain metaphors but not capable of working with the processing of others. What are the major factors that drive different mappings to be involved in processing different metaphors and affect the metaphor comprehension? This is the major question to be investigated in this research.

Inspired by recent studies, a hypothesis is formulated: the cognitive processing mechanisms in comprehending a metaphor are largely influenced by the addressees' pre-existing conceptual knowledge as reflected in their estimation of the conventionality and the aptness of the metaphor and the communicative context in which the metaphor arises.

To test this hypothesis, a cross-cultural web-based experiment has been carried out to explore how three metaphors are comprehended under various role-play conditions by subjects whose pre-existing conceptual knowledge concerning these metaphors varies from each other. The metaphor *The teacher is a candle* was estimated by the Chinese subjects as the most conventional and apt teacher metaphor but the German subjects estimated it as a less conventional and less apt metaphor. The metaphor *The teacher is a shepherd* was estimated by the German subjects as the most conventional and apt, but by the Chinese subjects as less conventional and less apt. The metaphor *The teacher is a captain* was estimated by both Chinese and German subjects as a less conventional but apt metaphor. Under various role-play conditions (no role play, after the role play scenario with the positive development or after the role play with the negative development), the Chinese and the German participants were first asked to rate their affective impressions of the teacher metaphors on dimensions of the Self-Assessment Manikin (SAM) (Lang,

1980). Then they were required to rate how suitable thirty-three features selected from a pilot study are in describing the teacher metaphors.

Altogether 180 complete valid data sets were collected from the participants from two German universities and two Chinese universities. The multivariate analysis of the SAM ratings and the cluster analysis and the network analysis of the feature ratings are summarized as follows: First, a greater consensus in both the SAM ratings and the feature ratings was shared among the subjects who regarded the metaphor as conventional and apt than those who regarded it as unconventional and inapt. Second, significant positive correlations between the topic and the vehicle concept were found in subjects' SAM and feature ratings of the metaphor that they regarded as conventional and apt. In contrast, their SAM ratings and feature ratings of the metaphor, which they regarded as unconventional and inapt, shows no positive correlation between the topic and the vehicle of the metaphor. Instead, there was a tendency of high rating emergent features. Third, context exerted significant influence on subjects' SAM and feature ratings. When the metaphor was provided in the role play with the positive development, a greater consensus in rating the SAM and the features appeared among the subjects who took the metaphor as unconventional and inapt. When the metaphor was provided under the condition of the role play with negative development, even the subjects who originally regarded the metaphor as conventional and apt seemed to lose their consensus in rating the SAM and the features.

Such results largely confirm the hypothesis of the experiment and reveal that the comprehension of a metaphor is not a static process but rather a dynamic one that can be affected by both the pre-existing conceptual knowledge of the metaphor addressee and the context in which the metaphor arises.

Based on the empirical findings, a dynamic theoretical view is formulated to explain the comprehension of metaphor through the integration of Wilson and Sperber's (2004) relevance theory, Cowan's (2005) working memory theory and relevant cognitive mapping theories. According to this view, the comprehension of metaphors can be segmented into various situations with the emphasis on the interplay of the addressee's conceptual knowledge and the communicative context in which the metaphor appears. Depending on people's conceptual knowledge preexisting in their long-term memory and the communicative context in which a metaphor appears, the comprehension of the metaphor involves testing the contextual metaphoric

assumption that is formulated through the ad-hoc interplay of the topic space, the vehicle space, and the contextual space generated in people's working memory. The more conventional and apt the metaphor appears to them, the less complicated are the mappings involved in drawing the contextual metaphoric assumption needed for comprehending the metaphor.

This dynamic view of metaphor comprehension can explain why the German subjects had more difficulty than the Chinese subjects in comprehending the metaphor *The teacher is a candle* in this experiment. It can also provide a good solution to solve the debate among the current metaphor mapping theories and synthesize them in a plausible way. Furthermore, this cognitive metaphor research also suggests follow-up studies should be done in order to develop further the present dynamic view into a well-structured model of metaphor comprehension.

## List of Figures

Figure 1: Network model of conceptual integration.	22
Figure 2: Conceptual integration network: <i>The surgeon is a butcher</i> .	24
Figure 3: The Self- Assessment Manikin.	82
Figure 4: Experimental procedure.	86
Figure 5: The SAM ratings of the concept <i>teacher</i> under the conditions of different teacher metaphors. (The three dimensions of SAM ratings: <i>dominance</i> , <i>pleasure</i> and <i>arousal</i> )	95
Figure 6: The SAM ratings of concept <i>teacher</i> under the different role-play conditions.	96
Figure 7: Major terms involved in describing a dendrogram.	104
Figure 8: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of no role play.	108
Figure 9: Dendrograms of the feature ratings for the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> by the Chinese and the German subjects under the condition of no role play.	108
Figure 10: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of the role play with the positive development.	109
Figure 11: Dendrograms of the feature ratings for the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> by the Chinese and the German subjects under the condition of the role play with the positive development.	110
Figure 12: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of the role play with the negative development.	111
Figure 13: Dendrograms of the feature ratings for the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> by the Chinese and the German subjects under the condition of the role play with the negative development.	112
Figure 14: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> under the condition of no role play.	113
Figure 15: Dendrograms of the feature ratings for the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> by the Chinese and the German subjects under the condition of no role play.	114
Figure 16: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> under the condition of the role play with the positive development.	115
Figure 17: Dendrograms of the feature ratings for the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> by the Chinese and the German subjects under the condition of the role play with the positive development.	116
Figure 18: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> under the condition of the role play with the negative development.	117
Figure 19: Dendrograms of the feature ratings for the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> by the Chinese and the German subjects under the condition of the role play with the negative development.	117
Figure 20: Bipartite graph of the feature network for the concept <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of no role play.	118

- Figure 21: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of no role play. 119
- Figure 22: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development. 119
- Figure 23: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of the role play with the positive development. 120
- Figure 24: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the negative development. 121
- Figure 25: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of the role play with the negative development. 122
- Figure 26: Bipartite graph of the feature network for the concept *candle* in the metaphor *The teacher is a candle* under the condition of no role play. 125
- Figure 27: Dendrograms of the feature ratings for the concept *candle* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of no role play. 126
- Figure 28: Bipartite graph of the feature network for the concept *candle* in the metaphor *The teacher is a candle* under the condition of the role play with the positive development. 127
- Figure 29: Dendrograms of the feature ratings for the concept *candle* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of the role play with the positive development. 127
- Figure 30: Bipartite graph of the feature network for the concept *candle* in the metaphor *The teacher is a candle* under the condition of the role play with the negative development. 128
- Figure 31: Dendrograms of the feature ratings for the concept *candle* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of the role play with the negative development. 129
- Figure 32: Bipartite graph of the feature network for the concept *captain* in the metaphor *The teacher is a captain* under the condition of no role play. 130
- Figure 33: Dendrograms of the feature ratings for the concept *captain* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of no role play. 131
- Figure 34: Bipartite graph of the feature network for the concept *captain* in the metaphor *The teacher is a captain* under the condition of the role play with the positive development. 131
- Figure 35: Dendrograms of the feature ratings for the concept *captain* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of the role play with the positive development. 132
- Figure 36: Bipartite graph of the feature network for the concept *captain* in the metaphor *The teacher is a captain* under the condition of the role play with the negative development. 133
- Figure 37: Dendrograms of the feature ratings for the concept *captain* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of the role play with the negative development. 134
- Figure 38: Bipartite graph of the feature network for the concept *shepherd* in the metaphor *The teacher is a shepherd* under the condition of no role play. 135

Figure 39: Dendrograms of the feature ratings for the concept <i>shepherd</i> in the metaphor <i>The teacher is a shepherd</i> by the Chinese and the German subjects under the condition of no role play.	136
Figure 40: Bipartite graph of the feature network for the concept <i>shepherd</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of the role play with the positive development.	136
Figure 41: Dendrograms of the feature ratings for the concept <i>shepherd</i> in the metaphor <i>The teacher is a shepherd</i> by the Chinese and the German subjects under the condition of the role- play with the positive development.	137
Figure 42: Bipartite graph of the feature network for the concept <i>shepherd</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of the role play with the negative development.	138
Figure 43: Dendrograms of the feature ratings for the concept <i>shepherd</i> in the metaphor <i>The teacher is a shepherd</i> by the Chinese and the German subjects under the condition of the role play with the negative development.	139
Figure 44: The interaction of the factors “role play” and “metaphor” on the suitability ratings of three teacher metaphors.	141
Figure 45: Career of metaphor.	160
Figure 46: Functions of attention in the working memory.	170
Figure 47: Acquisition of the contextual metaphoric assumption.	176
Figure 48: Direct reference in processing dead metaphors.	181
Figure 49: Categorization in processing conventional and apt metaphors.	182
Figure 50: Comparison in processing less conventional but apt metaphors.	183
Figure 51: Interaction or blending in processing novel and apt metaphors.	184
Figure 52: Comprehension of the metaphor <i>The teacher is a candle</i> by the Chinese and the German subjects.	187
Figure 53: Comprehension of the metaphor <i>The teacher is a captain</i> by the Chinese and the German subjects.	188
Figure 54: Comprehension of the metaphor <i>The teacher is a shepherd</i> by the Chinese and the German subjects.	191

## List of Tables

Table 1: Major cognitive metaphor theories.	44
Table 2: Quinn's eight thematic groups of metaphorical expressions.	64
Table 3: Chinese expressions of the metaphor <i>The teacher is a candle</i> .	80
Table 4: Orders of the metaphor implied texts and neutral texts in the class report.	88
Table 5: Time duration of the online experiment.	91
Table 6: The means and the standard deviations of the SAM ratings of the concept <i>teacher</i> in different teacher metaphors under the condition of no role play.	93
Table 7: The means and the standard Deviations of the SAM ratings of the concept <i>teacher</i> in different teacher metaphors under the condition of the role play with positive and negative development.	94
Table 8: SAM ratings of three vehicle concepts <i>under</i> various role play conditions.	97
Table 9: Summary of the two-tailed <i>Pearson</i> correlation test between the SAM ratings on the topic <i>teacher</i> and the SAM ratings of the correspondent vehicles in three teacher metaphors.	99
Table 10: The network degree centralization index values and the density values of the bipartite networks constructed according to the 33 feature ratings for the topic <i>teacher</i> in the three teacher metaphors.	106
Table 11: The $C_D$ and the <i>Density</i> of the bipartite networks constructed according to the 33 feature ratings of the vehicles from the three teacher metaphors.	124
Table 12: Status of hypotheses testing.	146

## List of Abbreviations

ACMS	Analog Mapping by Constraint Satisfaction
ACT	Attributive Categorization Theory
AI	Artificial Intelligence
CBT	Conceptual Blending Theory
C <sub>D</sub>	Network Degree Centralization
CI-LSA	Construction Integration-Latent Semantic Analysis
CMH	Career of Metaphor Hypothesis
CMT	Conceptual Metaphor Theory
DAM	Direction Access Model
DIT	Domain Interaction Theory
DMMC	Dynamic view of Metaphor Comprehension
DTH	Dynamic Type Hierarchy
EEG	Electroencephalograms
ERP	Event Related Potential
ESL	Ethnolinguistic School of Lublin
LH	Left Hemisphere
LHD	Left Hemisphere-Damaged
LSA	Latent Semantic Analysis
MIDAS	Metaphor interpretation, Denotation and Acquisition System
PET	Positron Emission Tomography
RH	Right Hemisphere
RHD	Right Hemisphere-Damaged
SAM	Self-Assessment Manikin
SD	Semantic Differential
SIT	Salient Imbalance Theory
SME	Structure Mapping Engine
SMT	Structure Mapping Theory
SPSS	Statistical Product and Service Solution
SSM	Space Structuring Model
STO	Stimulus Onset Asynchrony

## Table of Content

Acknowledgements .....	II
Abstract .....	IV
List of Figures .....	VII
List of Tables .....	X
List of Abbreviations .....	XI
Chapter 1 Introduction .....	1
Chapter 2 Theories of Metaphor Comprehension.....	9
2.1 Conceptual Metaphor Theory.....	10
2.1.1 Conceptual Metaphor .....	11
2.1.2 Image Schemata and Embodiment .....	13
2.1.3 Mappings and Invariance Principle.....	15
2.1.4 Critics .....	17
2.2 Conceptual Blending Theory.....	20
2.2.1 The Network Model of Conceptual Integration .....	21
2.2.2 The Blending Process .....	23
2.2.3 Critics .....	25
2.3 Structure Mapping Theory.....	26
2.3.1 Metaphor as Analogy.....	27
2.3.2 Structure-mapping .....	29
2.3.3 Mental Model.....	30
2.3.4 Critics .....	32
2.4 Salient Imbalance Theory .....	32
2.4.1 Salience Imbalance Model .....	32
2.4.2 Predicate Promotion Metaphor and Predicate Introduction Metaphor .....	34
2.4.3 Critics .....	35
2.5 Attributive Categorization Theory of Metaphor.....	36
2.5.1 The Class-inclusion Claim .....	36
2.5.2 Property Attribution.....	37
2.5.3 Critics .....	38
2.6 The Domains Interaction Theory of Metaphor.....	39
2.6.1 Metaphor as Interaction of Domains.....	39
2.6.2 Similarity and Aptness .....	41
2.6.3 Critics .....	42
2.7 Summary.....	42
Chapter 3 Studies of Metaphor Comprehension.....	45
3.1 Debate of Direct or Indirect Processing of Metaphor Comprehension .....	45
3.1.1 The Sequential View.....	45
3.1.2 The Direct View .....	46
3.1.3 The Parallel View.....	48
3.1.4 The Combined View .....	49
3.2 Comprehending Metaphors versus Similes.....	49
3.3 Steps of Metaphor Comprehension .....	51
3.4 Views of Mappings Involved in Metaphor Comprehension.....	52

3.5 Factors Involved in Metaphor Comprehension.....	57
3.6 Open Issues.....	59
3.6.1 Viability of Metaphor Comprehension.....	60
3.6.2 Metaphor Comprehension in Communicative Context.....	60
3.6.3 Metaphor Comprehension and Culture.....	63
Chapter 4: A Cross-cultural Web-based Experiment on Understanding Teacher Metaphors.....	71
4.1 Hypotheses.....	71
4.2 Method.....	75
4.2.1 Subjects.....	76
4.2.2 Materials.....	76
4.2.2.1 The Online Settings.....	77
4.2.2.2 The Metaphors.....	78
4.2.2.3 Affective Impression: Ratings of the Self- assessment Manikin.....	81
4.2.2.4 Conceptual Representation: Feature Ratings.....	82
4.2.3 Procedure.....	85
4.2.4 Experimental Design.....	90
4.3 Results.....	91
4.3.1 Affective Impression: SAM ratings.....	92
4.3.1.1 Affective Impression Ratings of the Topic Concept <i>Teacher</i> .....	92
4.3.1.2 Affective Impression Ratings of Three Vehicle Concepts.....	96
4.3.1.3 Correlation between the SAM Ratings of the Topic Concept and the SAM Ratings of the Different Vehicle Concepts.....	98
4.3.2 Conceptual representations: Feature Analyses.....	100
4.3.2.1 Analysis Methods and Tools.....	100
4.3.2.2 Feature Analyses of the Topic Concept <i>Teacher</i> .....	105
4.3.2.3 Feature Analyses of Three Vehicle Concepts.....	123
4.3.3 Metaphor Suitability.....	139
4.4 Discussion.....	143
Chapter 5: A Dynamic View of Metaphor Comprehension.....	159
5.1 Flexibility of Metaphor Comprehension.....	159
5.2 Theoretical Inspiration of the Dynamic View.....	162
5.2.1 Relevance Theory.....	163
5.2.2 Cowan's Working Memory Theory.....	168
5.2.3 Various Views of the Mapping Process.....	172
5.3 The Framework of the Dynamic View.....	172
5.3.1 Steps of Metaphor Comprehension.....	173
5.3.2 Acquisition of the Contextual Metaphoric Assumption.....	174
5.3.3 Mappings in the Dynamic View.....	178
5.3 Analysis of the Teacher Metaphors with the Dynamic view.....	185
Chapter 6: Conclusions and Outlook.....	193
References.....	201
Appendices.....	216
Appendix A: Pilot Study I.....	216
A1: Questionnaire for Selecting Teacher Metaphors (German Version).....	216

A2: Questionnaire for Selecting Teacher Metaphors (Chinese Version).....	217
Appendix B: Pilot study II.....	218
B1: Questionnaire for Selecting Features (German Version).....	218
B2: Questionnaire for Selecting Features (Chinese Version).....	219
Appendix C: The Screenshots of the Experiment .....	220
C1: German Version .....	220
C2: Chinese Version .....	239
Appendix D: Documentation of Statistical Data .....	258
D1-1: Affective Impression-SAM Ratings .....	258
D2: Conceptual Representation - Feature Analysis .....	266
D3: Suitability of Three Teacher Metaphors.....	272
Appendix E: Documentation of a Relevant Study .....	278
E1: The Screenshots (German Version) .....	278
E2: The Screenshots (Chinese Version).....	284
E3: Results of the SAM Ratings.....	290
E4: Results of the Feature Ratings .....	296

## Chapter 1 Introduction

<sup>10</sup> The disciples came to him and asked, "Why do you speak to the people in parables" <sup>11</sup>He replied, "The knowledge of the secrets of the kingdom of heaven has been given to you, but not to them. ...<sup>13</sup>This is why I speak to them in parables: "Though seeing, they do not see; though hearing, they do not hear or understand. (Matthew 13, New International Version)

Parables are extended metaphors (see e.g., Wilder, 1964). The above quote shows that Jesus Christ deliberately packed the secrets of the kingdom of heaven into metaphorical language so as to hide them from the outsiders and at the same time make them known to his disciples. At first sight, the theme of the verse seems to be irrelevant to this work. Nevertheless, apart from its religious essence, the verse itself reveals two rarely studied but innate aspects of comprehending metaphorical language. First, not all metaphors can be understood by all people with the same ease. For certain metaphors, a plausible interpretation is not at all possible unless its blurring background is well clarified<sup>1</sup>. Thus, some people get completely lost in pursuing the meaning of a metaphor, whereas others may find its meaning so obvious that it does not even deserve a second thought. Second, metaphors are used to communicate messages for certain purposes. Therefore, its meaning can only be entirely derived in the communicative context in which the metaphor is generated.

These two aspects reveal a crucial point: the comprehension of a metaphor is not a static process. Depending on how much relevant information people know and how well they perceive the context in which a metaphor arises, metaphor comprehension is a dynamic process which may differ from person to person and from situation to situation. In this thesis, this point is to be held tightly as a fateful thread to guide me out of the labyrinth<sup>2</sup> and secures my way throughout several hot debates and controversial views in current cognitive researches of metaphor comprehension.

### What Is a Metaphor?

Metaphor can be easily found in literature, such as the famous line from Shakespear's *As You Like It* spoken by Jaques (Act II, Scene VII, lines 139), "*all the*

---

<sup>1</sup> Later, Jesus explained to his disciples literally what he meant by "the seed dropped by the wayside", "the seed which went on the stones", "the seed which was dropped among the stone" and "the seed which was put in good earth". (see Mathew 13).

<sup>2</sup> "In Greek mythology, the Labyrinth was an elaborate structure constructed for King Minors of Crete at Knossos and designed by the legendary artificer Daedalus to hold the Minotaur, a half-man, half-bull creature that was eventually killed by the Athenian hero Theseus. Daedalus had made the Labyrinth so cunningly that he himself could barely escape it after he built it. Theseus was aided by Ariadne, who provided him with a fateful thread, literally the "clew" or "clue", to wind his way back again." (cited from <http://en.wikipedia.org/wiki/Labyrinth>)

*world's a stage...<sup>3</sup>* Here, the *world* is compared to a *stage*, *men and women* to *players*, and *people's life* to a *play*. Even *the seven stages of a man's life* are labelled as *infant*, *school-boy*, *lover*, *soldier*, *justice*, *pantaloon*, and *the second child*.

However, a metaphor does more than merely arouse feelings and images on people's mind. Its aliveness and magic power are beyond its abundant usage in literature. A metaphor can be used to communicate abstract scientific ideas, conceptualize complicated scientific problems, and influence the ways in which the problems are approached (Garfield, 1986). For instance, Gigerenzer and Goldstein (1996) have explored how *mind* is metaphorically conceptualized as *computer* and what is its impact on psychological theorizing. Moreover, the physician William Harvey's (1578-1657) conceptualization of *the movement of blood in the body* as "*motion as it were, in a circle*" (Garfield, 1986: 318) was later developed into the blood-circulation theory in physiology. Another famous example is that the image of a *snake biting its own tail* from the chemist August Kekulé's dream helped him to conceptualize *the arrangement of atoms in the benzene ring* and formulate its chemical structure.

Further, not only do the intellectuals living in an ivory tower or geniuses use metaphors as was once believed by Aristotle. Actually, ordinary people consciously and unconsciously speak and think metaphorically every day. When someone says, *my mind is running out of steam* or *my mind breaks down*, he or she is unconsciously using a *machine* to conceptualize *the mind*.

Wherever metaphor is used, whether in literature, in science or in daily life, whatever purpose it serves, whether to initiate rich emotions, to facilitate the understanding of complicated abstract things or to establish intimacy between people,

---

<sup>3</sup> The full passage is, "All the world's a stage,/ And all the men and women merely players;/ They have their exits and their entrances;/ And one man in his time plays many parts,/ His acts being seven ages. At first the infant,/ Mewling and puking in the nurse's arms;/ And then the whining school-boy, with his satchel/ And shining morning face, creeping like snail/ Unwillingly to school. And then the lover,/Sighing like furnace, with a woeful ballad/ Made to his mistress' eyebrow. Then a soldier,/Full of strange oaths, and bearded like the pard,/ Jealous in honour, sudden and quick in quarrel, /Seeking the bubble reputation/Even in the cannon's mouth. And then the justice,/ In fair round belly with good capon lin'd,/ With eyes severe and beard of formal cut,/ Full of wise saws and modern instances;/And so he plays his part. The sixth age shifts/ Into the lean and slipper's pantaloons, / With spectacles on nose and pouch on side;/ His youthful hose, well sav'd, a world too wide/ For his shrunk shank; and his big manly voice,/Turning again toward childish treble, pipes/ And whistles in his sound. Last scene of all, / That ends this strange eventful history,/ Is second childishness and mere oblivion;/Sans teeth, sans eyes, sans taste, sans everything." — Jaques (Act II, Scene VII, lines 139-166)

it usually takes the form or can be reduced to the form of an A is a B. In fact, metaphor is the understanding of a concept A in terms of a concept B.

### Historical Accounts of Metaphor

Metaphor derives from the ancient Greek word 'metapherein', which means transfer. The first extended analysis of metaphors can be traced back to Aristotle. He has claimed that a metaphor is intellectually superior to normal language and stressed its peculiar power and value in rhetoric terms:

But the greatest thing, by far, is to be a master of metaphor. It is the one thing that cannot be learnt from others, and it is also a sign of genius since good metaphor implies an intuitive perception of similarity of dissimilars. Through resemblance, metaphor makes things clearer.

(Aristotle, Poetics: 1459a 4-5)

According to him, metaphor consists in giving the thing a name that belongs to something else and the transference occurs either (i) from genus to species, (ii) from species to genus, (iii) from species to species, or (iv) on grounds of analogy. (Aristotle, Poetics, 1457b: 6-9) Aristotle argued that the transference of the first three kinds will lead to simple metaphors, but the transference by analogy will result in the most complex ones<sup>4</sup>.

The rhetoric perspective<sup>5</sup> has dominated the study of metaphors for about 2000 years. In the 1930s, with the publication of *the Philosophy of Rhetoric*, Richards (1936) launched a breakthrough in viewing metaphors. He disagreed with the previous ornamental view of metaphors and argued that metaphor is an "omnipresent principle of language" and that "we cannot get through three sentences of ordinary fluid discourse without it." (1936: 92) He developed the interaction theory of metaphor, in which a metaphor is viewed as a meaning-creating process that results from the interaction of two meanings. Such a view goes beyond the former lexical level of metaphor study to the semantic level that concerns sentences, paragraphs and even the whole text.

Unfortunately, Richard's work was not taken seriously in his time. Twenty years later, Max Black published his article *Metaphor*, which was considered by Johnson (1981) as a landmark for understanding recent work on the subject. Black (1979)

---

<sup>4</sup> The transference based on analogy is close to the modern comparison theory. For instance, Gentner and Gentner (1983) argued that metaphors are analogies.

<sup>5</sup> In Chinese tradition, metaphor has long been regarded as a basic rhetorical device that is crucial to expressing emotions, describing scenes and demonstrating spiritual inspirations. Reacting to the recent enthusiastic study of metaphor in the west, Chinese scholars such as Shu Ding fang (2000) also expressed interest in studying the nature, the function, the production and the mechanisms of metaphors.

formulated the interaction view of metaphor, in which a metaphor consists of the literal primary subject, the metaphorical secondary subject, and the so-called system of commonplace, namely the further ideas and beliefs associated with the primary and secondary. A metaphor involves the interaction of these two domains, which enables the transference of the associated ideas and implications of the secondary domain or system to the primary system.

Meanwhile, the pragmatic study of metaphor emerged. Searle (see e.g., 1979) developed pragmatic inferences by which the metaphoric utterance meaning can be construed out of the sentence meaning. Grice (see e.g., 1979, 1989) claimed that an utterance is only recognized metaphorically so far as the literal interpretation fails. Levinson (1983) added that the interpretation of metaphor must rely on features of our general ability to reason analogically.

In 1980, Lakoff and Johnson published *Metaphor We live by*, in which they amassed abundant linguistic examples uttered by ordinary people. They showed that metaphor is a pervasive phenomenon in people's everyday language and that numerous metaphorical expressions based on certain conceptual metaphors are unconsciously used so naturally that few people even realise their metaphorical nature any more. These include the spatial and orientational metaphors, (e.g., *my income rose last year, the stock market fell yesterday...*), ontological metaphors (e.g., *my mind is now running out of steam*), structural metaphors (e.g., *argument is war*) and so forth.

Lakoff and Johnson's work shows that metaphors are no longer merely a rhetoric device to show off swordplay skills in linguistic expressions, but are a basic conceptual tool to model cognitively our experience and view of the world cognitively. According to them, people's conceptual system is metaphorical in nature. Further, they also argued that metaphors are fundamental not only for people's language, but also for their thinking and action. Such an argument is well supported by the pervasiveness or ubiquity of metaphors in academic and daily communication. Graesser et al.'s (1989) analysis of a television program shows that a unique metaphor appears for every 25 words as uttered by a speaker. Likewise, the use of metaphor is omnipresent in politics (see e.g., Mio, 1996, 1997; Mio et al., 2005; Müller, 2005), in sciences (see e.g., Gentner and Grudin, 1985; Hoffman, 1980; Kuhn, 1979; Roediger, 1980; Sternberg, 1995), in organisation theory (see e.g., Morgan, 1986), in teaching and coaching (see Carlson, 2001; Gassner, 1999) and so on .

Currently, the cognitive perspective inherited from Lakoff and Johnson has sparked a profound interest of modern metaphor research in cognitive psychology (see e.g., Bowdle and Gentner, 2005; Gentner, 1988; Gibbs, 1994; Glucksberg and Keysar, 1990; Tourangeau and Sternberg, 1982 ), cultural anthropology (see e.g., Emantatian, 1995; Quinn, 1991; Strauss and Quinn, 1997), cognitive linguistics (see e.g., Fauconnier and Turner, 2000, 2002; Kövecses, 2000, 2005), communication (see e.g., Wilson and Carston, 2006), artificial intelligence (see e.g., Veale, 1997; Way, 1991) and so on.

### **Objectives of the Research**

The following four questions are central in all metaphor researches: What is the nature of a metaphor? What are the functions of a metaphor? How does metaphor comprehension work? What kind of cognitive mechanisms are involved in a metaphor?

From the cognitive psychological perspective, this work deals especially with the third and the fourth questions, namely how a metaphor is understood and how it works. The investigation of the two questions in this field is not new, as various aspects have already been addressed by a large number of theoretical and empirical cognitive psychological studies (see e.g., Bowdle and Gentner, 2005; Coulson and Matlock, 2001; Gentner and Clament, 1988; Gibbs, 1994; Glucksberg and Keysar, 1990; McGlone and Manfredi, 2001; Nayak and Gibbs, 1990; Nueckles and Janetzko, 1997; Ortony, 1985; Tourangeau and Sternberg, 1982; Wolff and Gentner, 1992, etc).

It is not hard to notice several controversial issues in a systematic review of these cognitive studies of metaphor comprehension. Concerning the comparison between comprehending metaphors and literal statements, some studies have shown that the comprehension of metaphors takes longer (see e.g., Gerrig Healy's experiments, 1983) and creates more costs (see e.g., Noveck et al., 2001) than reading literal statements, whereas other studies have suggested that metaphors do not necessarily take longer to comprehend than literal statements (e.g., Cacciari and Glucksberg, 1994; Gibbs, 1994, 2001; Martin, 1994; Rumelhart, 1979; Shinjo and Meyer, 1987); Concerning the cognitive mapping mechanism involved in processing a metaphor, some empirical results support the comparison view (see e.g., Gentner, 1987), others support the categorization view (Glucksberg and Keysar, 1990), the interaction view (see e.g., Tourangeau and Sternberg, 1982), the integration view (Coulson and Matlock, 2001) or the synthetical view of comparison and

categorization (see e.g., Bowdle and Gentner, 2005; Utsumi, 2006). Concerning the factors affecting metaphor comprehension, some studies have highlighted context (see e.g., Cacciari and Glucksberg, 1994; Gibbs, 1994, 2001; Lemaire and Bianco, 2003); others emphasized conventionality (see e.g., Bowdle and Gentner, 2005; Jones and Estes, 2006), aptness (see e.g., Chiappe et al., 2003) or interpretive diversity (see e.g., Utsumi, 2006).

Just like *the parable of the blind men and the elephant*<sup>6</sup>, every single study mentioned above seems to have touched one part of the truth, but a complete picture of metaphor comprehension still needs to be reconstructed. To find a clue for the reconstruction work, it is helpful to further explore a chain of questions. Why are there so diverse ideas on metaphor comprehension? What cause such diversity? Why does some empirical evidence support the comparative theory to explain metaphor comprehension, but other evidence shows that metaphor comprehension could be explained by categorization? Does the discrepancy among the various empirical findings result merely from the different types of metaphors that they studied or are those empirical findings affected by the context in which the metaphors are provided or some other factors? Is it possible to synthesize these different views of metaphor mappings? If it is possible, what is the key point for such a synthesis? Is the comprehension of a metaphor a static process, involving the same routine and more or less similar cognitive mechanisms, or is it a dynamic one in which the cognitive

---

<sup>6</sup> The well-known Indian tale, *the Parable of the Blind Men and the Elephant* was recorded in *Jainism and Buddhism. Udana* 68-69. The text is presented here. A number of disciples went to the Buddha and said, "Sir, there are living here in Savatthi many wandering hermits and scholars who indulge in constant dispute, some saying that the world is infinite and eternal and others that it is finite and not eternal, some saying that the soul dies with the body and others that it lives on forever, and so forth. What, Sir, would you say concerning them?" The Buddha answered, "Once upon a time there was a certain raja who called to his servant and said, 'Come, good fellow, go and gather together in one place all the men of Savatthi who were born blind... and show them an elephant.' 'Very good, sire'" replied the servant, and he did as he was told. He said to the blind men assembled there, 'Here is an elephant' and to one man he presented the head of the elephant, to another its ear, to another a tusk, the foot, back, tail, and tuft of the tail, saying to each one that was the elephant. When the blind men had felt the elephant, the raja went to each of them and said to each 'Well, blind man, have you seen the elephant? Tell me, what sort of thing is an elephant?' There upon the men who were presented with the head answered, 'Sire, an elephant is like a pot.' And the men who had observed the ear replied 'An elephant is like a winnowing basket.' Those who had been presented with a tusk said it was a ploughshare. Those who knew only the trunk said it was a plough; others said the body was a grainery; the foot, a pillar; the back, a mortar; the tail, a pestle; the tuft of the tail, a brush. Then they began to quarrel, shouting. 'Yes it is!' 'No, it is not!' 'An elephant is not that!' 'Yes, it's like that!' and so on, till they comes to blow over the matter. Brethren, the raja was delighted with the scene. Just so are these preaches and scholars holding various views blind and unseeing... In their ignorance they are by nature quarrelsome, wrangling, and disputation, each maintaining reality is thus and thus. " Then the Exalted One rendered this meaning by uttering this verse of uplift: O how they cling and wrangle, some who claim/ For preacher and monk the honoured name! / For quarrelling, each to his view they cling./ Such folk see only one side of a thing.

mechanisms employed for processing a metaphor vary from person to person and from situation to situation? If the processing of metaphors is a dynamic one, what is the cognitive force that drives the dynamics in comprehending a metaphor, or put another way, why do people use different cognitive mechanisms to comprehend the same metaphor?

Looking for the solutions to these questions is the primary motivation for conducting this research. In other words, the objective of this work is to investigate experimentally the factors that affect metaphor comprehension and at the same time seek a plausible theoretical explanation to why and how these factors affect the cognitive processing of a metaphor.

### **Structure of the Thesis**

The thesis is divided into three parts. The first part includes a critical review of six cognitive metaphor theories and a sketch of the current cognitive researches on metaphor comprehension. In this theoretical part, several important terms for this work, like “topic” and “vehicle” are carefully selected. By reviewing the important research findings on metaphor comprehension, three open issues<sup>7</sup> are raised.

To address these open issues, the empirical part starts with raising the research hypothesis: the cognitive processing mechanisms for comprehending a metaphor are largely influenced by the addressees’ pre-existing conceptual knowledge as reflected in their estimation of conventionality and aptness of the metaphor and the communicative context in which the metaphor arises. In this part, a detailed experimental design and procedure illustrate how this cross-cultural experiment “Comprehending Teacher Metaphors in Virtual Communicative Context” was designed and implemented through the Internet. The multivariate analysis of the SAM ratings and the network analysis and the cluster analysis of the feature ratings given by the German and the Chinese subjects were presented and discussed.

The third part provides a general discussion. Based on the empirical findings, a dynamic view of metaphor comprehension is established that addresses which steps the comprehension of a metaphor generally takes, what kind of role that context plays in metaphor comprehension, and how the metaphor addressee’s view of the conventionality and the aptness of a metaphor in a specific context influences the complexity of the mapping mechanism for processing the metaphor. This dynamic

---

<sup>7</sup> Open issues refer to the issues that are rarely studied but also controversial.

view is then applied to analyze how the Chinese and the German subjects comprehend the teacher metaphors provided in the online experiment. The final section sums up conclusive remarks, delivers critical comments of the study, and motivates the agenda for follow-up cognitive studies on metaphor comprehension.

## Chapter 2 Theories of Metaphor Comprehension

The conceptual metaphor theory founded by Lakoff and Johnson in 1980 has initiated enthusiasm and discussions of metaphors at the cognitive level. Among the six cognitive theories to be introduced in this chapter, Lakoff and Johnson's conceptual metaphor theory, and Fauconnier's conceptual blending theory are two cognitive linguistic theories. Gentner's structure mapping theory, Ortony's interaction theory, Tourangeau and Sternberg's geometric metaphor theory and Glucksberg and Keysar's categorization theory are four cognitive psychological metaphor theories.

In theorising metaphors, different schools have adopted different terms or notions to discuss the two halves of a metaphor. Richards (1936) named them as 'tenor' and 'vehicle'. The 'tenor' is actually the subject of a metaphor or the underlying idea and the 'vehicle' is the means used to convey it in a metaphorical way. For instance, in the metaphor *men are wolves*, *men* is the tenor and *wolves* is the vehicle. This pair of technical terms or their variations, like Gentner's (1983) 'base' and 'vehicle', or Ortony's (1979) 'topic' and 'vehicle', have been favoured by a number of metaphor researchers (e.g., Glucksberg and Keysar, 1990; Tourangeau and Sternberg, 1982; Way, 1991). Moreover, 'ground' is another term often used with the 'tenor' and the 'vehicle'. The 'ground' refers to the set of features shared by the 'tenor' and the 'vehicle' in a metaphor.

Other alternative formulations are 'subject' and 'modifier' (see e.g., Beardley, 1958; Miall, 1979) or 'primary subject' and 'secondary subject' (Black, 1962). In addition, Black (1979) introduced another set of terms, namely 'frame' and 'focus'. The 'focus' refers to those words used metaphorically and the 'frame' refers to those remaining literal words in a sentence.

Lakoff and Johnson (1980a) have introduced another widely used pair terms 'source domain' and 'target domain'. The 'source domain' refers to the conceptual domain from which the metaphorical mapping is drawn and the 'target domain' refers to the conceptual domain to understand. To avoid the strong reference of direction as suggested by the 'source' and the 'target', cognitive linguists Fauconnier and Turner (1998, 2002) used a comparatively neutral term, namely 'input spaces' to refer to both the 'source' and the 'target'.

Since most cognitive psychologists have used the terms 'topic (tenor)' and 'vehicle' in discussing metaphors (see e.g., Glucksberg and Keysar, 1990; Tourangeau and Sternberg, 1982), this work follows this tradition and adopts the 'topic' and the

'vehicle' to refer to the two halves of a metaphor<sup>8</sup>. However, in the review of the cognitive metaphor theories, the original terminologies used by the founders of each metaphor theory are used. The review of each theory includes an objective description of their tenets, notions and critics in separate texts. At the end of this chapter, a brief summary of those cognitive theories of metaphor is presented in a table.

## 2.1 Conceptual Metaphor Theory

In 1980, cognitive linguists Lakoff and Johnson published their famous book *Metaphor We Live by* and established the conceptual metaphor theory, sometimes called cognitive metaphor theory. With continuous development and elaboration (Evans and Green, 2006; Gibbs, 1994; Kövecses, 2002, 2005; Lakoff, 1993), the CMT has become one of the most influential contemporary metaphor theories.

The fundamental tenet of the CMT is that metaphors are pervasive in our everyday thought and action. Lakoff and Johnson (1980a: 3) argued, "our ordinary conceptual system, in terms of what we both think and act, is fundamentally metaphorical in nature." Lakoff and Johnson's assertion raised interests in studying metaphors no longer as novel poetic expressions, but as vital conceptual phenomena in the scope of human cognition reflected in people's everyday language. They once wrote, "[t]he locus of metaphor is not in language at all, but in the way we conceptualize one mental domain in terms of another." (Lakoff, 1993: 203)

According to the CMT, the nature of metaphor is perceived in association with people's conceptual system. Lakoff argued, "[m]etaphor is the main mechanism, through which we comprehend abstract concepts and perform abstract reasoning." (1993:203) It is the conceptual system that makes it possible to have abstract reasoning work in a more concrete and highly structured way. In his original words, "metaphor allows us to understand a relatively abstract or inherently unstructured subject matter in terms of a more concrete or at least a more highly structured subject matter." (1993: 244)

---

<sup>8</sup> In the dynamic view of metaphor comprehension constructed in Chapter 5, the *topic space* and the *vehicle space* refer respectively to the areas of the topic or the vehicle associated information as activated in people's memory when they comprehend metaphors. The term '*feature*', instead of 'predicate', 'property', or 'attribute' as applied by various metaphor theories, is used in this work to describe the specific entities mapped or transferred from the vehicle to the topic. Other relevant notions for the dynamic view of metaphor comprehension, such as contextual metaphoric assumption, are to be defined in Chapter 5.

In this part, several important notions of the CMT, such as conceptual metaphor, image schema, embodiment, mapping and invariance principle are explored with concrete examples. In the end, a number of critics and new development of the CMT are presented to provide an updated view of the CMT.

### 2.1.1 Conceptual Metaphor

Conceptual metaphors are different from metaphorical expressions. Actually, metaphorical expressions are the surface manifestation of conceptual metaphors. One conceptual metaphor can be reflected in a number of metaphorical expressions. In Lakoff's article (1993: 207) "The Contemporary Theory of Metaphor", ten different everyday metaphorical expressions of the conceptual metaphor *Love is a journey* are listed as follows:

- Look how far we've come.
- It's been a long bumpy road.
- We can't turn back now.
- We are at a crossroads.
- We may have to go our separate ways.
- The relationship is not going any where.
- We are spinning our wheels.
- Our relationship is off the track.
- The marriage is on the rocks.
- We may have to bail out of the relationship.

Obviously, the ten metaphorical expressions are not ten conceptual metaphors. In fact, they all mirror the same conceptual metaphor *Love is a journey* and reflect the way of describing or experiencing *love* in the way of a *journey*. As Lakoff himself explained,

If metaphors were just linguistic expressions, we would expect different linguistic expressions to be different metaphors. Thus, 'We've hit a dead end street' would constitute one metaphor. 'We can't turn back now' would constitute another, quite different metaphor 'Their marriage is on the rocks' would involve a still different metaphor. And so on for dozens of examples. Yet we do not seem to have dozens of different metaphors here, we have one metaphor, in which love is conceptualized as a journey. (Lakoff, 1990: 50)

A conceptual metaphor typically involves "a source domain, a target domain and a source-to-target mapping" (Lakoff, 1987a: 206). The source domain is the domain from which the metaphorical mapping is drawn to the conceptual domain of the target. In *Metaphor We Live by*, Lakoff and Johnson (1980a) introduced three types of conceptual metaphors:

- **Oriental Metaphors:** As its name suggests, orientational metaphors have to do with spatial orientation: up-down, in-out, front-back, on-off, deep-shallow,

central-peripheral. Orientational metaphors help us to understand a concept from the bodily orientation. Taking the up-down dimension as an example, a group of concepts can be well conceptualised through the up-down orientation:

- HAPPY IS UP; SAD IS DOWN e.g.: I'm feeling up. My spirit sank.
- CONSCIOUS IS UP; UNCONSCIOUS IS DOWN e.g.: Wake up. He sank into a coma.
- HEALTH AND LIFE ARE UP; SICKNESS AND DEATH ARE DOWN e.g.: He is at the peak of his health. He is sinking fast.
- HAVING CONTROL or FORCE IS UP; BEING SUBJECT TO CONTROL or FORCE IS DOWN e.g.: His power rose. He is low man on the totem pole.
- MORE IS UP; LESS IS DOWN e.g.: My income rose last year. His income fell last year.
- FORESEEABLE FUTURE EVENTS ARE UP e.g.: I am afraid what's up ahead of us.
- HIGH STATUS IS UP; LOW STATUS IS DOWN e.g.: He has a lofty position.
- GOOD IS UP; BAD IS DOWN e.g.: Things are looking up. Things are at an all-time low.
- VIRTUE IS UP; DEPRAVITY IS DOWN e.g.: He is high-minded. That was a low-down thing to do.
- RATIONAL IS UP; EMOTIONAL IS DOWN e.g.: The discussion fell to the emotional level, but I raised it back up to the rational plane. (see Lakoff and Johnson, 1980a : 15)

- **Ontological Metaphors:** Ontological metaphors are based on our physical experiences with physical objects. In this way, a number of events, activities, emotions, abstract ideas, and so forth are conceptualized as entities and substance which can be much better categorized, grouped, identified, referred and quantified. Three examples from Lakoff and Johnson (1980a: 25-33) are provided here:

- INFLATION IS AN ENTITY e.g., Inflation is backing us into a corner.
- THE MIND IS A MACHINE e.g., My mind is now running out of steam.
- EVENTS, ACTIONS, ACTIVITIES and STATES ARE ENTITIES: He is out of the race now.

- **Structural metaphors:** Structural metaphors are considered by Lakoff and Johnson as a very important type of conceptual metaphors. They are grounded in systematic correlations within people's experience. Usually, they allow people to conceptualise an abstract concept in another more concretely structured subject. According to Lakoff and Johnson (1980a: 61), "structural metaphors allow people to do much more than just orient concepts, refer to them, quantify them, etc., as we do with simple orientational and ontological metaphors; they allow people, in addition, to use one highly structured and clearly delineated concept to structure another." The most famous example is *Argument is war* (Lakoff and Johnson,

1980a: 81), which allows people not only to conceptualize what a rational argument is in terms of a physical conflict, which they understand more readily, but also to implement in their arguing practice their knowledge and experience of a physical combat.

In conclusion, the notion of the conceptual metaphor frees metaphor research from the restriction of merely rhetorical or philosophic discussion and enables it to be further anatomized by the cognitive scientists. A conceptual metaphor is not a single metaphorical expression but a metaphor that underlies a system of related metaphorical expressions that appear on the linguistic surface. Conceptual metaphors can be defined as understanding one conceptual domain in terms of another conceptual domain. Typically, a more concrete or physical concept is employed as a source concept to understand a more abstract concept, or the so-called target concept. According to Lakoff and Johnson, such a process is usually unidirectional because it always goes from the more concrete to the more abstract, and not the other way around.

### 2.1.2 Image Schemata and Embodiment

Another important notion for the CMT is the so-called image schema, or embodied schema, which was first introduced by Johnson in 1987. The image schema itself is not metaphorical, but it is closely related to the source domains of most conceptual metaphors.

It is important to notice that the notion image schema used in the CMT is different from schema, a concept which has been widely used in cognitive science (Barlett, 1932; Neisser, 1976; Rumelhart, et al., 1986)<sup>9</sup>. According to Johnson, image schemata exist in a continuous, analogical fashion in people's conceptual system. They are "recurrent pattern or regularities in or of the ongoing ordering activities" (1987: 29). Most of those patterns emerge as meaningful structures for people chiefly at the level of their bodily movements through space, their manifestations of objects, and their perceptual interactions. Here two image schemata *path* and *container* are taken as examples (Lakoff and Jonson, 1980a). According to the common experience, the image-schema *path* has a starting point and an end. In the metaphor *The career is a path*, *career* is conceptualized as a directional road, which has a start

---

<sup>9</sup> Barlett (1932) first proposed the concept schema/schemata in explaining why people tend to recall detail stories that were not actually there. According to Rumelhart, et al. (1986), a schema is data structure for representing the generic concepts stored in memory. That means, schemata are derived from prior experience or knowledge.

and an end. Likewise, *container* is a cylinder-like object, with the possibility to open and close, to fill in and pour out. When *container* is employed as an image schema to describe one's life, one can come up with a sentence like '*My life is crammed with miseries*'.

Like *path* and *container*, a number of other image schemata were also listed out by Johnson (1987: 126), such as *balance*, *compulsion*, *blockage*, *counterforce*, *restraint*, *removal*, *enablement*, *attraction*, *mass-count*, *link*, *center-periphery*, *cycle*, *near-far*, *scale*, *part-whole*, *merging*, *splitting*, *full-empty*, *matching*, *superimposition*, *iteration*, *contact*, *process*, *surface*, *object*, and *collection*. It is also interesting that many image schemata exist not as exclusive entities, "but are often linked together to form very natural relationships through different image schema transformation" (Johnson, 1987: 440), for instance the *path-focus* to the *end-point focus*.

Since image schemata are greatly related to people's concrete experiences, Lakoff and Johnson (1999) conceived that the nature and the existence of image schemata depend on embodiment. With the notion 'embodied mind', they claimed that people's mind is inherently embodied. In the following citation, a general explanation is given:

Reason is not disembodied, as the tradition has largely held, but arises from the nature of our brains, bodies, and bodily experience. This is not just the innocuous and obvious claim that we need a body to reason; rather, it is the striking claim that the very structure of reason itself comes from the details of our embodiment. The same neural and cognitive mechanisms that allow us to perceive and move around also create our conceptual systems and modes of reason. Thus, to understand reason we must understand the details of our visual system, our motor system, and the general mechanisms of neural binding. In summary, reason is not, in any way, a transcendent feature of the universe or of disembodied mind. Instead, it is shaped crucially by the peculiarities of our human bodies, by the remarkable details of the neural structure of our brains, and by the specifics of our everyday functioning in the world. (Lakoff and Johnson, 1999: 4)

In the citation above, Lakoff and Johnson (1999) pointed out that both the operations of our body and the brain process are crucial for the structure of people's conceptual system, which is directly grounded in perception, body movement, and experience of a physical and social character.

-thought is embodied, in that the structures used to put together our conceptual system grow out of bodily experience and makes sense in terms of it. Moreover, the core of our conceptual systems is directly grounded in perception, body movement, and experience of a physical and social character.

-thought is imaginative, in that those concepts which are not directly grounded in experience employ metaphor, metonymy and mental imagery - all of which go beyond the literal mirroring, or representation of external reality.

-thought has gestalt properties and is thus not atomistic; concepts have an overall structure that goes beyond merely putting together conceptual "building blocks" by general rules. (Lakoff, 1987: 5)

Just as Rohrer (2001: 28) commented, “[t]he primary claim of their position is that these metaphors and the directionality are not arbitrary, but instead are a natural outgrowth of the manner in which our minds and brains constituted.” In other words, the conceptual system of people is influenced, constituted and constrained by the biological and anatomical characteristic of their body and brain. No wonder abstract ideas, like people’s ethical, philosophical, political and religious contemplations, are usually expressed in terms of the bodily domains.

Although the notion of embodiment is a later development of the CMT School, the idea itself came into being at the very start of the establishment of the CMT. According to Lakoff and Johnson (1980a:117), conceptual metaphors are mostly related to people’s experiential gestalts, which are based on the nature of their bodies, their interactions with the physical environment and their interactions with other people within their culture. Later, Johnson (1987) named these experiential gestalts as image schemata or embodied schemata.

In recent years, the phenomenon of body metaphors is taken as another argument for the ubiquity of embodied experience. (see e.g., Kövecses, 2002: 16; Yu, 2004: 677-678, 682) However, the idea of embodiment is central or closely connected to but not equal to the CMT. According to Goschler (2005:35), embodiment is on one hand more than but, on the other hand less than the CMT. Embodiment is clearly more than CMT because it offers much more as a framework to study the mind and explore how cognition evolves in general (Veale, Thompson and Rosch, 1991). It is a theory that overcomes the paradoxes of materialism and idealism by giving way to a philosophy of embodiment realism (Lakoff and Jonson, 1999). However, embodiment is less than the CMT also, because it does not necessarily claim that every conceptual metaphor is embodied.

### **2.1.3 Mappings and Invariance Principle**

At the very start of the CMT, Lakoff and Johnson employed the gestalt theory<sup>10</sup> to explain the mapping process:

In such mappings, the parts of one gestalt get mapped onto parts of other gestalts. As a result of such mappings, a gestalt may ‘inherit’ properties and inherent relations from a gestalt that it gets mapped onto. (Lakoff and Johnson, 1980b: 198)

---

<sup>10</sup> However, what Lakoff meant by ‘gestalt’ is different from what is meant by the gestalt psychologist. He himself explained, “first the term ‘gestalt’ as I am using it bears some relation to the concept of the same name used by gestalt psychologists of two generations ago, but obviously differs in many respects. Secondly it’s vague and meant to be.” (cited after Liebert, 1992: 46 )

In the metaphor A IS B, some of the dimensions of structure for B are imposed upon the gestalt for A, forming a complex gestalt. (Lakoff and Johnson, 1980 b: 203)

As an example, the conceptual metaphor *Love is a journey* actually involves understanding one domain of experience *love* in terms of a very different domain of experience *journey*. That is what Lakoff means by a mapping. In this example, the *love-as-journey* mapping is concretely described by Lakoff (1993: 207) as follows:

THE LOVE-AS-JOURNEY MAPPING

- The lovers correspond to travellers.
- The love relationship corresponds to the vehicle.
- The lover's common goals correspond to their common destinations on the journey.
- Difficulties in the relationship correspond to impediments to travel.

In this example, an ontological mapping is observed across two conceptual domains, namely from the source domain (of *journey*) to the target domain (of *love*). In this sense, a mapping involves the projection of items from one domain to another domain, or, in other words, from the so-called source domain to the target domain.

Lakoff has described four different types of mapping according to four general types of metaphors: complex schema mappings, image-schema mappings, one-shot rich image mapping, and Aristotle's metaphor. According to him, these four types of mapping are not mutually exclusive but commonly mixed:

-Complex schema mappings: These map complex schemas in one domain (e.g. war) into corresponding schemas in another domain (e.g., Argument). Each such mapping applies both to entities (the source ontology is mapped onto the target ontology) and relations holding among the entities (knowledge about the source is mapped onto knowledge about the target).

-Image-schema mappings: Image schemas are general topological and orientational structures that are kinaesthetic in nature. They have an analogy rather than digital character. And they have sufficient internal structure to permit inferences. Examples include: containers, paths, linear scales, center-periphery, force, links, balance, contact/noncontact, cycles, front/back, etc. A great many conventional metaphors are based on such schemas. For example, purposes are understood metaphorically as destinations, and achieving a purpose is understood as travelling along a path to that destination.

-One-shot rich-image mappings: Consider the word *dunk* as applied to (i) to cookies and milk, donuts and coffee, etc. and (ii) to basketball. There is a conventional rich image for cases like (i) it involves a hand putting a piece of food through the rim of a cup or glass into liquid. In (ii), a hand is putting a basketball through the rim of the basket. There is a partial mapping from the image in (i) to the image (ii). The extension of the word *dunk* from food to basketball is a metaphorical extension based on this mapping from one conventional image to another. This is a 'one-shot' mapping. That is, there is no system of concepts being mapped. The mapping sanctions the lexical extension of only one word.

-Aristotle's metaphor: this is a single, very general metaphor of the following form: SOMETHING IS WHAT IT HAS SALIENT PROPERTIES OF. It relates entities in one domain to entities in another domain, on the basis of common properties. Unlike other general metaphorical mappings, which have fixed domains, this general metaphor seems to have variable domains. It is this metaphor that gives rise to relatively boring cases like *man is a wolf*, *Harry is a pig*, etc. , which are unfortunately the

cases most cited in the classical metaphor literature. Oddly enough, little of systematic nature is known about this metaphor (e.g., whether there are restrictions on its domains). (Lakoff, 1987: 194)

The invariance principle has been employed by Lakoff to explain the mechanism of the mapping process from the source domain to the target domain. The invariance principle is defined as “the metaphorical mappings preserve the cognitive topology (that is, the image-schema structure) of the source domain in a way consistent with the inherent structure of the target domain.” (Lakoff, 1990: 54) According to him, the invariance principle highly emphasizes the consistency between the image-schema structure of the source domain and the inherent structure of the target domain.

However, the invariance principle should not lead us to the misunderstanding that mappings start with source domain structure and wind up with target domain structure. In other words, mappings are not simple copies from the source domain onto the target domain. In its nature, the invariance principle explains the constraints of possible mappings on fixed correspondence. This means that source domain interiors correspond to the target domain interiors. As a consequence, the image-schematic structure of the target domain cannot be violated: One cannot find cases where a source domain interior is mapped onto a target domain exterior, or where a source domain exterior is mapped onto a target domain path. For the schema of *container*, as illustrated by Lakoff (1993), interiors are definitively mapped onto interiors, exteriors onto exteriors, and boundaries onto boundaries.

In 1993, Lakoff summarized his views on the mapping process governed by the invariance principle. According to him, the mappings do not occur arbitrarily but depend on people’s everyday experience and knowledge. Both the conceptual mappings and image mappings obey the invariance principles. A conceptual system typically contains a number of conventional metaphorical mappings. The image-schema structure of the source domain is mapped onto the target domain in a way that is consistent with its inherent structure. Of course, such mappings are not always symmetric and complete; in most cases, they are asymmetric and partial.

#### **2.1.4 Critics**

In summary, the CMT has changed the tradition of studying metaphors from rhetorical language perspective to enthusiasm in exploring metaphors from the cognitive perspective. According to the CMT, our thought and action is underlain by the conceptual system that is metaphorical in nature. In order to illustrate this point,

Lakoff and Johnson (1980a) introduced the notion of the conceptual metaphor, defined as the mapping of the source domain onto the target domain. The mapping process is guided by the invariance principle, which emphasizes the consistency between the source domain and target domain and helps to constrain and direct the between-domain correspondences. In addition, the embodiment hypothesis emphasizes that metaphors are mostly based on correspondences in our experiences rather than on similarity and that people's metaphor systems are central to their understanding of experience and to the ways they act on this understanding. (Lakoff, 1993) It cleans up the way for them to understand how image schemata, which are comparatively more concrete patterns of the source domain, are employed to understand more abstract target domains.

Despite its distinguished position as the most influential contemporary theory of metaphor, the CMT has also been strongly criticized over the years by researchers from various disciplines. The major criticisms come from Alverson (1991), Quinn (1991), and Geeraerts and Grondelaers (1995) who argued that the CMT does not take enough consideration of the cultural heritage of metaphors. Further, Murphy (1996) also attacked the CMT for its lack of empirical evidence. In the following part, some of the criticisms are presented in a brief way:

Quinn (1991) argued from the cultural anthropologist perspective that metaphors do not structure people's understanding as the CMT supposes but are chosen to "satisfy mapping onto already existing understanding". By employing eight metaphorical categories (*sharedness, lastingness, mutual benefit, compatibility, difficulty, effort, success/failure* and *risk*) in discussing marriage in American culture, she pointed out that those ideas are not imbedded in any single metaphor, although they are communicated through metaphors. These metaphors are preferred because they reflect the existent cultural beliefs or cultural models of marriage. In this sense, the understanding of a concept is driven by culture rather than by conceptual metaphors.

Murphy (1996) criticized Lakoff and Johnson for basing their CMT theory merely on linguistic evidence because such reliance is both equivocal and circular. Confirming the plausibility of the CMT requires more non-linguistic evidence. What the CMT school claimed as empirical evidence, such as the psycholinguistic experiments on idioms comprehension (Gibbs, 1993; Gibbs and O'Brien, 1990; Nayak and Gibbs, 1990) was also questioned by Murphy as unreliable evidence for the CMT. In

addition, Murphy also pointed out that the phenomena of multiple metaphors for a single domain is actually contrary to the spirit of the conceptual metaphor view. Furthermore, Murphy challenged the CMT theory by saying that it fails to explain why the arbitrary choice of metaphors in everyday speech and many of the metaphors that we use to describe the same concept are inconsistent with each other.

Gevaert (2001, 2005) found it hard to accept that the conceptualization of *anger* in *heat* is due to our actual physiology in anger as the CMT argues. According to her investigation through various corpora, the *heat-related anger* conceptualization changed considerably throughout time. Before 850 AD, only 1.58% of all words employed to describe *anger* were *heat-* related words. Between 850 AD and 959 AD, heat-related words describing *anger* dramatically increased in number. Then they decreased between 950 AD to 1050 AD to 6.22%, to 1.71% by around 1200 AD, and then to 1.36% by around 1300 AD. After 1300 AD, the number started to grow again. Those findings led her to question the embodiment hypothesis. According to the embodiment hypothesis, the conceptualization of *anger* in *heat* is a mechanical consequence of people's physiology in anger. Since people's physiology in anger does not change every hundred years, it is hard to explain how the constant physiology in anger can cause the unstable conceptualization of *anger*.

Although Zinken (2003, 2004) agreed with the CMT that metaphors are vital in people's conceptualization, he questioned the mono-directional causal chain assumed in CMT - from sensori-motor experience to image schemata to abstract concepts to linguistic expressions. He argued that this process actually reduces the human conceptualization to cognitive structures that all primates are capable of acquiring, namely simple schemas such as *path* or *container* (Zinken, 2003). He proposed paying more attention to the socio-cultural aspects of understanding metaphors. Therefore, he advocated using the view of the ethnolinguistic school of Lublin (ESL) to study metaphors. According to Zinken (2003, 2004), compared with the CMT, the ESL enjoys more advantages for studying conceptualization in action and for integrating metaphors as important aspects of conceptualization into a general framework of studying language and conceptualization.

Fauconnier and Turner (1998) criticized the CMT that its two-domain model is not sufficient to account for a good theory of the development of metaphorical mapping and instead proposed the conceptual integration for explaining the metaphorical mapping.

The two-domain model of metaphor (e.g., CMT) with its invariance principle is not a theory of the development of metaphoric mappings. In our view, the development of a conventional metaphoric mapping involves conceptual integration. In cases where useful inferences or structure have been projected from the blend to the target so that the mapping from source to target becomes thoroughly conventional, and the blend is no longer a working place, it is possible to overlook both blend and generic space.

(Fauconnier and Turner, 1998: 181)

Going with Fauconnier, Grady et al. (1999) further argued that the emergent property of the blend could hardly be explained by the CMT. “This emergent property of the blend cannot be captured so explicitly within a CMT style analysis focusing on correspondences and projections from source to target.” (Grady et al., 1999: 105)

On one hand, those criticisms have pointed out some weaknesses of the CMT. On the other hand, it is these critics who are providing insights for the new development of the CMT. Kövecses (2000, 2001 and 2005) suggested that an extended version of the CMT can successfully handle much of the criticism. According to him, the extended version of the CMT includes the following notions: a theory of metaphor variation, a three-level view of metaphor, the recognition of the bottom-up vs. top-down distinction and the notion of the meaning focus of the source domain.

## 2.2 Conceptual Blending Theory

Fauconnier and Turner have collaborated in establishing the conceptual blending theory (CBT), which is also known as the conceptual integration theory (see e.g. Fauconnier, 1997; Fauconnier and Turner, 1998, 2003). According to the CBT, metaphors are much more than a set of mappings between the source and the target domain as the CMT suggests.<sup>11</sup> The CBT involves four mental spaces including two input spaces, one generic space, and one blended space. Especially in the blended space, composition, completion and elaboration are used to integrate content from the input domains into the new structure. Thanks to the fresh air brought by the reformative conceptual integration theory, new insights have come to the study of metaphor comprehension. For instance, Coulson and Matlock (2001) regarded the metaphor comprehension as a complicated process, which not only involves the activation of conceptual structure in the input and generic spaces, but also the integration of conceptual structure in the blended space and the establishment of various projection among the spaces in the integrative network.

---

<sup>11</sup> Actually, the CBT rather viewed metaphor from a competing perspective along the CMT, as its tenet, the multiple mental spaces, the emergent structure directly attack the two-domain uni-directional frame of the CMT.

In this part, the network model of conceptual integration typically employed to analyse a metaphor is introduced. Then, the classic example *The surgeon is a butcher* is provided to show how emergent features can be achieved through *composition*, *completion* and *elaboration*. Finally, the optimality principle is illustrated.

### 2.2.1 The Network Model of Conceptual Integration

The conceptual integration network is central to the CBT. The network model is “concerned with on-line, dynamical cognitive work people do to construct meaning for local purposes of thought and action“ (Fauconnier and Turner, 1998: 141). It involves several mental spaces and their correspondences.

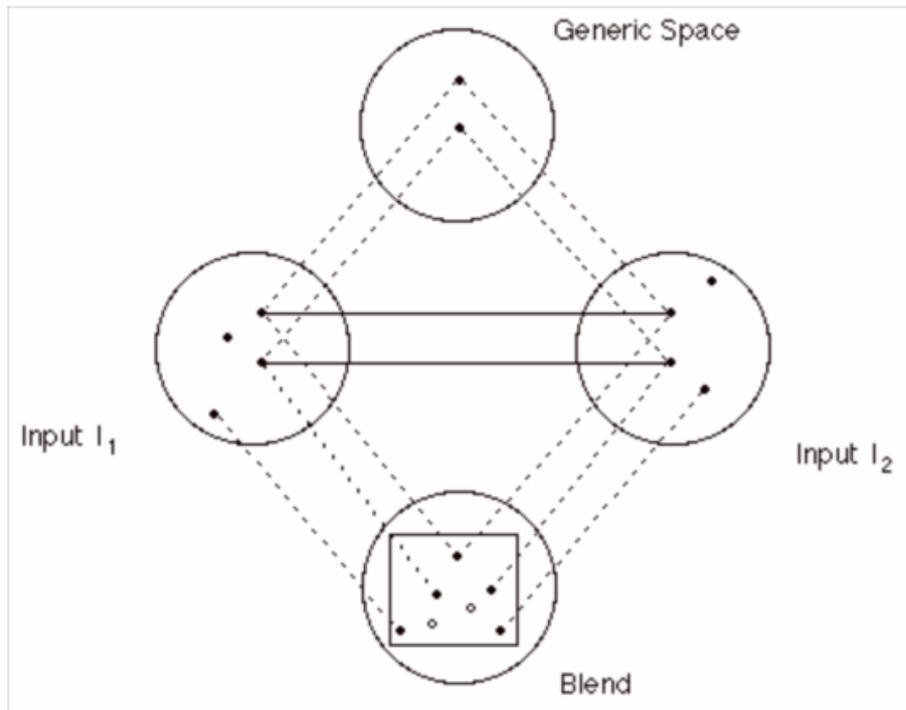
By applying the network model of the conceptual integration to analyzing metaphors, four mental spaces are concerned. The mental spaces are temporarily constructed based on more stable knowledge frames. Fauconnier and Turner (Fauconnier, 1988, 1994 and 1997) defined mental spaces as small conceptual packet constructs that people use in their thinking for purposes of local understanding and action.<sup>12</sup> Grady, Oakley and Coulson (1999) explained Fauconnier’s definition and regarded the mental spaces as partial and temporary representational structures, which speakers construct when they think or talk about a perceived, imaged, past, present, or future situation.

As illustrated in Figure 1, the four mental spaces include two input spaces, one generic space and one blending space. They are represented by the four large circles.

Two input spaces are mental spaces correspond to the “source” and “target” in the two-domain model provided in the CMT. The generic space represents the structure, including common elements, which are shared by and can be applied to both input spaces. Within the blended space, the structures and the elements of the two input spaces interact, fuse together, and are reconstructed in a special structure.

---

<sup>12</sup> In *The Way We Think*, Fauconnier and Turner even argued, “in the neural interpretation of the cognitive processes, mental spaces are sets of activated neuronal assemblies, and the [connections] between the elements correspond to the coactivation bindings of a certain kind.” (Fauconnier and Turner, 2002: 40)



**Figure 1: Network model of conceptual integration.**  
**(Fauconnier and Turner, 1998: 143)**

In Turner and Fauconnier's (1995) opinion, the blended space is both less and more than the two input spaces. It is less in the sense that it takes only partial structure from each of the two input spaces. It is more than the two because a frame, absent from both two input spaces, is reconstructed in the blended space.

In describing the network model of integration, Fauconnier and Turner (1998) mentioned three connections that can occur among mental spaces; they are *cross-space mapping of counterpart connections*, *blending* and *selective projection*. Cross-space mapping of counterpart connections refers to the element-to-element counterpart connections between the input spaces. Blending is special in that the structures from the two input spaces are projected to a third space and construct a new structure, which is impossible to attain within any of the two input spaces alone. As a matter of fact, not all elements from the inputs are projected to the blended area. Such a projection is rather partial and selective. As shown in Figure 1, the relations are represented by different types of lines. Solid lines represent the cross-space correspondence that constitutes the mapping between the input spaces, whereas the dotted lines represent the projection across spaces.

### 2.2.2 The Blending Process

The blended mental space mentioned in the last part is a genius idea of the conceptual integration theory. In this blended space, projection from both inputs are involved to construct a new conceptual structure, often referred to as the emergent structure derived from three cognitive operations namely *composition*, *completion* and *elaboration*:

Composition: Blending composes elements from the input space, providing relations that do not exist in the separate inputs. (...)

Completion: Blends recruit a great range of background conceptual structure and knowledge without recognizing it consciously. (...)

Elaboration: Elaboration develops the blend through imaginative mental simulation according to principles and logic in the blend. (Fauconnier and Turner, 1998: 144)

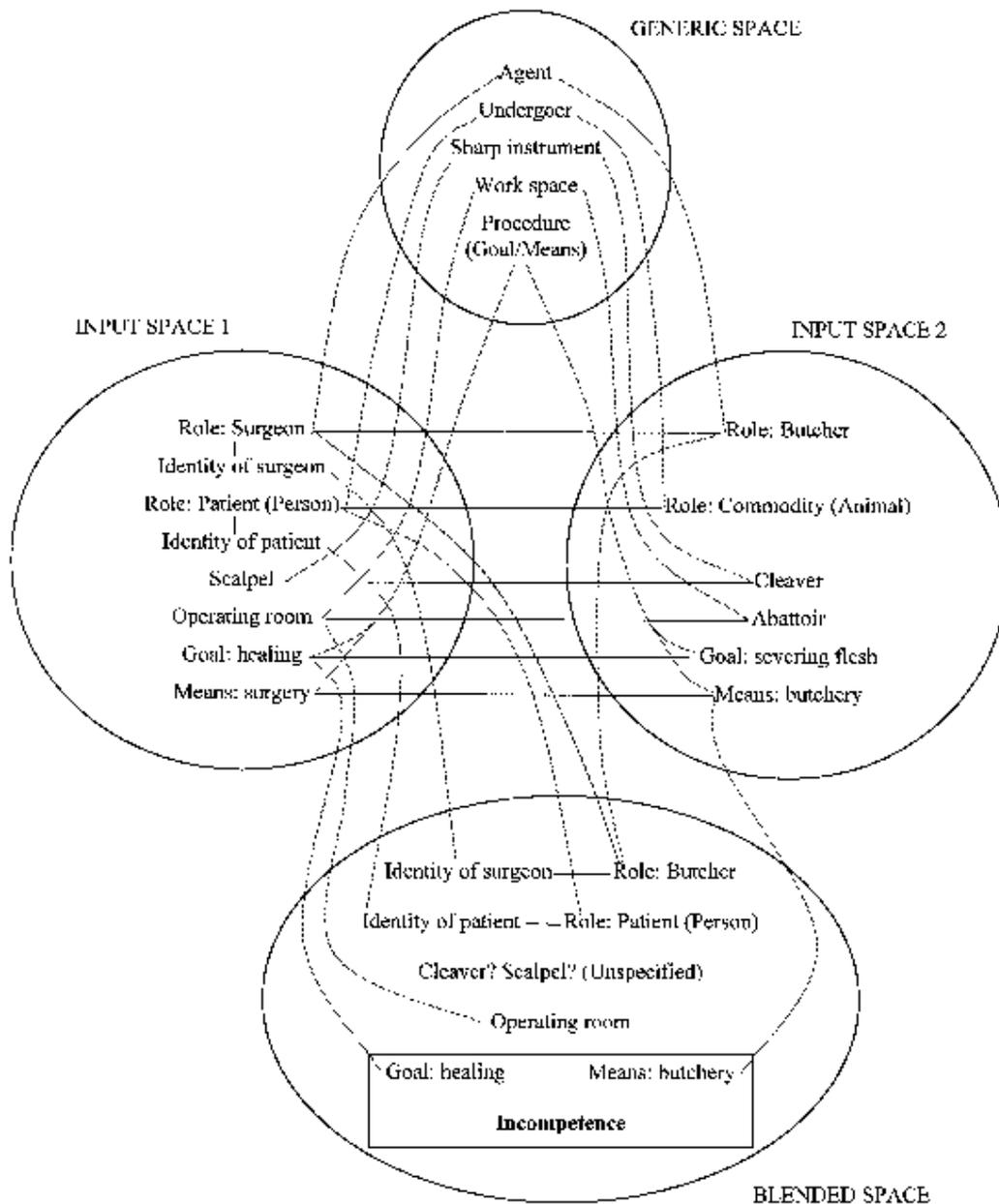
The definitions of those three cognitive operations sound quite abstract. Grady (1999) illustrated these operations through the well-quoted metaphor *The surgeon is a butcher*. (see Figure 2) It is clear that *butcher-surgeon*, *animals-human beings*, *commodity-patient*, and *cleaver-scalpel* can be employed to establish good counterpart connections. Nevertheless, those connections still fail to uncover the true meaning of this metaphor, namely that the surgeon is incompetent. Such a meaning is attained in the blended areas which involves all three cognitive operations.

Through *composition*, content from each of the inputs are projected into the blend spaces. According to Fauconnier and Turner (1998), *composition* allows the elements from separate inputs to be fused as one element. In this example, the identity of the surgeon, the identity of the patient, and even the goal of healing are projected from the input space of surgeon into the blended space. Meanwhile, 'Butchery' the way that the surgeon performs is recruited from the input space of the butcher. Through *completion*, the information drawn from our long-term memory matches the structure projected from the inputs. This cognitive operation was explained by Grady et al (1999) as follows:

When we mentally project a butcher into an operating room, we end up introducing the notion of incompetence and malice into the scene as well, in order to make sense of the scene. We complete our understanding of the scenario by introducing a new feature of the person, prompted by the juxtaposition of elements from the inputs. The idea of destructive, inappropriate action calls to mind the notion of an incompetent and /or malicious person. In this way, the completion process is often a source of emergent content in the blend. (Grady, Oakley and Coulson, 1999<sup>13</sup>: para. 17)

---

<sup>13</sup> Since the text is directly cited from Coulson's home page, the exact page number is unclear. The web link is <http://markturner.org/blendaphor.html>. The date of the last retrieval was 13.06.2008.



**Figure 2: Conceptual integration network: *The surgeon is a butcher.***  
 (see Grady, Oakley and Coulson, 1999)

Through *elaboration*, one can simulate a real-life performance of the event. For instance, one can mentally perceive how scarily incompetent the surgeon is by imaging a surgeon chops the tissues from the patient with no intention to be precise.

All these cognitive operations, including *composition*, *completion* and *elaboration*, cause emergent structure to come into being in the blended area. However, the emergent feature is not restricted to the blended area. It actually exists in the entire

integration network and in the compressions<sup>14</sup> that operate within this network. (Fauconnier, 2005) Fauconnier further argued, “what is novel and powerful in the emergent structure is the way in which blended space remain linked to the network as a whole” (2005: 525).

Different metaphors may involve different degrees of blending. To evaluate how good blends are, Fauconnier and Turner (1998) set five optimality principles of conceptual blending:

- Integration: The blend must contain a well-integrated scene. In other words, the integration should be reflected in the blend structure.
- Web: The blended space must keep the web of the correspondent connections to the input spaces.
- Unpacking: The blend itself must be able to be unpacked. That is, the blend can be unpacked to reconstruct inputs, the cross-space mapping, the generic space, and the network of connections between all these spaces.<sup>15</sup>
- Topology: The relations of the elements in the blend should match the correspondent relations of the elements in the inputs.
- Good reasons: The elements in the blended area all appear for good reasons. They must possess either relevant links to other spaces or relevant functions in running the blend. In addition, there is another additional principle called metonymy projection constraint. Under this principle, an element from the input is likely to project to the blend if it possesses a metonymic link to another element that has already been projected to the blend.

### 2.2.3 Critics

Like most cognitive linguistic theories which are based on merely linguistic evidence, the CBT has been criticized for its lack of verification. Gibbs (2000) regarded the CBT more as a general framework rather than a single theory to be either confirmed or falsified. He pointed out that the challenge for blending theory is

---

<sup>14</sup> Besides, compression is also vital for conceptual integration or blending. Fauconnier and Turner (2000: 283) defined compression as “a phenomenon that allows human beings to simultaneously control long diffuse chains of logical reasoning and to grasp the global meanings of such chains.” Recently, Turner (2006: 17) regarded compression as a feature of conceptual blending by asserting that “many aspects of mental space can be compressed under blending”. In the same article, he discussed how relations of analogy that connect input mental spaces can be compressed into blended structures in the mental blend space. Fauconnier (2005: 523) expressed similar idea by saying “a central feature of integration networks is their ability to compress diffuse conceptual structure into intelligible and manipulable human-scale situations in a blended space.”

<sup>15</sup> The principle of unpacking is the reverted process of the compression.

to find ways in which different parts of the theory can be articulated to form hypotheses that can be tested experimentally. Due to the lack of verification, the conceptual blending theory has also been criticized for its incapability to support falsifiable predictions. Such a weakness was also acknowledged by Fauconnier and Turner themselves, as they wrote in their book, *The Way We Think*, “We have so far given analyses of blends, but we have not framed our analyses in terms of prediction and confirmation.”(2002: 55)

In a related criticism, the CBT has been subjected to the challenge that it proceeded only through *post hoc*<sup>16</sup> analyses of examples. Gibbs (2000) criticized the CBT for simply inventing theoretical entities such as blending spaces to explain linguistic behaviours rather than searching for the real causes or bases of those linguistic behaviours. As a response to this criticism, Coulson and Oakley on one hand agreed that “blending analyses must move beyond post hoc analysis” (2000: 192); on the other hand they protested that *post-hoc analysis* necessarily play a role in building and refining models of online meaning construction” (Ibid.). In the same article, Coulson and Orkley also dealt with another criticism that the conceptual blending has an *ad hoc* quality for employing temporary procedures for dealing with specific instances.

Moreover, the CBT was also criticized for its complicated model of four spaces and the unclear blending process. For instance, Grady (2000) questioned whether blending processes operate similarly for all of the different sorts of blends. Ritchie (2004) challenged the necessity of the four mental spaces through employing several examples from Fauconnier and Turner (2002) to demonstrate that those metaphors can be interpreted better and more simply without the complexity of four separate spaces. Despite all the criticism, the CBT, in the author’s opinion, has made a breakthrough in explaining how emergent meaning comes into being in metaphor comprehension.

### **2.3 Structure Mapping Theory**

As Lakoff and Johnson renewed the understanding of metaphor in the field of cognitive linguistics (see 2.1), Gentner and her colleagues made efforts to explore metaphor from cognitive psychological perspective. They expressed their mission under the influence of the cognitive linguist Lakoff as:

---

<sup>16</sup> Post hoc means ‘after fact’. A post hoc is often used to refer to one kind of fallacy, with the illogical argument „post hoc, ergo propter hoc“. This Latin phrase means “after this, therefore because of this”.

...it is clear that Lakoff has identified an important phenomenon. Our research aims to capture the phenomena of large-scale mappings in a psychological account.

(Gentner, Bowdle, Wolff and Boronat, 2001: 207)

For this purpose, Gentner and her colleagues have conducted a number of empirical experiments on metaphor cognition (Gentner and Clement, 1988; Gentner and Boronat, 1992). The results have confirmed that metaphors, especially novel metaphors can be explained well by the extended structure mapping, which was originally employed by Gentner in analyzing analogy. The following section introduces Gentner's assertion that metaphors are like analogies (Gentner, 1983; Gentner, Bowdle, Wolff and Boronat, 2001; Gentner, 2003), and also lists the differences between them according to Gentner's view. Gentner's notion of mental model is also briefly introduced and followed by the criticisms of structure-mapping theory.

### 2.3.1 Metaphor as Analogy

Simply speaking, an analogy can be formulated in a way that "An A is like a B." Gentner (1983) proposed structure mapping to interpret analogies. Structure mapping is defined as "a mapping of knowledge from one domain (base) onto another (target) which conveys that a system of relations that holds among the base objects also holds among the target objects" ( See e.g. Gentner, Falkenhainer and Skorstad, 1987: 156). Such a mapping emphasizes relational commonalities between the base and the target domains rather than the objects, in which those relations are embedded. This was expressed by Gentner in the following text:

People seek to put objects of the base in one-to-one correspondence with the objects in the target so as to obtain the maximum structural match. Objects are placed in correspondence by virtue of their like roles in the common relational structure; there does not need to be any resemblance between the target objects and their corresponding base to map connected systems of relations governed by high-order relations with inferential import, rather than isolated predicates. (Gentner, 1983: 160)

Gentner (1983) adopted the analogy *The hydrogen atom is like our solar system* as an example to illustrate that analogy focuses more on relational structure than on object attributes. This example chiefly concerns the relational structure of a revolving system. The analogy is established in a way that "the electron REVOLVES AROUND the nucleus, just as the planets REVOLVE AROUND the sun," rather than suggest that " the nucleus is YELLOW, MASSIVE, etc., like the sun."

According to Gentner (1983), the mechanics of both metaphor comprehension and analogical reasoning have much in common. The structure-mapping process employed to explain analogy can also be used to illustrate metaphor processing. In

many of her papers, she and her colleagues have expressed the idea that metaphors are (like) analogies. For instance,

A number of different kinds of comparisons go under the term 'metaphor'. Many (perhaps most) metaphors are predominantly relational comparisons and are thus essentially analogies. (Gentner, 1983: 163)

We have suggested that metaphor is like analogy- that the basic process of analogy is at work in metaphor. Specifically, we suggest that structural alignment, inference projection, progressive abstraction, and re-representation are employed in the processing of metaphor. Viewing metaphor as analogy offers a unified account of many important phenomena and helps resolve some current conflicts. (...) Metaphors are processed by means of the same structure-mapping processes that are used to understand analogies. (Gentner, Bowdle, Wolff and Boronat, 2001: 243)

On this view, metaphors are like analogies. They are comparisons between two situations that highlight common information and invite inferences from the base to the target. (Gentner, 2003: 19)

Although Gentner used analogy to explain metaphor, she did not mean that all metaphors can be explained through analogies. In fact, she and her colleagues (Gentner, Falkenhainer and Skorstad, 1987) categorized three kinds of metaphors according to various mappings: attributional metaphors, relational metaphors, and complex metaphors. Among them, relational metaphors can be analysed like analogies, since those metaphors also embody mappings of relational structure. The mapping involved in the attributional metaphors chiefly concern common object attributes. Nevertheless, it can still be described in structure-mapping terms. Since the complex metaphors do not suggest a clear way of deciding exactly how the base predicates correspond to those of the target, Gentner, et al. (1987) excluded those metaphors from her attempt at analogical analysis.

In general, Gentner, Bowdle, Wolff and Boronat (2001) pointed out three differences between metaphors and analogies: First, metaphors can be more structurally variable than analogies, as metaphors can not only involve attribute matching or relation matching but also violate structural consistency. Second, on one hand, metaphors are used for novel and vivid non-literal comparisons, but on the other hand they are applied to systems of extended meanings, which are too familiar to be recognized as metaphorical at all. In addition, Gentner also asserted that metaphors are different from analogies in its pragmatic functions. In her opinion, metaphors are used mostly for expressive-affective purposes while analogies are used for explanatory- predictive purposes (Gentner, 1982).

Despite these three minor differences, Gentner observed vast commonalities between metaphors and analogies. According to her, the commonalities between metaphors and analogies exist in such a way that basic process of analogies, the so-

called structure-mapping, also works in metaphors. The following section illustrates in detail Gentner's structure mapping to elaborate how the rules of analogy can also be applied generally to the analysis of metaphors.

### 2.3.2 Structure-mapping

The tenet of the structure-mapping theory (Gentner 1983, 1988; Gentner, Bowdle, Wolff and Boronat, 2001; Gentner and Markman, 1997) is to establish a structural alignment between two represented situations and then to project inferences. Through establishment of the alignment, correspondences are identified between the representational elements of two situations.

Gentner and her colleagues (Falkehainer, Forbus and Gentner, 1986, 1989; Gentner, Bowdle, Wolff and Boronat, 2001) suggested that the alignment is constrained by structural consistency, which refers to the one-to-one correspondence between the mapped elements in the base and the target and also to the parallel connectivity in which the arguments of corresponding predicates also correspond.

One of the central ideas of the structure-mapping is that the selection of an alignment should abide by the systematicity principle, which infers that a system of relations connected by higher-order constraining relations is prior to the independent matches. In Gentner's original words, "[a] predicate that belongs to a mappable system of mutually interconnecting relationships is more likely to be imported into the target than is an isolated predicate." (Gentner, 1983: 163)

As supported by the empirical studies (Bowdler and Gentner, 1997; Clement and Gentner, 1991), Gentner and her colleagues further argued that the complete common system of relations, rather than random facts, are imported from base to target in analogical inferences.

According to Gentner, the structural-mapping is the interpretation of rules for analogies. If an analogy is formulated as *a T (target) is like a B (base)*, the rules of structural mapping can be illustrated in the following mathematical ways:

Suppose that the representation of the base domain B can be stated in terms of object nodes  $b_1, b_2, \dots, b_n$  and predicates such as A, R, R', and that the target domain has object nodes  $t_1, t_2, \dots, t_m$ . The analogy maps the object nodes of B onto the object nodes of T:

$$M: b_i \rightarrow t_i$$

....

The mapping rules are

1. Discard attributes of objects

$$A(b_i) \rightarrow A(t_i)$$

2. Try to preserve relations between objects:

$$R(b_i, b_j) \rightarrow R(t_i, t_j)$$

3. (The systematicity principle) To decide which relations are preserved, choose systems of relations:

$$R' (R1(b_i, b_j), R2(b_k, b_l)) \rightarrow [R' (R1(t_i, t_j), R2(t_k, t_l))$$

(Gentner, 1983: 158)

Gentner and her colleagues proposed that metaphors are processed as structural alignments and argued that the structure mapping theory can provide explanations to how domain mappings are processed. According to Gentner's school (Gentner, Bowdle, Wolff and Boronat, 2001), there are two key features that support the extended mapping, *systematicity bias*, and the *incremental mapping mechanism*. Systematicity bias refers to "the preference for alignments that form deeply interconnected structures." (Gentner, Bowdle, Wolff and Boronat, 2001: 208) Such a structural preference is identified also in several empirical studies. For instance, Gentner and Clement (1988) found out that comprehension of metaphors (e.g., *Plant stems are drinking straws*) is achieved by adults through invoking relational commonalities (e.g., *they both convey liquids to nourish living things*) rather than object commonalities (e.g. *both are long and thin*). The *incremental mapping mechanism* (Falkenhainer, Forbus and Gentner, 1989; Forbus, Gentner, and Law, 1994; Gentner 1982; Gentner and Markman, 1997) shows how an analogical mapping can be extended by adding further information from the base domain and establishing further correspondences in the target. (Forbus, Ferguson and Gentner, 1994)

In general, two important emphases can be inferred from the SMT when it is employed in illustrating the mapping process of metaphor: First, what is important is the common relations rather than the objects in the domain. Second, the choice of which relations to match is guided by the principle of *systematicity*. (see e.g., Gentner and Clements, 1988)

### 2.3.3 Mental Model

In 1983, Gentner and Stevens co-edited *Mental Models*, a book of collected papers on a variety of models. Although the papers concern various domains, they all share one common theme that analogical reasoning governs the formation of mental models for diverse domains. In other words, people actually have the tendency to form an understanding of a less known phenomenon by transferring inferences from an existing mental model to that phenomenon.

Gentner and Gentner's (1983) two famous experiments on "mental models of electricity" analysed how different mental models may affect people's reasoning by comparing two different mental models of *electricity*, namely *water* and *crowds of little men*.

In the first experiment, subjects who were fairly naive about physical science were asked to judge whether the current (and the voltage) in circuits with a variety of battery and resistor combination would be greater, equal to, or less than that of a simple circuit with only one resistor and one battery. Then they were asked to word their reasoning of electricity when solving each problem and to choose whether they were thinking about flowing fluid, moving objects, or another analogy in dealing with the circuit problems. The results show that people who used the flowing-fluid analogy performed better on batteries than on resistors, whereas people who used the moving-crowd analogy performed better with resistors, particularly resistors in parallel, than they do with batteries. This confirms that "the use of different analogies leads to systematic differences in the patterns of inferences in the target domain." (1983: 118) Therefore, Gentner and Gentner (1983) argued that various analogies lead to various inferences in the target domain of *electricity* according to the structural relations that exist in a different base domain, namely *flowing-water* or *moving crowd*.

In the second experiment, the principle of electricity was explained to three groups of subjects with three different analogical mental models before they were asked to tackle a series of circuit problems. Subjects were asked to word their reasoning of electricity when solving each problem and to choose whether they were thinking about flowing fluid, moving objects, or another analogy in solving these physical problems. The results falsified the claim that analogies, once adopted, do exert relational inferences in the target domain and influence our reasoning process in problem solving and they validated the structure-mapping as the major mechanism underlying analogies.

Furthermore, Collins and Gentner (1987) suggested that mental models are always constructed through analogical reasoning and that the process of structure-mapping between two domains seems to require that the two phenomena have structural commonalities. Since Gentner herself mentioned the mental model is less frequently than the structure-mapping mechanism when she discussed metaphors, the notion of mental model is not discussed in detail here.

### 2.3.4 Critics

In reviewing the SMT, Veale (1996) pointed out that Gentner's understanding of analogy contains a high degree of noise; noise refers to relations which are valid memories but which do not contribute to the final analogy or metaphor. Moreover, he criticized Gentner's SMT, as founded upon rocky epistemological ground, for embodying misguided and deep-seated assumptions, which should not be considered valid in analyzing metaphors.

Fauconnier and Turner (1998) strictly criticized Gentner's SMT for being focused merely on the one-way projection from a 'source' to a 'target' and overlooking the construction of the blended space.

For example, we find evidence against all three of the claims in Dedre Gentner's classic paper on structure mapping (Gentner, 1983). (1) We find that, as a general principle, analogy is not compositional; the meaning of an analogy does not derive from the meaning of its parts. (...) (2) We find, as a general principle, that mapping does depend upon specific content of the domains and not just on structural properties. (...) (3) We find, as a general principle, that there are not clean distinctions in kind between various products of conceptual projection and conceptual integration, but rather several interacting gradients of distinctions. (Fauconnier and Turner, 1998: 184)

In the author's opinion, Gentner's structure-mapping theory, with its emphasis on structural or relational projection rather than projection of isolated entities, provides a convincing comparative theory to approach mappings of certain types of metaphors but not of all metaphors.

## 2.4 Salient Imbalance Theory

According to Glucksberg, McGlone and Manfredi (1997), not only Gentner's SMT as described above, but also the salience imbalance theory (SIT) established by Ortony (1979a, 1979b, 1993) are the two most prominent comparison-models of metaphor comprehension. Adopting a comparative approach, the SIT illustrates how the less salient properties of the tenor are highlighted by forcing a comparison with a vehicle concept in which those very properties are considered highly salient. In this way, it helps to explain why some properties are emphasized and others are deemphasized in a metaphor and why good metaphors are not easily reversible.

### 2.4.1 Salience Imbalance Model

Ortony's salience imbalance model is an extension of Tversky's (1977) feature-matching model. Unlike the feature-matching model, Ortony's model allows for the salience of common properties to vary across the referents of a comparison. This model defines metaphors in terms of particular relationships between tenor and

vehicle. According to Ortony (1979a), there are four possible tenor-vehicle shared property pairings, namely low-low, high-high, high-low, and low-high.<sup>17</sup> Among them, the low-high pairings create good metaphors, as the tenor attribute salience is highlighted or increasing. In other words, a good metaphor comes into being when a property is less salient in the tenor but more salient in the vehicle. For example, in the metaphor *A highway is a snake*, the property of danger is lowly salient in the tenor *highway* but highly salient in the vehicle *snake*, which allows the salience of the property 'being dangerous' to increase in the tenor *highway* as it is forced to be compared with the vehicle *snake*. Thus, it is clear that the creator of the metaphor wants to highlight or emphasize the inherent danger of travelling on highways.

In contrast, Ortony (1979a, 1979b) pointed out that literal comparison statements are those that relate concepts of the same salience distribution. That is to say, if both the vehicle and the tenor share the high salience of a property in a comparison, that comparison is rather literal rather than metaphorical. For instance, *an encyclopaedia is a dictionary* is literal, because both *encyclopaedia* and *dictionary* possess an inherent salient balance. However, *an encyclopaedia is a goldmine* is metaphorical with the possession of an inherent salience imbalance between the tenor *encyclopaedia* and the vehicle *goldmine*.

From the salience imbalance model, it is not hard to infer that good metaphors are asymmetric and irreversible, as good metaphors always require that the relevant properties be of low salience in the tenor but of high salience in the vehicle. For a good metaphor "A is a B," its reversed expression "B is an A" can either mean something differently or turn out to be totally meaningless. In reviewing the salient imbalance theory, Hao and Veale (2006) used the example *One's lawyer is a bodyguard* to explain the asymmetry from Ortony's point of view. The metaphor *One's lawyer is a bodyguard* conveys the idea that lawyers protect their clients. In a reversed way, the metaphor *One's bodyguard is a lawyer* has a completely different meaning. A querulous *bodyguard* may come into the scene, because a *lawyer* is highly representative of the category argue-agent, but a *bodyguard* is rather a weak member of that category.

---

<sup>17</sup> According to Ortony, highly metaphorical comparisons are low-high pairings whose shared properties are of low salience in the tenors but of high salience in the vehicles, for instance, *an encyclopaedia is a goldmine*. Literal comparisons are high-high pairings whose shared properties are of high salience in both the tenors and the vehicles, for instance, *an encyclopaedia is dictionary*. Low-low pairings have both the tenor and the vehicle sharing low salient properties. High-low pairings refer to those whose shared properties are of high salience in the tenors but of low salience in the vehicles.

Thus, it is clear that reversing the positions of the tenor and the vehicle involves the selection of a different property set. In the metaphor *One's lawyer is a bodyguard*, the protective property is emphasized, as this property enjoys higher salience in the vehicle *bodyguard* than in the tenor *lawyer*. When it is reversed as *One's bodyguard is a lawyer*, another property "being good at arguing", is highlighted instead, this property is highly salient in the vehicle *lawyer* but lowly salient in the tenor *bodyguard*. Therefore, the directional asymmetry results from a preference for having the salience of the properties be comparatively lower in the tenor but higher in the vehicle.

In general, Ortony's salience imbalance model provides a comparative approach to metaphor. Through the comparison between the tenor and the vehicle, the high salience of the properties possessed by the vehicle lead the low salience of these same properties in the tenor to increase, so that those properties are highlighted, as intended by the creator of the metaphor.

#### **2.4.2 Predicate Promotion Metaphor and Predicate Introduction Metaphor**

Ortony (1979b) made a distinction between the so-called "predicate promotion" metaphor and "predicate introduction" metaphors. Whether a metaphor is a "predicate promotion" metaphor or a "predicate introduction" metaphor depends on how much the addressee and the addresser of the metaphor knows the topic.

"In a predicate promotion metaphor, it is assumed that the hearer (and presumably the speaker) knows enough about the topic to recognize that what is implicitly being said of it is true." (Ortony 1979b: 199) As to the metaphor, *an encyclopaedia is a goldmine*, most people already know that the topic *encyclopaedia* is a source of rich knowledge. A similar predicate is also recognisable in the vehicle *goldmine*, which is usually used to denote a source of richness. In order to comprehend the metaphor, one needs to promote the salience of the relevant predicates for the topic. In this case, the predicate as a source of richness is more highly salient in the vehicle *goldmine* than in the tenor *encyclopaedia*, which allows the salience of the predicate "being a source of richness" to be promoted in the tenor as compared with the vehicle. In this predicate promotion process, the highlighted information extractable from the metaphor is old information, recognized by the speaker and the hearer.

By encountering a predicate introduction metaphor, the metaphor addressees know nothing specific about its topic. Thus, it is likely for them to acquire new

knowledge about the topic after the comprehension of the metaphor or at least make inference of something previously unknown. Ortony explained what he meant by the predicate introduction metaphors with the example, *Attila the Hun* as follows:

Suppose ...the hearer knows nothing more specific about Attila the Hun than that he was a renowned barbarian. Then, although no high-salient predicates of cesspool are low-salient predicates of Attila, or of his manners, [the metaphor itself] is interpretable, and most people will interpret it correctly. Less salient predicates that the speaker has for Attila may include things like “being extremely unpleasant,” “having repulsive manners” and so on. These are not attributes of Attila the Hun at all from the hearer’s point of view. Indeed, the purpose of the simile may be to introduce these ideas. (Ibid: 200)

In Ortony’s opinion, the predicate introduction metaphors are “one of the cornerstone of insight,” as they result in “richer representations-representations that may be to some extent inappropriate because they exclude only what is flagrantly incompatible,” and “[t]his more coherent, holistic representation helps us to see things in different ways.” (Ibid: 200)

Thus, the previously existing predicates in the topic get promoted or emphasized in predicate promotion metaphors, whereas previously non-existent predicates in the topic get introduced in predicate introduction as they are forced to be compared with the vehicle of a metaphor:

A simile, by using high-salient predicates of the vehicle that are low-salient predicates of the topic, if they are predicates at all, has the effect of emphasizing or promoting the salience of those predicates if they were low-salient, and of introducing them if they were not there at all. (Ibid: 200)

For both the predicate promotion metaphors and predication introduction metaphors, the salience of predicates in the tenor is changed, either created or promoted because those predicates are highly salient in the vehicle of the metaphor.

### 2.4.3 Critics

The SIT has provided a genius view in solving the problem of the irreversibility of metaphors and in explaining how properties of the tenor are highlighted in a metaphor. However, Ortony’s hypothesis that metaphor should involve the property of high salience in the vehicle and the property of low salience in the tenor has been criticized by a number of researchers (see e.g., Glucksberg & Keysar, 1990; Shen, 1989, 1992; Wilcox, 1995). These researchers suggested that the vehicle does not have to possess higher salient properties than the tenor to be metaphorical as Ortony originally argued. They pointed out that the tenor and the vehicle, which has the same salience of the shared property, can construct a good metaphor as well. For instance, *coal is night (night is coal)* and *snow is flour (flour is snow)* are

metaphorical, although *night* and *coal* share the similar salient property *blackness*, and *snow* and *flour* the similar salient property *whiteness*. (see Gibbs, 1992b) Moreover, Wilcox's (1995) experiments found that the salience pairings of the low salient property in both the tenor and the vehicle, and the salience pairings of the high salient property in both the tenor and the vehicle may also have metaphoric potential, just as the salience pairings with high salient property in the vehicle and low salient property in the topic do. Based on the empirical findings, Wilcox rejected Ortony's argument that salience imbalance existing in the tenor and the vehicle is necessary for formulating a metaphor. Moreover, Kintsch (2000) criticized Ortony's view of metaphor for involving merely transference of a small set of features and argued that metaphors actually rearrange a whole semantic field.

## **2.5 Attributive Categorization Theory of Metaphor**

Glucksberg and Keysar (1990, 1993) established the categorization theory of metaphor. The gist of the categorization theory is that metaphors are intended as class inclusion statements rather than similes. This theory also attempts to explain the irreversibility of metaphor.

### **2.5.1 The Class-inclusion Claim**

Glucksberg and Keysar (1990, 1993) launched the class-inclusion claim to explain metaphor by rejecting the comparative view of metaphor. They disagreed that the metaphor *X is a Y* can be implicitly converted into the simile *X is like Y*. In their opinion, metaphors should be interpreted as implicit category statements.

Metaphors are not understood by transforming them into similes. Instead they are intended as class inclusion statements and are understood as such. When metaphors are expressed as comparisons, that is, as similes, they are interpreted as implicit category statements, rather than the other way around. The grouping that is created by the metaphor induces the similarity relation, and so the grouping is prior. (Glucksberg and Keysar, 1993: 422)

According to the class-inclusion claim, the topic of a metaphor is a member of a category which can be represented by the vehicle. That is, the metaphor *X is a Y* indicates that "the concept *X* is assigned to a category denoted *Y*" (Glucksberg, McGlone and Manfredi, 1997: 51). It is clear by Glucksberg's class-inclusion claim that the vehicle itself is not the category into which the topic is placed. It is selected to represent that category because the vehicle, as a typical member of that category, can exemplify its most defining features. "...[W]hen someone says *my job is a jail*, the job in question is declared to belong to a category of unpleasant entities that is referred to by the word *jail*." (Glucksberg, McGlone and Manfredi, 1997: 51).

As to the category, it can either be a pre-existing category or, in most cases, a temporary one created in the very moment of processing the metaphor. In the metaphor *My lawyer is a shark*, “the metaphor vehicle shark is used to refer to the superordinate category of predatory creatures in general, not to the smaller, concrete category of marine creatures that is also named shark” (Glucksberg, 1998: 41). Here the vehicle embodies the so-called *due reference*, as it stands for not only the category (shark of marine creatures) to which it ordinarily refers, but also the category (a dangerous, vicious type) into which the topic is placed. The metaphorical properties of *shark*, -vicious, aggressive, and dangerous - are attributed to *lawyer*, rather than the literal *shark* properties, such as being a fast swimmer with fins, sharp teeth, leathery skins and gills. Seeing it in a converted way, we can also say that the tenor inherits the defining attributes of that category. This is what Glucksberg meant by saying “[w]hen such a category is used to characterize a particular topic, it functions as an attributive category in that it provides properties (e.g., high quantity and quality, etc) that may be attributed to the topic.” (Glucksberg, McGlone and Manfredi, 1997: 52)

If metaphors do function in the way that the class-inclusion claim suggests, they should not just be asymmetrical, but also irreversible. Glucksberg and his colleagues (Glucksberg, McGlone and Manfredi, 1997) perceived this irreversibility of metaphorical comparison as a direct result of metaphors being understood as class-inclusion assertions. Their empirical studies showed that metaphors and similes either lose or change meaning when reversed, whereas literal comparisons are generally reversible.

### **2.5.2 Property Attribution**

The attributive categorization model implies that both the topic and the vehicle play a role in metaphor comprehension. Glucksberg shared the same idea with Black (1962, 1979) that the topic and the vehicle of a metaphor interact with each other to select which properties of the vehicle are appropriate to select the category that the vehicle represents and the topic into which it is to be placed. The vehicle provides properties to be attributed to the topic, and the topic provides the constraints on which properties of the topic can be plausibly attributed to it.

In a metaphor, the topic has a range of possible dimensions and the vehicle also has a range of salient properties that might be relevant to the dimensions suggested

by the topic. The Glucksberg school (Glucksberg, McGlone and Manfredi, 1997) pointed out that two kinds of knowledge are required in metaphor comprehension: sufficient knowledge about the topic to help decide which kinds of characterizations are relevant and meaningful to the topic and sufficient knowledge about the vehicle to know what kind of categories it may represent. By allowing the topic to select features of the vehicle, it is clear which of the vehicle features references the category to be inferred. Moreover, when paired with different topics, the vehicle is then free to represent different categories.

In order to study the interactive function of the tenor and the vehicle in metaphor comprehension, Glucksberg and his colleagues conducted an empirical study (Glucksberg, McGlone and Manfredi, 1997) in which the topics of the metaphors were divided into high-constraint and low-constraint topics while the vehicles were divided into ambiguous and unambiguous vehicles. The results showed that the high-constraint topics generated fewer expectations than the low-constraint topics did regarding the dimensions upon which they were likely to be characterized by a vehicle. Likewise, unambiguous vehicles generated fewer expectations than ambiguous vehicles regarding the properties that they provided for attribution to the topic. Thus, high-constraint topics and unambiguous vehicles produced facilitation, while low topics and ambiguous vehicles did not.

### 2.5.3 Critics

The categorization theory has received a lot of criticism. Gibbs (1992c) argued that metaphors reflect the conceptual mapping existing in long-term memory, rather than the instantiations of temporary ad hoc categories. Thus, he criticized the class-inclusion view for being insufficient to explain metaphor comprehension:

The class-inclusion view of metaphor comprehension does not properly acknowledge the role of metaphor in everyday cognition. Metaphorical expressions are not simply the result of temporary, ad hoc categorization processes. Instead, and more powerfully, metaphor is a fundamental schema in long-term memory by which people make sense of their experiences. (Gibbs 1992c: 576)

Lakoff (1993) questioned whether the attributive categorization was a sound theory. He did not even think that Glucksberg explained well how it is possible for a general situation (*my job*) should be metaphorically categorized in terms of a fundamentally spatial notion like 'confining' in his example *My job is a jail*. He criticized the categorization theory for not being able to account for either the everyday conceptual metaphors or the poetic metaphors. "Since it does not even

attempt to deal with most of the data covered by the contemporary theory of metaphor, it cannot account for how metaphor works.” (Layoff, 1993: 236)

Kennedy and Chiappe (1999) mainly criticized Glucksberg and Keysar’s categorization theory in two aspects. First, they challenged the class-inclusion claim that metaphors are stronger than similes when similes are outside of a correction situation. According to Glucksberg (1993), metaphors are stronger than similes, since metaphors are usually used to correct similes, i.e. “Jack isn’t just like a rock, he is a rock!” Kennedy and Chiappe pointed out that such a correction situation is too extreme, because it reminds people of corrections of literal language, for “that is a banana” sounds like it involves more common features than “that is like a banana.” Thus, they argued that similes may equal metaphors in strength when no correction is involved. Second, they argued that metaphor comprehension at a minimum needs categorization plus specification of some common features. Thus, categorization is not sufficient to address metaphor comprehension, because the relevant features involved in the mapping process can hardly be found through categorization alone.

Kintsch (2000) criticized Glucksberg’s view as incomplete by raising the question of what is a superordinate-category level and what is a basic-level property. According to her, the basic level category can be regarded as a member of several superordinate categories, and Glucksberg’s intuitive choice of the right one is unsatisfactory from the computational point of view. Despite all the criticism listed above, the ACM is direct and powerful in explaining the comprehension process of most conventional metaphors.

## **2.6 The Domains Interaction Theory of Metaphor**

Two psychologists Tourangeau and Sternberg (1981, 1982) have collaborated in developing the domains interaction theory of metaphor (DIT) in order to solve several controversial issues in the comparison view, anomaly view and interactive view of metaphor. This theory is also known as the geometry theory of metaphor because it presents a geometrically grounded metric of metaphoric aptness, which is based upon the measurement of within-domain and between-domain distances of the topic and the vehicle.

### **2.6.1 Metaphor as Interaction of Domains**

According to Tourangeau and Sternberg (1982), metaphor involves not only two particular things or concepts but also the domains to which they belong as well. For

instance, the metaphor *the room was orange with warmth* involves not only *orange* and *warmth*, but the two domains of hues and temperature. Domains not only help to determine the features relevant to the interpretation of a metaphor but also determine the nature and the degree of the parallel that is constructed between the tenor and the vehicle.

According to them, metaphors generally involve seeing something in one domain in terms of something in a second domain with a resulting change in people's view of both domains (see Tourangeau and Sternberg, 1982). The first part of their understanding of metaphors is quite similar to Lakoff and Johnson's definition of conceptual metaphors; the latter part emphasises on another aspect, namely that such a "seeing something in one domain in terms of something in a second domain" brings new changes in "people's view of both domains." In their opinion, metaphor comprehension may require *constructing* correspondences. They agreed with Ortony (1979a, 1979b) that the tenor and the vehicle do not share features directly as they are in different domains.

It is the domains that suggest which characteristics of the tenor and the vehicle are likely to matter in comprehending a metaphor and suggest how to map the features applying within one domain onto those applying with the other. One of the examples that Tourangeau and Sternberg (1982) employed to explain the mechanism is *men are wolves*. Obviously, the characteristics of *wolves* should not be merely literally applied to *men*. Instead, these characteristics must be transformed, i.e. interpreted in a new way, to be applied to *men*. Fitting the characteristics of *men* to those of *wolves* mainly involves seeing social relations in a new way. This encourages people to change their view of the features operating within the domain of social relations to see their correspondence to those within the domain of beasts.

In summary, the domains–interaction view asserts,

(a) a metaphor involves seeing something in one domain in terms of something in another domain; (b) because features are often specific to a domain, they must be transformed, i.e., seen in a new way, if we are to find correspondences across domains; (c) since the features that structure the domains are reinterpreted or transformed by the metaphor, the whole domain, and not just a particular term in it, partakes in this conceptual 'interaction'; (d) either the context, or in default of this, the domains themselves, can provide the structure that makes salient the features or dimensions that figure in the interpretation of the metaphor; and (e) the domains involve place limitations on the manner by which features or dimensions applying within the domain of the vehicle can be altered so as to fit the tenor.

(Tourangeau and Sternberg, 1982: 217)

In addition, Tourangeau and Sternberg (1982) also mentioned that most metaphors occur in a context. They argued that the context can determine the relevant domains and can affect which domain we infer. If a metaphor is provided in a strong context, it is the context not the pre-existing structure of the two domains that determines the meaning of the metaphor.

Based on such a domains-interaction view, they suggested that metaphor interpretation should involve recognising metaphors, inferring the two domains involved, and constructing correspondences. Depending on individual metaphor, such correspondences between dimensions of features in different domains are also constructed in various ways:

a) there may be some common feature or dimension crosscutting the two domains; b) we may abstract the features themselves; c) the features or dimensions may be naturally correlated; d) there may be a punning connection or a common label linking them; e) the dimensions may map onto a common absolute scale; f) they both may relate to a mediating dimension in a third domain; and (g) the concepts may have similar network structures. (Tourangeau and Sternberg, 1982: 221)

### 2.6.2 Similarity and Aptness

According to Tourangeau and Sternberg (1981, 1982), there are two forms of similarity of the tenor and vehicle. The within-domain similarity refers to the extent, to which the tenor and the vehicle occupy similar 'relative positions' within their respective domains. The between-domain similarity refers to the degree to which the two-domains themselves resemble each other.

Concerning the between-domain similarity, they proposed that metaphors are more apt when they relate things from more diverse domains and when the correspondence between the tenor and the vehicle is more exact. In their opinion, the within-domain should affect the aptness more if the tenor is unfamiliar and the vehicle is familiar, whereas the between-domain distance plays a more important role in affecting the aptness if a startling new perspective rather than the familiar aspect is more emphasized. (see Tourangeau and Sternberg, 1982)

Their important hypothesis raised the idea that distance within domain relates negatively to aptness whereas the distance between domains relates positively to aptness. They used the results from two empirical studies (Tourangeau and Sternberg, 1981) to support this hypothesis.

A good metaphor, for example, *Brezhnev is a hawk* should satisfy two criteria: First, it should involve two different domains, which indicates a high between-domain distance. In this case, *Brezhnev* is a politician, and *hawk* is a bird. The domain of politicians is very much different from the domain of the *bird*. Second, it should at the

same time show a high within-domain similarity of the tenor and the vehicle: *Brezhnev* and *Hawk* enjoy the same relative position in their within-domain distance. The greater the between-domain distance, and the smaller the within-domain distance, the more apt is a metaphor. In other words, the best metaphors involve big distance between two diverse domains and close correspondence between the terms within those domains.

### 2.6.3 Critics

Veale (1996) has pointed out three problems with this approach. First, he criticized such a spatial model for leaving no room for non-literal similarity or true domain congruence (Ortony, 1979) in which the same general feature can have different meanings in different opinions. In his opinion, both the within-domain distance and the between-domain distance metrics are based upon the viability of literal similarity and also every domain is organized by the same set of features, as the basis for all matches of similarity. Second, he challenged the application of Euclidean space<sup>18</sup> in analyzing metaphor. Veale argued, "Metaphor essentially requires a high-order, non-Euclidean space in which aspects such as asymmetry, domain incongruence and non-localisation of meaning can be explicated" (Veale, 1996:83). Furthermore, he criticized the model for failing to account for the role of context in judgement of aptness.

## 2.7 Summary

In this chapter, altogether six cognitive theories of metaphor have been reviewed. The important elements of each theory are summarized in Table 1. The CMT theory distinguishes the metaphorical expressions from the conceptual metaphors. With a profound analysis of conceptual metaphors, Lakoff and Johnson have asserted that our conceptual system is metaphorical in nature. With the so-called invariance principle, they explained metaphor as mapping from the source concept onto the target concept. Gentner has drawn much insight from the conceptual metaphor theory. She has applied the SMT from her study of analogy to metaphor and highlighted the relational projection over the predicate projection in the mapping process. Another comparative approach in studying metaphor is the SIT established by Ortony, who did not focus his study on how the mapping process is carried on in a

---

<sup>18</sup> Two- and three-dimensional Euclidean geometry refers to a relationship in that the sum of the angles in a triangle is always 180 degrees. An n-dimensional Euclidean space refers to an n-dimensional space with notions of distance and angle that obey the Euclidean relationships.

metaphor as Gentner did but on reasoning why this mapping process is actually possible. In his opinion, the high property salience in the vehicle causes the low property salience in the topic to change to a high degree. That is why most metaphors are nearly irreversible.

Glucksberg and Keysar distinguished themselves from all comparative approaches above by arguing that metaphor is an implicit category statement. Although their views have often been criticized and rejected (Gibbs, 1992; Lakoff, 1993; Kintsch, 2000), the ACM is insightful in arguing that the tenor and the vehicle interact with each other in selecting which properties of the vehicle are used to establish the category in which the tenor is going to be placed. Tourangeau and Sternberg have viewed a metaphor as a mapping from the vehicle onto the tenor domain on the basis of the interaction of the two domains. They used a geometrical model to explain how the within-domain distance relates negatively to aptness whereas distance between domains relates positively. In their opinion, a good metaphor should enjoy a high between-domain distance and at the same time a high within-domain similarity.

Likewise, the CBT also takes an interactive approach. Its peculiar characteristic lies in employing four mental spaces in analyzing metaphors rather than two domains in analyzing metaphors. The blending theory surpasses other theories in addressing the emergent structure. In order to explain how emergent structure comes into being in processing metaphors, the CBT uses a complex of integration networks, including the complicated operations of blending. This really makes sense especially in explaining how the meaning of metaphors are attainable even if their meaning cannot be retrieved from either the tenors or the vehicles. Furthermore, the CBT uses mental spaces rather than domains in discussing metaphors. According to Fauconnier (1985, 1997), mental spaces operate in people's working memory. However, they are also connected to the knowledge which is stored in people's long-term memory. With their great flexibility and online reconstructive potentiality, mental spaces enjoy more advantages compared to relying on the mappings of two domains in long-term knowledge for explaining the changes or variations of those conceptual representations under various conditions.

Table 1: Major cognitive metaphor theories.

Theories	Founders	Mapping	Notions	Conceptualizations of metaphor	Directionality	Contributions
Conceptual metaphor theory (CMT)	Cognitive linguists: Lakoff and Johnson (1980)	Comparison	Source - domain and target- domain; invariance principle; mappings; embodiment	Metaphor is a mapping from the source domain onto the target domain.	Uni-direction	CMT frees metaphor from the golden cage of the rhetoric and prove its pervasive existence in our language, our conceptual system and our thought through systematic language evidence.
Structure-mapping theory (SMT)	Psychologist: Gentner (1983)	Comparison	Base and target; structure-mapping	Metaphor is a mapping of knowledge from one domain (base) into another domain (target), in which a system of relations that holds among the base objects also holds among the target objects.	Uni-direction	SMT provides one of the most prominent comparative model through highlighting the relational rather than attributional mappings under the systematicity principle.
Saliency-imbalance theory (SIT)	Psychologist: Ortony (1979)	Comparison	Vehicle and topic; predicate saliency	Metaphor is particular relationships between low property salient topic and high property salient vehicle.	Uni-direction	SIT well explains the irreversibility of metaphor through resolving the imbalance of property saliency between the vehicle and the topic of a metaphor.
Attributive categorization theory (ACT)	Psychologist: Glucksberg and Keysar (1990)	Categorization	Topic and tenor; properties; category	Metaphor is an implicit category statement, whose topic is a member of a category, which can be represented by the vehicle.	Bi-direction	ACT provides another perspective in explaining the irreversibility of metaphor and highlights that the tenor and the vehicle interact to select which properties of the vehicle are used to establish the category, into which the topic is to be placed.
Domain interaction-theory (DIT)	Psychologists: Tourangeau and Sternberg (1982)	Interaction	The domain of the vehicle, the domain of the tenor	Metaphor generally involves seeing something in one domain in terms of something in a second domain, with a resulting change in our view of both domains.	Bi-direction	DIT presents a geometrically grounded metric of metaphoric aptness, which is based upon the measurement of within-domain and between-domain distances of the topic and the vehicle.
Conceptual blending theory (CBT)	Cognitive linguists: Fauconnier and Turner (1998, 2002)	Integration	The input spaces, the generic space, and the blend space; blending	Metaphor involves a complex of mappings in a network of the two input spaces, one generic space and one blend space.	Multi-direction	CBT goes beyond the dominated two- domain view of metaphor, and involves four mental spaces in approaching metaphor and surpass the CMT in explaining the emergent structure.

## **Chapter 3 Studies of Metaphor Comprehension**

Thanks to modern metaphor theorists like Layoff and Johnson (1980), metaphor is fundamentally seen as a cognitive phenomenon. Abundant cognitive studies have been carried out to deal with different aspects of metaphor comprehension. Some studies are dedicated to studying the comprehension of metaphors in comparison with literal statements (see e.g., Blasko and Connine, 1993; Giora, 1997; Glucksberg, Gildea and Bookin, 1982; Keysar, 1989) or with similes (see e.g., Chiappe and Kennedy, 1991, 2001; Gentner and Bowdle, 2001; Gibbs and Wales, 1990; Gregory and Mergler, 1990), whereas other studies aim at exploring the steps of metaphor comprehension (see e.g., Nueckles and Janetzko, 1997), its mapping process (see e.g., Bowdle and Gentner, 1999, 2005; Coulson and Matlock, 2001; Glucksberg and Keysar, 1990), and the factors that influence metaphor comprehension, such as context, aptness, and conventionality (Bortfeld and McGlone, 2001; Chiappe et al, 2003; Glucksberg, 1998; Lemaire and Bianco, 2003; Martin, 1994; Nayak and Gibbs, 1990; Shinjo and Meyer, 1987; Utsumi, 2006). After a brief review of these studies, three open issues concerning metaphor comprehension are raised at the end of this chapter.

### **3.1 Debate of Direct or Indirect Processing of Metaphor Comprehension**

Intensive debates have been involved in exploring how metaphors are comprehended in comparison to how literal statements are comprehended. Four different views can be retrieved from the relevant studies. They are the sequential view, the direct view, the parallel view, and the combined view:

#### **3.1.1 The Sequential View**

It was traditionally believed that metaphors should demand greater cognitive efforts to be understood than literal sentences demand. (see e.g., Clark and Lucy, 1975; Grice, 1975; Searle, 1979) According to the so-called standard pragmatic model of metaphor processing (Grice, 1975; Seale, 1979), a special metaphorical understanding process only starts when the metaphor addressee realizes the literal incongruity of a metaphorical utterance. In other words, any utterance including a metaphorical one will first be processed as if it were literal. Only when the literal interpretation fails to reveal the meaning of the metaphor is a non-literal interpretation process initiated.

Thus, understanding metaphor involves several stages, including first the recognition of incompatible truth after the attempt of the literal interpretation and then the reconstruction of possible meaning and proper interpretation of the utterance (Miller, 1979). Such a view is also called the sequential view of metaphor comprehension. In the sequential view, a non-literal interpretation will never occur unless it is incongruent with the truth. In other words, metaphor comprehension does not occur directly but takes place only when the literal understanding fails to attain the true meaning of the metaphor. As a consequence, understanding metaphors takes longer than understanding literal statements, demands more cognitive effort, and involves qualitatively different processes.

### **3.1.2 The Direct View**

A large number of empirical works have been understood as refuting the assumption that literal processing is obligatory and necessarily prior to metaphorical processing (e.g., Glucksberg, Gildea and Bookin, 1982; Keysar, 1989). It has been claimed by a number of researchers that metaphors are interpreted directly and that the cognitive understanding processes of metaphorical and literal language are essentially the same. For instance, Gibbs's direct access model (DAM) (1994) suggests that metaphor comprehension requires the same processes as the understanding of literal language. He claimed that "[the] psychological research ...clearly shows that listeners do not ordinarily devote extra processing resources to understanding metaphors compared with more literal utterances" (Gibbs, 1994: 232).

Gibbs (1994) further argued that difficulties in processing metaphorical language is a function of contextual support needed for establishing correspondent mappings from the source domain (vehicle domain) to the topic domain. Since literal meaning is predominant in the interpretation of de-contextualized sentences and metaphorical meanings require realistic contexts, when no context is provided, literal sentences seem to be more easily understood than the metaphorical sentences. However, the difference in comprehension time required to access the literal meaning and the metaphorical meaning can be greatly reduced when relevant contextual supports are provided. That means that the contextual supports can greatly facilitate the mapping process from the source domain to the target domain in understanding a metaphor. In addition to Gibbs's own experimental studies, the ERP data collected by Pynte,

Besson, and others (1996) also confirmed this claim that difficulty in understanding metaphors is largely due to the unavailability of contextual support.

Moreover, a number of other empirical studies also suggest that metaphors do not have to take longer to comprehend than literal statements when sufficient context is provided. (e.g., Cacciari and Glucksberg, 1994; Gibbs, 1994, 2001; Gibbs and Nagaoka, 1985; Glucksberg, 1998; Martin, 1994; Rumelhart, 1979; Shinjo and Meyer, 1987). Ortony, Schallert, Reynolds and Antos (1978) measured the time it took for subjects to comprehend literal sentences versus metaphorical sentences at the end of long and short contexts. They found that there was almost no time difference between understanding literal or metaphorical sentences if the metaphorical sentences appeared in long contexts, although subjects took significantly longer to read them than they did to read literal sentences in short contexts. Likewise, Janus and Bever (1985) tracked eye movements and compared the amount of time people spent being focused on the target sentences. Subjects again responded to the metaphorical sentences as quickly as literal sentences in the long context condition. Moreover, a number of other studies also showed that metaphorical utterances can be understood as fast as the literal utterances if sufficient supporting context can be provided (Inhoff, Lima and Carrol, 1984; Ortony, Shallert, Reynolds and Antos, 1978). These results contradicted the Searlean sequential model of metaphor processing. Additionally, based on the differing results in the long v. short context conditions, they rejected the possibility that metaphorical contexts are 'chunked' and processed as semantic units. Otherwise, metaphors should have been retrieved in nearly equal times for both short and long context conditions, if metaphorical context were chunked in a fashion similar to how lexemes are processed.

Coulson and Van Petten's (2002) continuity claim suggests that both literal and metaphoric language processing "occur in the same course and involve the same processing mechanism" (Coulson and Van Petten, 2002: 959). However, they strongly rejected the view that metaphoric language is no more difficult to comprehend than literal language is. (ibid.) In their opinion, metaphorical language requires greater cognitive effort for processing, although literal and metaphorical language may take the same amount of time to comprehend. In their experiments (Coulson and Van Petten, 2002), they found that metaphors elicited larger N400s than did literal sentences. This suggests that subjects expended more effort in

metaphor comprehension than literal understanding. Moreover, they also discovered that metaphors generated a larger positivity than literal statements did at parietal, parietotemporal and occipital sites. These results have proved neuropsychologically that metaphor comprehension involves the establishment of mapping among more distantly related domains and in a more complicated integration cognitive process. Moreover, Coulson and Matlock's (2001) experiment finding that more unique features are generated in metaphorical than in literal mapping contexts suggests that metaphor processing involves more elaboration in the blending operations.

Likewise, many other scholars also realized that metaphor comprehension may cost more cognitive effort. As stated by Noveck (2001), understanding metaphors often comes up with more costs in comparison to understanding non-figurative statements. The extra costs can be reflected by the longer time taken to understand metaphorical than literal utterances. Gerrig and Healy's experiment (1983) is one example which demonstrated that reading metaphors takes longer than reading synonymous formulations. However, Noveck also pointed out that the extra costs (cognitive effort) in understanding a metaphor also bring out extra benefits (cognitive effect). That is perhaps why a metaphoric conclusion at the end of a paragraph leads to higher (immediately and delayed) "memorability" of both the conclusion and its context than does a literal conclusion (Reynolds and Schwartz, 1983).

### **3.1.3 The Parallel View**

There are also metaphor researchers who adopted a parallel view of metaphorical and literal comprehension that both the literal and metaphorical meaning are involved in parallel in understanding a metaphor. Through investigating whether metaphorical or literal interpretation of a text may produce stroop-like interference, Keysar's research (1989) has suggested that metaphorical and literal interpretation may well at least share component subsystems. Moreover, Gibbs' studies (1980, 1986) have shown that subjects take less time to read idiomatic phrases when the context supports an idiomatic interpretation than they do to read the same phrases in contexts supporting a literal interpretation. This suggests that comprehension processes of literal and metaphorical language operate in parallel, depending on which process the context primes.

Using the cross-modal priming technique, Blasko and Connine (1993) found that metaphors whose metaphorical and literal meanings are equally salient are

processed initially both literally and metaphorically. Such a result was confirmed by Giora and Fein's (1999) findings. According to them, both literal meaning and metaphorical meaning were activated in parallel in comprehending familiar metaphors. Since the literal and metaphorical meanings of familiar metaphors are similarly salient, they must share similar comprehension processes. However, the metaphorical meanings of novel metaphors are usually non-salient. As a matter of fact, they should take longer to read than their literal paraphrases.

### **3.1.4 The Combined View**

Recently, metaphor researchers (see e.g., Giora, 1997) started to notice that the metaphors adopted in most empirical studies which support the direct metaphor comprehension processing are conventional metaphors. In this sense, the direct processing view of metaphor comprehension is an oversimplification, because the claim of the equal cognitive effort required by the literal and metaphorical texts could be applicable to conventional metaphors, but not to novel metaphors.

In Giora's (1997) opinion, whether the comprehension of metaphors, in comparison to the literal statements, involves different process (direct/ parallel/ sequential) depends on the types of metaphors involved. In his words, "the direct/ sequential process debate, then, can be reconciled: Different linguistic expressions (salient- less salient) may tap different (direct/ parallel/ sequential) processes" (Giora, 1997: 183).

Bowdle and Gentner (2005) agreed with this view and argued that metaphor comprehension could involve either direct or indirect processing, with the conventional metaphor usually processed as direct categorizations and novel metaphors as indirect comparisons. Moreover, their empirical experiments show that the conventional metaphors are understood more rapidly than novel metaphors are.

### **3.2 Comprehending Metaphors versus Similes**

Unlike the hot debate of metaphor comprehension versus literal comprehension, there has been quite a lot of consensus in the views on comprehending metaphors versus similes. Generally speaking, fairly convincing cognitive studies have suggested that there exist clear differences between metaphors (X is a Y) and similes (X is like a Y) in terms of their interpretation and evaluation (see e.g.,

Aisenmann, 1999; Gregory and Mergler, 1990).<sup>19</sup> Some of the interesting findings are presented as follows:

According to the results of Sternberg and Nigro's studies (1981), metaphorical and analogical understanding is similar but not identical, because the interaction between the two domains, which Tourangeau and Sternberg (1981, 1982) proposed as crucial for metaphor comprehension does not necessarily characterize the analogical understanding process. In other words, metaphor comprehension but not simile comprehension is likely to involve the interaction between the two domains.

Chiappe and Kennedy's studies (1991, 2001) employed the so-called *aptness of the comparison* (the similarity between a topic and a vehicle) to explain when the metaphor form (X is a Y) is more preferred over the simile form (X is like a Y). According to the empirical results that they provided, the simile form was preferred when the aptness of the comparison is low whereas the metaphor form was preferred when the aptness of the comparison was high.

A series of experimental studies (Bowdle and Gentner, 1999, 2005; Gentner and Bowdle, 2001; Zharikov and Gentner, 2002) proposed that the *conventionality of the figurative meaning* of the vehicle concept play an important role in the preference of metaphor or simile. Those experiments suggested that metaphor form should be more preferred when the vehicle is a conventional one, as the tenor of the metaphor can be understood as one member of the category represented by the vehicle. When the vehicle of the comparison is novel, the simile form is preferred.

Three experiments from Utsumi and Kuwabara (2005) demonstrated that the *interpretive diversity* of a comparison between the topic and the vehicle should be crucial to explain the differences between metaphor and simile. The interpretive diversity is "the richness of the figurative meaning of a comparison," which is decided by two factors: "the number of features involved in the meaning and the salience distribution of those features" (2005: 2230). Based on the empirical results, they argued that the metaphor form should not only be preferred over but be more

---

<sup>19</sup>Of course, similes and metaphors do share similarities in contrast to literal statements. For instance, Glucksberg and Keysar (1990) found that the directionality (reversibility) seems to affect the meanings of the metaphorical comparisons (similes) than literal comparisons. Ortony *et al.* (1982) also suggested that the salience of the attributes involved in metaphorical comparison were much higher for the a-term than for the b-term as compared to the literal comparisons, and metaphorical comparison showed greater asymmetry of similarity and meaningfulness than literal comparisons. Bowdle and Gentner (2005) pointed out that not all but some metaphors can be understood as comparison just as similes.

comprehensible than the simile form when the interpretive diversity for a comparison is high, that is, when the figurative meaning involves more features and the salience of those features are more uniformly distributed.

In addition, Gibbs and Wales (1990) found that abstract vehicle concepts (e.g., beauty, imprisonment) are more likely to be associated with a preference for metaphors over similes than concrete vehicle concepts (e.g., cloud, pearl) are. This makes sense if metaphors, unlike similes, sometimes invite categorization, and therefore apply most naturally when the vehicle is more general than the topic. Gregory and Mergler (1990) suggested that similes are more likely than metaphors to highlight non obvious similarities between targets and vehicles. This supports the claim that similes, unlike metaphors, invite merely comparison and therefore are likely to involve a larger radius of potential commonalities.

As to the time required for processing similes and metaphors, Gregory and Mergler (1990) found that metaphors are read more slowly than similes whereas A. T. Johnson (1990) argued that metaphors took less time to understand than similes. Bowdle and Gentner (2005) proposed with their empirical findings that whether metaphor comprehension is quicker than simile understanding or vice versa depended on the conventionality of the figurative statements.

### 3.3 Steps of Metaphor Comprehension

Despite the abundance of cognitive empirical studies on metaphor comprehension, very few of them have provided a holistic view of the steps needed for comprehending metaphors. Tourangeau and Sternberg (1982) are one of the few researchers who have addressed this issue. They argued that metaphor can be comprehended in seven steps, somewhat similar but not identical to the seven steps of analogical reasoning proposed by Sternberg (1977a, 1977b). The following citation shows how they took *a lion among beasts is a king among rulers* as an example to illustrate those seven steps:

(a) *encoding* of the given terms, whereby the terms and possibly relevant attributes are retrieved from long-term memory; (b) *inference* of the relation between lion and beasts, whereby a lion is conceived as a kind of beast; (c) *mapping* of the higher-order relation that links a lion in its domain to a king in his domain, whereby each is seen as having a certain kind of primacy within its respective domain; (d) *application* of the previously inferred relation as mapped to the new domain to generate an ideal completion, such as 'people'; (e) *comparison* of this ideal completion to the two given completions, in this case, rulers and humans; (f) *justification* of one of the given answers as better than the other, although possibly non-ideal, so that humans is seen as close enough to the ideal, people, such as to be acceptable; and (g) *response*. (Tourangeau and Sternberg, 1982: 222)

Based on the experimental results, Nueckles and Janetzko (1997) suggested that metaphor comprehension proceeds in two successive steps: First, an analysis of the lexical meanings of the tenors and the vehicles is attempted. If there are enough similarities to produce a coherent and plausible interpretation, the comprehension process will cease. In case the similarities between the tenor and the vehicle are not sufficient, a shift to a different processing mode will take place. Therefore, a metaphor is not interpreted by resorting to the lexical meanings of the tenor and the vehicle; rather, there will be a synthesis of these terms. Such synthesis requires the activation of broader world knowledge about the semantic domains involved. A coherent interpretation is then achieved through a construction of new components of meaning. This is reflected in a high number of emergent features. The distinction between analysis-based and synthesis-based processing is closely akin to the distinction between similarity-based and similarity creating metaphors.

Although there have been few other systematic views on the steps of metaphor comprehension, several operations have been argued to be involved in metaphor comprehension. Fauconnier and Turner (1988) proposed that three cognitive operations are important for the comprehension of novel metaphors: composition, completion, and elaboration in attaining meaning through blending. Gibbs (1992) emphasized the access of the conceptual metaphor in comprehending conventional metaphorical expressions. Glucksberg, Keysar and McGlone (1990) argued for building up ad-hoc metaphorical categories for comprehending metaphorical expressions.

### **3.4 Views of Mappings Involved in Metaphor Comprehension**

In contrast to the limited systematic views on the steps taken to comprehend a metaphor, abundant studies are available to discuss the mapping process that could be involved in metaphor comprehension. As introduced in Chapter 2, most metaphor theories involve two domains (target and source, or tenor and vehicle). A central question is to clarify what happens between those two domains in processing a metaphor. There are at least three competitive proposals, namely *comparison*, *categorization*, and *interaction*:

The *comparison* view (Gentner and Clements, 1988; Ortony, 1979) argues that metaphor comprehension begins with a comparison of the two domains of the metaphor. Ortony (1985) argued that it is important for metaphor comprehension to detect the salience imbalance of the properties between the tenor and the vehicle.

Two predictions inferred from the SIT were tested in Ortony et al. (1985)'s four empirical studies:

- Compared with literal or anomalous similarity statements, metaphorical similarity statements will show much greater asymmetry of similarity and meaningfulness.
- Compared with other types of similarity statements, the salience of the attributes involved in metaphorical similarity statements will be much higher for the *a*-term than for the *b*-term.

The four experiments conducted by them confirmed that more salience imbalance of properties exists in the statements of metaphorical similarity than in those of literal similarity.

Gentner and Clements (1988) rejected that metaphor interpretation should be rated as more immediate and important with respect to the vehicle than with respect to the tenor as the SIT (Ortony, 1979) suggests. As a matter of fact, their series of studies showed that a systematic structure alignment with a focus of relational information shared by the tenor and the vehicle plays an important role in the metaphor comprehension process. According to Gentner<sup>20</sup>, two interrelated mechanisms, namely *alignment* and *projection*, are involved in metaphor comprehension. Through the *alignment* process, a maximal structurally consistent match between two representations is first attained under the systematicity constraint in which relational commonality is focused. Once such a structurally consistent match between the target and the base domains (the two domains concerning the topic and the vehicle concept) is found, other features from the base can be further projected to the target. Gentner and Clement (1988) conducted a series of experiments to test whether relations or attributes take priority in metaphor comprehension. The results of those experiments confirm the SMT's prediction that relational information is actually highlighted in metaphor comprehension in comparison with the attributional information. Moreover, it is also found that the aptness of a metaphor is related to the amount of relational information involved in metaphor comprehension. The more

---

<sup>20</sup> Gentner has actually collaborated with a number of people in the experimental research on metaphor comprehension. Among them, the experiment on the relational selectivity (Gentner and Clement, 1988) has directly provided empirical evidence that the SMT can be applied to articulate metaphor comprehension, whereas other experiments (Wolff and Gentner, 1992; Bowdle and Gentner, 1999; Bowdle and Gentner, 2005) were not aimed to find empirical evidence for SMT alone, but to tackle with the metaphor comprehension in a more comprehensive way. They used the experimental results to explain the plausibility of the coexistence of the comparison view and the categorization view as important mappings in understanding various types of metaphors.

relational information rather than attributional information is involved in comprehending a metaphor, the more apt the metaphor seems to be. Based on the empirical findings, Gentner and Clements (1988) argued that a systematical structure alignment with a focus of relational information plays an important role in the metaphor comprehension process.

The *categorization* view (e.g., Glucksberg and Keysar, 1990) regards metaphor comprehension as a process which starts with deriving an abstraction (metaphoric category) from the vehicle term, to which the topic belongs. In other words, metaphor comprehension involves identifying an abstract attributive category denoted by the vehicle concept *Y* to which the topic concept *X* can be assigned to. Thus, metaphors should be just as irreversible as literal class-inclusion assertions are. According to the two experiments done by Glucksberg, McGlone and Manfredi (1997), metaphors either lost or changed their meaning if reversed but literal comparisons were mostly reversible. Their empirical findings not only confirm that metaphors are irreversible just as literal inclusion did but also show that high-constraint topics and unambiguous vehicles<sup>21</sup> produce much facilitation in metaphor comprehension. This helps Glucksberg and et al. (1997) to clarify the specific contribution that the topics and the vehicles made to metaphor comprehension.

The *interaction* view (e.g, Tourangeau and Sternberg, 1982) also suggests that the topic domain and the vehicle domain are both important for metaphor comprehension. The interaction of the two domains<sup>22</sup> not only specifies what characteristics (features) are important for interpreting metaphors but also determines how to map those features within one domain onto those within the other. Tourangeau and Sternberg (1981) collaborated in conducting a number of experiments whose results confirm that the aptness of a metaphor increases with the between-domain distance but decreases with the within-domain distance. The data show that the comprehensibility of a metaphor is correlated with the aptness of that metaphor. They also found that the vehicle's extremity within its domain, but not the

---

<sup>21</sup> According to Glucksberg and et al. (1997), topics such as *lawyer*, which can be described in relatively few ways, place a high level of constraint on potential features, while topics such as *my brother* provides very few constraints as possibly anything can be said about one's own brother. Likewise, some vehicles like *voyage* are more ambiguous as they do not uniquely exemplify an attributive category or in other words, enjoy less agreement concerning their attributional features than other vehicles. Actually a pretest was implemented to assess the level of constraint and ambiguity of the topics and the vehicles applied in this experiment.

<sup>22</sup> The two domains refer to the domain to which the topic and the vehicle belong. In the metaphor, *a shark is the hawk among the fish*, the domain for the tenor *shark* is *fish* and the domain for the vehicle *hawk* is *bird*.

tenor's extremity within its domain, is related significantly to comprehensibility of a metaphor and the flexibility of the tenor, but not the flexibility of the vehicle correlates significantly with the comprehensibility of that metaphor.

Interestingly, these three distinguished views concerning the functions and the relations of the two terms in a metaphor are not mutually exclusive. Recent empirical studies rather show a possibility for their co-existence in explaining metaphor comprehension (e.g., Bortfeld and McGlone, 2001; Bowdle and Gentner, 2005; Nueckles and Janetzko, 1997; Wolf and Gentner, 1992).

According to Nueckles and Janetzko (1997), different semantic similarities between the topic and the vehicle in various metaphors can suggest that different processing models operate in metaphor comprehension. The following results have been attained from their experiments: First, the production of the emergent features was encouraged when the similarity between the tenor and the vehicle was low. Second, metaphors that subjects found difficult to understand (i.e. low ratings of propositional adequacy) provoked significantly more emergent features. Third, topic-vehicle pairs with high similarity produced shorter lexical decision latencies than tenor-vehicle pairs with low similarity.

Experiments conducted by Bortfeld and McGlone (2001) showed that different modes of metaphor comprehension (e.g., categorization attributive mode and analogical mode) are operative in different discourse context. By using the notion of a processing set<sup>23</sup>, they explain why people favor the attributional approach to metaphor comprehension in some contexts, but the analogical approach in others. Based on the empirical results, Bortfeld and McGlone argued that there is not necessarily a legitimate conflict between various metaphor comprehension models because they "may in fact describe different points on a continuum of metaphor processing." (2001:75)

Through three experiments, Bowdle and Gentner (2005) concluded that whether metaphors are processed as comparison or categorizations depended on two factors: the conventionality of the vehicle concept and the grammatical form of the statement, because conventional metaphors can either be understood through a comparison process or a categorization process. Bowdle and Gentner (2005) used

---

<sup>23</sup> The notion of different processing sets was used by Bortfeld and McGlone (2001) to account for a significant portion of the observed variability in metaphor interpretation. For instance, attributional and analogical approaches are likely to be preferred for understanding metaphors which are predominantly attributional (e.g., *clouds are marshmallows*) or analogical (e.g., *sarcasm is a veil*).

the results from the three experiments to support their career of metaphor hypothesis (CMH), which postulates a shift in the mode of mapping from comparison to categorization as metaphors are conventionalized. The hypothesis suggests that a computational distinction can be drawn between novel and conventional metaphors.<sup>24</sup> According to their research, a novel metaphor is typically understood as a comparison in which the tenor concept is structurally aligned with a domain-specific concept. A conventional metaphor can be understood either as a comparison with the tenor concept aligned with a vehicle concept or as a categorization process in which the tenor concept can be regarded as a member of the superordinate metaphoric category represented by the vehicle concept. With such a claim, the CMH is aimed at “uncover[ing] the mechanism of metaphoric processing” and “solving the debate between comparison and categorization model” (2005:193).

The Space structuring model (see e.g., Coulson and Matlock, 2001) distinguishes itself from the typical two-model view of metaphor comprehension and adopts a four-space view in processing metaphors. The Space structuring model is motivated by the conceptual blending theory and asserts that metaphor comprehension is a complicated online process. In order for a metaphor to be fully comprehended, not only the conceptual structure already existent in the two input spaces and the commonalties shared by the tenor and the vehicle in the generic space are activated and retrieved but also various mappings are encouraged in a timely way, which helps to temporarily construct an emergent structure in the blended space. In other words, the comprehension of a metaphor involves not only the activation of the conceptual structure already existed in the two input spaces and the generic space, but it also involves the activation of a reasonable temporarily constructed structure in the blended space and the establishment of a series of mappings among those four spaces. Coulson and his colleagues have done feature generating studies (see e.g., Coulson and Matlock, 2001) and event-related potential (ERP)<sup>25</sup> studies (see e.g.,

---

<sup>24</sup> According to Bowdle and Gentner (2005), a conventional metaphor (e.g., *a gene is a blueprint*) is the metaphor whose vehicle concept refers both to a domain specific concept (literal concept) and an associated metaphoric category, whereas a novel metaphor (e.g., *science is a glacier*) involves the vehicle concept, which refers to a domain-specific concept but are not yet associated with a metaphoric category.

<sup>25</sup> According to Rugg and Coles (1995), ERPs enables the discovery of even small fluctuations in the recording of subjects' EEG as synchronized to sensory, motor or cognitive events. This feature is used by Coulson and Van Petten (2002) to detect the differences between comprehending metaphors and comprehending literal statements. They suggested that there was a quantitative difference in neurophysiologic processes as indexed by ERPs that have the same polarity, wave shape, and scalp

Coulson and Van Petten 2002). The latent semantic analysis (LSA)<sup>26</sup> of the features generated from the former study shows that metaphor comprehension involves more elaborations in its blending operation than utterances in literal context. According to the results from the latter study, metaphor elicited larger N400s than did literal sentences, providing the neuropsychological evidence that metaphor comprehension involves the establishment of mapping among more distantly related domains and through more complicated cognitive integration processes. Based on those empirical studies, the space structuring model does not postulate that a discrete metaphoric meaning exists in people's conceptual system, but argues that metaphoric meaning results from the temporary construction of mental spaces in the integration network along with the establishment of mappings among objects and relationship represented in various spaces.

Despite the differences, the views on the mapping process mentioned above may not necessarily conflict with each other as different metaphor comprehension models. Instead, they could be brought together to explain how the comprehension process can operate for different types of metaphors.

### 3.5 Factors Involved in Metaphor Comprehension

The cognitive research on metaphors has identified several important factors (*context*, *familiarity*, *conventionality* and *aptness*) that could affect metaphor comprehension in a crucial way:

*Context* includes not only the sentential context and discourse context in which a metaphor appears but also the communicative situation in which a metaphor is used. Tourangeau and Sternberg (1982) pointed out in their domain-interaction metaphor theory that the context in which a metaphor is spoken may greatly affect its meaning.

Sometimes, of course, an author establishes a new system of beliefs about the concepts; or an author may develop the subject in enough details so that the context makes clear what the relevant features are. In these cases, it is not the pre-existing structure of the two domains that determines the meaning of the metaphor; it is the context. (Tourangeau and Sternberg, 1982: 216)

In empirical studies, it has been found that sufficient context can greatly facilitate metaphor comprehension (Cacciari and Glucksberg, 1994; Gibbs, 1994, 2001; Gibbs

---

distribution, but differ in amplitude or latency. Meanwhile, ERPs also suggest qualitative differences that differ in plority and waveshape distribution.

<sup>26</sup> *Latent semantic analysis* (LSA) is a method for "extracting and representing contextual-usage meaning of words by statistical computation applied to a large corpus of text." (Landauer, Foltz and Laham, 1998: 259) Through LSA, the representation of the words in a high dimensional semantic space can be attained.

and Nagaoka, 1985; Glucksberg, 1998; Lemaire and Bianco, 2003; Martin, 1994; Nayak and Gibbs, 1990; Rumelhart, 1979; Shinjo and Meyer, 1987). Nayak and Gibbs's six experiments on contextual appropriateness of idioms show that metaphorical expressions like idioms with a coherent context were processed faster than those without. Gibbs' other experiments (Gibbs, 1980, 1986) indicate that different context primes can vary people's preference to use a literal or metaphorical processing of a text.

Moreover, Bortfeld and McGlone (2001) also discovered that the attributional approach is favoured for metaphor comprehension in some contexts but the analogical approach is favored in others. The empirical study done by Pudelko and et al. (1999) shows that the context in which the topic appears decides the properties of the vehicle that are actually attributed to the topic. Also, conventional interpretations of a metaphor do not predominate unless this context is neutral.

*Conventionality*, or another similar term, *familiarity* indicates whether a metaphor has ever been encountered before. Jones and Estes defined conventionality as "the extent to which the concept is associated with a figurative meaning". (2006: 23) Blasko and Connine (1993) argued from their experimental results that *familiarity*, moderated by the *aptness* of metaphor, can greatly affect the processing of metaphors. According to their experiments, the figurative meaning of familiar metaphors, rather than of unfamiliar metaphors can be accessed as quickly as the meaning of the literal statements. And if unfamiliar metaphors are perceived as apt, the figurative meaning and literal meanings will be derived equally rapidly.

*Conventionality*, according to Bowdle and Gentner (2005), is closely related to whether a domain-general category is available to the base term (vehicle). If there pre-exists such a metaphoric category for the base term, this metaphor is a conventional metaphor. Otherwise, it is a novel metaphor. Novel metaphors are mostly processed by comparison, but conventional metaphors can be processed as comparison or categorization.

*Aptness*<sup>27</sup> refers to the quality of a metaphor. Chiappe et al. defined the aptness as "the extent to which the statement captures important features of the topic" (Chiappe et al., 2003:97). Tourangeau and Sternberg (1982) empirically proved their hypothesis that the aptness of a metaphor increases with the between-domain distance but decreases with the within-domain distance. Their data also suggest that

---

<sup>27</sup> There are several proposals of different metrics by which the aptness of a metaphor can be measured. ( see e.g., Gentner 1980; Ortony, 1979; Tourangeau and Sternberg, 1981)

the comprehensibility of a metaphor correlates with its aptness. Nueckles and Janetzko (1997) used propositional adequacy to show the aptness of the proposition a metaphor communicates. Their experiments show that emergent features are encouraged if the propositional adequacy ratings are low.

Moreover, Utsumi (2006) and his colleagues proposed that *interpretive diversity*<sup>28</sup> determines whether metaphors are processed as comparisons or categorizations. According to the psychological and computational evidence (Utsumi, 2006; Utsumi and Kuwabara, 2005), they have attempted to tackle metaphor comprehension using comparison and categorization algorithms based on word vectors in a multidimensional semantic space constructed by LSA. They argued that the comprehension of diverse metaphors requires the process of categorization whereas less diverse metaphors are likely to be processed as comparison.

In addition, other factors, such as *the availability of semantic similarity* (Nueckles and Janetzko, 1997) between the tenor and the vehicle and the *salience* (Ortony, 1979a, 1979b) have also been argued as important factors, which can affect the cognitive process of metaphor comprehension.

### 3.6 Open Issues

A number of empirical cognitive studies have clarified a large amount of the mist for metaphor comprehension. For instance, metaphor comprehension was no longer seen as a process in which a non-literal interpretation follows only after the literal understanding fails as the sequential view (see e.g., Grice, 1975; Seale, 1979) suggests. Rather, a large number of metaphors, especially familiar metaphors can be accessed directly as literal statements. As to the most controversial debate of the mapping process involved in metaphor comprehension, recent studies (Bortfeld and McGlone, 2001; Bowdle and Gentner, 2005; Nueckles and Janetzko, 1997) have shown that it might be an oversimplification to argue that a comparative view or a categorization view alone is sufficient for understanding the process involved in comprehending all types of metaphors. Different types of metaphors may be processed through different cognitive mechanisms. Despite these achievements, several issues are still open for further empirical studies. Following are three selected issues that are related to the present empirical study.

---

<sup>28</sup>Interpretive diversity is “a measure of the semantic richness of literal or figurative utterances including metaphors; it is high to the extent that more features constitute the utterance meaning and that their relative salience are more evenly distributed.” (Utsumi, 2006: 2281)

### 3.6.1 Viability of Metaphor Comprehension

Several empirical studies (see 3.4) have been reported to show that different types of metaphors may exert an influence on the mapping mechanism and the degree of difficulty involved in the comprehension process. Different criteria were adopted to distinguish those metaphor types. Some studies employ *familiarity* and *conventionality* (see e.g., Blasko and Connine, 1993; Bowdle and Gentner, 2005; Lu, 2002) to distinguish various cognitive metaphor comprehension processes; others hold the view that aptness (see e.g., Chiappe et al 2003; Jones and Estes, 2005; Tourangeau and Sternberg, 1982) greatly affect metaphor comprehension. In addition, a number of studies (see e.g., Bortfeld and McGlone, 2001; Cacciari and Glucksberg, 1994; Gibbs, 1994, 2001; Gibbs and Nagaoka, 1985; Glucksberg, 1998; Martin, 1994; Rumelhart, 1979; Shinjo and Meyer, 1987) suggest that whether the metaphor is presented in isolation or in an ongoing context causes the metaphor comprehension process to vary. In general, a consensus has been reached that the comprehension of metaphors may vary from one to another although different views exist on which factors cause the viability of metaphor comprehension.

### 3.6.2 Metaphor Comprehension in Communicative Context

Although a number of empirical studies have investigated metaphor comprehension in the sentential, discourse or even social context (see e.g., Cacciari and Glucksberg, 1994; Gibbs, 1994, 2001; Gibbs and Nagaoka, 1985; Glucksberg, 1998; Lemaire and Bianco, 2003; Martin, 1994; Nayak and Gibbs, 1990; Rumelhart, 1979; Shinjo and Meyer, 1987), there have been very few studies that have dealt with metaphor comprehension in communicative context, with the exception of discourse analyses of metaphors in the sense of language use (see e.g., Cameron, et al, 2008).

This is very astonishing, because metaphors are actually pervasive in people's communication, as Bowdle and Gentner (2005) pointed out that metaphor is common in every day communication. They quoted an analysis of television programs done by Graesser et al. (1989) who found that a unique metaphor appears for every 25 words uttered by a speaker. Besides, a number of studies have shown that metaphor plays an important role in communication in many other fields, such as in politics for its persuasiveness (see e.g., Mio, 1996, 1997; Mio et al., 2005; Müller, 2005), in science for conceptualizing theoretical construct (see e.g., Gentner and Grudin, 1985;

Hoffman, 1980; Kuhn, 1979; Roediger, 1980; Sternberg, 1995), in media communication for proposing new ways to communicate what is novel (see e.g., Kennedy, 2005; Forceville, 1996, 2007) and in teaching and coaching for importing inspiring analogies to develop skill acquisition (see e.g., Carlson, 2001; Gassner, 1999).

The popularity of the metaphors in people's everyday and academic communication is not arbitrary. Three hypotheses (Ortony, 1975, 1993; Fainsilber and Ortony, 1987) have been employed to support Ortony's assertion that "metaphors are necessary and not just nice" (1975: 45) The inexpressibility hypothesis asserts that metaphors can convey ideas which are otherwise not easily or even impossible to be expressed in literal language. The compactness hypothesis emphasizes that the direct and concise form of a metaphor captures the essence instead of the detailed elements of a particular experience. Since these detailed elements can be reconstructed later from the rich image of the metaphor, the cumbersome and inefficient attributive description can be avoided. The vividness hypothesis suggests that aspects of ideas which are intangible, complex and, relational are more communicable through metaphors. In other words, when an abstract idea is expressed metaphorically, it is more vivid and memorable than when expressed in literal language.

Another important support for the necessity of metaphors in human communication is the embodiment hypothesis (Lakoff and Johnson, 1999). It argues that the functioning of our body and the interactive experience with the environment are crucial for the structure of our conceptual system, which is metaphorical in nature. Thus, it is logical for people to retrieve their former relevant experiences in order to make new experiences or ideas easier to access or process.

Moreover, metaphors help to import new knowledge to the old knowledge. Carroll and Mack claimed, "[m]etaphor can facilitate active learning in this situation by providing clues for adductive and adductive inferences through which learners construct procedural knowledge of the computer" (1985: 47). Lawsley and Tompkins (2000)<sup>29</sup>, through their coaching and clinical experiences, observed the property of metaphors from the perspective of individual use of metaphors in their daily communications. They claimed that the use of many metaphors is idiosyncratic and unique to individuals. Such an individual use of metaphor shows a coherent logic that

---

<sup>29</sup> Lawley and Tompkins have developed the so-called symbolic modelling, an information-centred therapeutic model, in which therapists help their clients in modelling their own metaphoric landscape.

is consistent over time. Once a metaphor is internalized by an individual, it exerts logical influence on their behavior consistent with that metaphor. If the basic metaphor is changed, correspondent changes concerning their view of the world, their decisions and actions will follow in consequence.

In addition, Gibbs (1994) argued that metaphor, as a good mnemonic aid, is helpful in learning new information by applying the new information to the “semantic frameworks from long term memory” anchored by metaphors. In this sense, metaphors can facilitate people’s processing of new information in communication. In Keysar and Glucksberg (1992)’s opinion, metaphors can convey new information, but this function is not unique to metaphors. Literal means can also be employed in conveying new information. Thus, they argued that the unique function of metaphors lie in the categorization way to convey new information. In their words, “the use of a metaphor serves the communicative function of indicating the strength of the implied attribution.” (1992: 656)

Moreover, another important function of metaphor in communication is the “achievement of intimacy” (see e.g., Cohen, 1979; Horton, 2004). Through using a metaphor, speakers can create a link, a common ground or feelings of commonality with their addressees who share similar experiences and interests (see e.g., Gerrig and Gibbs, 1988; Gibbs, 1994; Gibbs and Gerrig, 1989). Gibbs (1994) also argued that metaphors and other figurative means are quite effective in expressing people’s emotional attitudes, which are crucial for communication, as communication is more than information exchange.

In short, metaphors are omnipresent in people’s daily communication. As literary language alone is not sufficient for all communication purposes, metaphors, together with other figurative language forms, fill those gaps by using compact and vivid images anchored to the conceptual framework of people’s long-term memory to assist learning new information, by retrieving the former embodied experiences to express ideas which are difficult to express in literary language, by creating common grounds to achieve social intimacy and so on.

Since metaphors are created and used in communication to encode particular communicative persuasive and contextually-motivated goals, the determination and evaluation of these goals, in the author’s opinion, shall form a major part of the interpretative process of metaphors. It would not only be interesting but also

necessary to study metaphor comprehension in a possibly interactive communicative context.

### **3.6.3 Metaphor Comprehension and Culture**

Metaphors have long been argued to be culturally embedded (see e.g., Lakoff and Johnson, 1980; Kövecses, 2005). A large number of empirical studies have been conducted to search for the conceptual metaphors in various cultures through corpus of rich metaphorical expressions (see e.g., Ahrens, 2005, Kövecses, 2005). In research on metaphor and culture, two themes have been studied with great enthusiasm: metaphor and culture models in formulating understanding and universal metaphors and their cultural variations:

#### **Metaphor and Culture Model in Formulating Understanding**

In studying metaphor and culture, there are two competing claims in the debate between the cognitive linguists and the cultural anthropologists. (see e.g.: Gibbs, 1994; Kövecses, 2000, 2005; Lakoff and Kövecses, 1987, Quinn, 1991, Strauss and Quinn, 1997;)

One claim holds that metaphor is conceptual and constrains our understanding, while the other argues that metaphor cannot structure understanding if the guideline of the cultural models or schemas is deprived. The former is mainly represented by the CMT theorists. According to the CMT, “our conceptual system is largely metaphorical”. (Lakoff and Johnson, 1980: 65) Metaphor is not a form of figurative expressions but a form of conception. Since it is manifestly conceptual, it is also crucial for constraining thought. From systematic metaphorical expressions, imbedded conceptual metaphors can be detected. These major conceptual metaphors underlie and model our language, thought and culture. (see e.g., Gibbs, 1994; Lakoff, 1993; Lakoff and Johnson, 1999)<sup>30</sup>

This cognitive view that metaphor constitutes culture through its pervasive power over people’s conceptual system has been challenged by cultural anthropologists (see e.g., Quinn, 1991, Strauss and Quinn, 1997). Quinn (1991) rejected the idea that conceptual metaphors can drive culture. On the contrary, she argued that

---

<sup>30</sup> Influenced by the conceptual metaphor theory, a number of studies have been done to explore metaphor and culture by sorting the metaphorical expressions based on corpus data, generalizing conceptual metaphors and deriving and comparing cultural information.(see e.g., Ahren et.al, 2005; Su 2002)

cultural models or schemas motivate the use of metaphor. According to her, metaphors do not produce new conceptual inferences; they just reflect existing understanding. In her words, metaphors are generated to “satisfy mappings onto already existing cultural understanding” (Quinn, 1991: 65).

**Table 2: Quinn’s eight thematic groups of metaphorical expressions.**  
(see Quinn, 1991: 66)

Thematic groups	Examples of metaphorical expressions
Lastingness	It was stuck together pretty good.
	It’s that feeling of confidence we have about each other that’s going to keep us going.
Mutual benefit	That was really something that we go out of the marriage.
	Our marriage is a very good thing for both of us.
Sharedness	I felt like a marriage was just a partnership.
	We’re together in this.
Compatibility	The best thing about Bill is that he fits me so well.
	Both of our weakness are such that the other person could fill in.
Efforts	She works harder at our marriage than I do.
	We had to fight our way back to the beginning.
Difficulties	That was one of the hard barriers to get over.
	The first year we were married was really a trial.
Success or failure	We knew that it was working.
	The marriage may be doomed.
Risk	There’re so many odds against marriage.
	That marriage was in trouble.

Quinn (1991) has collected data from an interview about the American conceptualization of *marriage* to support the view that metaphor does not constitute the understanding of a concept but is rather used as an expository device of the preexisting concepts. Quinn separated the metaphorical expressions which were collected from the interview into eight groups. She called the eight groups the eight different thematic fields of the concept *marriage*, including *lastingness*, *mutual benefit*, *sharedness*, *compatibility*, *efforts*, *difficulties*, *success or failure*, and *risk*. Each thematic element is instantiated by a wide variety of metaphors. In Table 2, two examples of the metaphors within each thematic group are provided. Obviously, highly variable expressions are included in each of the eight thematic groups. For instance, several types of metaphors were used by the interviewees to describe the *lastingness* of marriage. Some people used expressions like *shaped into something good*,” *solid foundation* and *forging together the best parts of that person* to talk about marriage, as if marriage is a well manufactured product, which is put together with good material and can last long. The other people would rather prefer to have the *lastingness* of marriage be cast as an ongoing journey undertaken together by

two people, a durable attachment, an indestructible object, a secure possession, or a covenant with God, so on and so forth.

A lasting marriage can be both a well-made product and an ongoing journey, as well as a firmly held possession, a secure bond, and a permanent location, and that this is so can be only made explicable in terms of the underlying concept, independent of any of these metaphors, of marriage as lasting.  
(Quinn 1991:71-72)

Quinn also noticed that those various metaphors that contributed to the one thematic group were not necessarily created by different interviewees. In contrast, she observed that several of her interviewees effortlessly slipped between various metaphors in talking about their understanding of marriage. Thus, Quinn inferred that there must be a more general underlying structure than metaphors that encompass the choice of various metaphors within a thematic group.

Quinn (1991) further argued that this more general underlying structure is cultural model or cultural schema. It is the conceptual themes of an underlying cultural model or cultural schema that motivate the use of metaphors; not conceptual metaphors motivate the cultural model. Cultural schemas refer to the mediating structures that are responsible for efficient reasoning because they create condensed neural networks that allow direct reasoning chains from any thematic part to any other, even if these are causally distant, such as *efforts* and *lastingness of marriage*. (Strauss and Quinn, 1997: 166)

By listing the eight metaphorical categories associated with marriage, she showed that the metaphorical expressions employed by the interviewees revealed their beliefs of what marriage is. In other words, the use of metaphor merely reflects their existing cultural understanding of marriage but by no means creates new conceptual inference. The metaphorical expressions that they uttered were deliberately selected by the interviewees to match the points that they already had in mind.

On this basis, Quinn questioned the argument put forth by Lakoff and Johnson that image schema structures the understanding of a concept. She criticized their approach for understating the variability in the use of metaphor and argued that linguistic metaphors can only provide satisfactory mappings on independent and already existing cultural understandings because they are too multiform to arise from a simple image schema as named by Lakoff and Johnson (1980a).

The supporters of the CMT, such as Kövecses and Gibbs, rejected this argument. Gibbs wrote,

The fact that speakers often employ a variety of metaphors in talking about marriage, sometimes switching quickly between tropes, does not mean that those expressions only name or refer to aspects of some non-metaphorical cultural model. As is the case for anger, people use different metaphors,

even within the same narrative, because each metaphor reflects a different aspect of their metaphorical understanding of some experience. One's cognitive model of marriage may consist of various metaphors that capture different aspects of our understanding of marriage, such as compatibility, mutual benefit and lastingness. These metaphors may be contiguously linked, perhaps as a kind of radical structure, yet need not be internally consistent. For example, we may at times see marriage as being a container but at other times as being like a manufactured product  
(Gibbs, 1994: 204-205)

In order to remove Quinn's doubts, Kövecses (2000:12) even proposed the *unity* metaphor to be a high-level metaphor that is compatible with Quinn's eight thematic American understandings of marriage. He explained why the *unity* metaphor also implies themes such as *sharedness*, *compatibility*, *mutual benefits*, *lastingness* and so on as follows:

Because a part by itself is not functional, people want to share their lives with others in marriage. because only one or some parts fit another part, people want compatible partners in marriage. Because (to get a functioning whole) a part must perform its designated function, people want to fulfil their designated roles in a marriage relationship. Because wholes have a designated function to perform, marriage relationship must be lasting.  
(Kövecses 2000: 121)

Of course, there are other views that adopt a more compromising attitude in dealing with the issues of this debate. For instance, Holland and Valsiner (1988) deliberately avoided the dominating position argument between cultural models and metaphor by highlighting the importance of both:

Highlighted by a new metaphor, a cultural model may be developed in different directions, and similarly the meaning of the 'new' metaphor itself may come to be elaborated in new ways (...) The metaphor and the model develop together in a dialectical fashion; neither determines or is determined by the other .  
(1988:264-5)

Kimmel (2002) even argued that such a debate between cognitive scientists and cultural anthropologists is largely due to their different understanding of the key term "ontology." He expressed this idea in the following: "When we factor out terminological muddles and misprisions, the two sides complement each other."  
(2002: 170)

All in all, there are considerable differences between the cognitive scientists and cultural anthropologists in explaining the driving force of the understanding of a concept. The former emphasize on the conceptual metaphors as the underlying force that drives the understanding, whereas the latter rely more on cultural models. The author holds the view that conventional metaphors reflect but do not create the understanding of a concept. However, this does not exclude that new understanding can be imported by novel metaphors.

### Universal and Culture-specific Metaphors

A very interesting phenomenon of metaphors is the coexistence of its universality and variation. The comprehension of universal metaphors and culture-specific metaphors may differ from each other. On one hand, a couple of concepts such as *anger* (Kövecses, 2000) and *time* (Alverson, 1994) are conceptualized in universal metaphors across cultures. On the other hand, this general metaphorical conceptualization also varies considerably in each culture. Metaphorical universals are reflected in the following aspects:

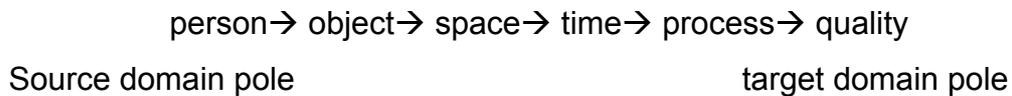
First, recent studies have shown that identical or similar metaphors can be found across several cultures. For instance, Neumann (2001) presented 106 analogous metaphors in German and Japanese. Kövecses (2000, 2002, 2005) reported that there is language evidence not only in English but also in Hungarian, Polish, Chinese, Japanese, Zulu, Wolof and Thintian to suggest a similar conceptual metaphor *anger is hot fluid in a container* with minor variations. Yu (1999) discovered that both Chinese and English conceive *causes as forces, changes as movements, means as paths, and difficulty as impediments* and so on. Furthermore, Alverson (1994) claimed that the linguistic expressions for *time* in English, Chinese, Hindi, and Stswana suggest that the conceptualization of *time as a partible entity, a causal force, a source, and an artefact of ascertainment of the change* are shared by those cultures.

Second, there are a large number of metaphors based on the universal topology or truth-like analogies, such as the famous *solar system/ atom* analogy, which Gentner (1983) regarded as complex topology that is mainly structure-based and independent from the surface features. This is also described by Alverson as follows:

There is an experience that would in some minimal way be shared by all languages/ cultures and their speakers- that of the immediate surface of the earth and the seeming course of sun and moon. Such a 'scene' would contain such potentialities for experience as these : 1) propinquity; 2) distance; 3) demarcation of spatial relationships; 4) the dial, orbit, or trajectory of sun and moon, whose light is both a point and a sweep or array; 5) cloud cover; 6) altitude; 7) courses of movement/ travel through the trajectory; 8) barriers to sensory and locator access; and 9) behaviour of entities occupying this scene. (Alverson 1991: 112)

Third, there is a universal tendency of expressing of one ontological kind in terms of another. According to Heine and his colleagues (see Heine, Claudi, and Hünemeyer 1991, cited by Kimmel 2002: 151), there are experiential salient connections between the most elementary ontological domains that hold universally across languages. Their research suggests that a universal order holding between source-target pairing exists among a number of cultures. Such an order that

determines which domain class can become a metaphorical source for other classes is expressed in a chain as follows:



They argued that metaphors are typically formed to use the left of the chain (concrete concepts) as source domains to describe the right of the chain (progressively abstract) as target domains. Consistent with this logic, concepts within the categories of *person*, *object*, *space*, *time* and *process* can be used to describe *quality*. Concepts within the categories of *person*, *object*, *space* and *time* can be used to describe *process* and so on.

Last but not least, various cultures also share the same favour in employing several source domains (vehicles) in generating metaphors. For instance, *body*, includes body motion and functions and creates a rich source for metaphors among a large number of cultures (see Kövecses, 2000). Furthermore, Tilley (1999: 36) argued that house and landscape are favoured by many cultures as source domains. In various cultures, animals, nature and machines are also typically used as the source domain for metaphors.

The universality of metaphor shows that there must be a language independent mechanism responsible for metaphor production. Grady (1997) argued that universal metaphors, in his term 'primary metaphors,' result from the human embodied experience. He tried to use the parent-child relationship to explain universal metaphors like *affection is warmth*. Kimmel (2002) summarized various kinds of experiential co-occurrence that motivate the universals in metaphor:

1) Universal archetypal experiences may motivate metaphors such as AFFECTION IS WARMTH or INTIMACY IS CLOSENESS.

2) Other universal archetypes may motivated a rich image-schematic scene that is encoded in language and underlies polysemous categories; e.g. for a proposition such as OVER. Yet, it cannot be simply taken for granted that just because an experience such as the rising sun is universal, it is the cognitive archetype from which the conceptual system in question results. It needs to be shown that a scene actually shapes the lexical system as reflected in a detailed analysis of the imagery.

3) Universal physiological reaction of the autonomous nervous system may indirectly motivate metaphors, such as in the case of emotions.... [E.g.] ANGER IS HOT FLUID IN A CONTAINER is so widespread because of universal experiences of blood pressure, body heat, and respiratory intensification in anger.

4) General ontological metaphors for time, space, modality, etc. are hardly shaped through a single formative experience. Instead, basic ontological metaphors, such as EVENTS ARE JOURNEYS, MEANS ARE PATHS, or TIME IS A MOVING OBJECT, underlie many kinds of experience and arise from basic spatio-temporal experience. (Kimmel, 2002: 155)

In contrast to the universals in metaphors, there is pervasive evidence of not only culture-specific metaphors but also cultural variations of universal metaphorical conceptualizations. For instance, on one hand, Ots (1994) found that *heart* is basically conceptualized as a *container* in both the Chinese and the German culture; on the other hand, he also discovered considerable differences with regard to the movements inside the *container*:

But there is a small, yet decisive difference between the Chinese and the German idioms of the heart. In Chinese the rhythmic action, e.g. the pounding, beating and jumping of the heart of joy is missing. If the heart jumps or palpitates (...) it refers to something negative, refers to a heart that is in fear and danger (...). The cultural motto of quietness and harmony that constructs a still and empty heart has left its imprint on Chinese idiomatic language. (Ots, 1994: 129)

Another well-known example is the conceptualization of *anger*. As we know, people experience an increase in both skin temperature and blood pressure when they grow angry. However, Yu's (1995, 1998) studies of *anger*-related expressions in Chinese and English indicate that *anger* is conceptualized by Chinese mostly on pressure alone rather than on pressure and heat as by the English speakers. Thus, it is clear that the Chinese speakers differ from the English users by their different emphasis on the aspect of the physiology involved in the metaphorical conceptualization of *anger*.

Through comparing metaphors for lust and sexuality from American English and Chagga (a Bantu language of Tanzania), Emantatian (1995) found that both languages reflect similar conceptualizations of *lust* and *sexuality* as *eating* and *heat*, but the conceptualizations differ from each other in their scope, entailments, framing, and associated imagery.

The studies above show that even a universal bodily basis does not necessarily build universal metaphors. Kövecses (2000: 165) proposed the following possible cross-cultural variation in metaphors: 1) variation in the content of prototypical cultural models, 2) variation in the influence of the broader cultural context and its key concepts, 3) variation in the scope of a conceptual metaphor or metonymy, 4) variation in the elaboration of conceptual metaphor or metonymy, and 5) incidence of linguistic metaphor as opposed to a preference for metonymies.

Likewise, Kimmel (2002:162) summarized possible potential sources of metaphor variations in the following aspects: 1) the incidence and variability of metaphor and models used for a given domain, 2) the systematicity of structural sub-mappings and the possible entailments of a given conceptual metaphor, 3) the discourse pragmatic usage and social framing of a given conceptual metaphor, 4) the illustrative imagery

used at the level of linguistic manifestations for a given conceptual metaphor and 5) general patterns in metaphor use in a culture.

To explain the cultural variation of the metaphor universals, Kövecses coined the term 'differential experiential focus in mind' (Kövecses, 2005: 246, 286-287). On a large scale, he concurred with the embodiment theory that the universality of metaphors largely relies on its universal embodied experience. By 'differential experiential focus in mind,' he meant,

[D]ifferent peoples may be attuned to different aspects of their bodily functioning in relation to target domain, or that they can ignore or downplay certain aspects of their functioning as regards the metaphorical conceptualization of a particular target domain. (Kövecses, 2006: 3)

Beside those cultural variations, diachronic changes in metaphor also accompany the evolution of a language. For instance, Gevaert (2001, 2005) have found that the conceptualization of *anger* in the Middle English language differs considerably from that in the Old English language.

Despite the wide recognition of the culture-specific metaphors, very few studies have explored how metaphors originating from another culture are comprehended, or what specific cognitive process is involved in comprehending the metaphors when their required background fails. Although the experiment presented here was not aimed at studying cultural factors in metaphor comprehension, *culture* was employed as an experimental factor to distinguish two experimental groups who may differ dramatically from each other in estimating the aptness and conventionality of the teacher metaphors. Moreover, the above clarification of the coexistence of metaphor universals and cultural variations makes it easy to acknowledge that metaphors may be accepted as conventional and apt in one culture but be unconventional and inapt in another.

## **Chapter 4: A Cross-cultural Web-based Experiment on Understanding Teacher Metaphors**

This chapter mainly focuses on a cross-cultural online experiment that explores how three teacher metaphors are understood by the German and Chinese subjects in various role-play contexts. Based on the research question, the hypotheses of the experiment were formed. A detailed description of the experimental method, including subjects, material, procedure and design, is available to illustrate the implementation of the experiment. The results from this experiment show the comprehension process of metaphor is not only influenced by the conceptual knowledge of the metaphor addressees but also by their perception of the context in which the metaphor is provided.

### **4.1 Hypotheses**

After a review of the current empirical researches on metaphor comprehension in Chapter 3, three open issues have been brought onto scene:

- What are the factors that influence the comprehension of metaphors?
- How are metaphors comprehended in a communicative context?
- How can a culture-specific metaphor be comprehended by people from another culture?

Of course, all these open issues are interesting to be studied in detail. However, this study does not have the ambition to deal with all of them because it is not at all possible that all three separate issues can be cleared up in one empirical study. As a matter of fact, the study intends to explore just one aspect which all those issues reflect, the dynamic aspect of metaphor comprehension. In other words, this research is to study what kind of factors may alter the comprehension process of a metaphor and in which way the processing of a metaphor may change.

Two arguments can be inferred from the dynamic aspect of metaphor comprehension. First, it is argued that no single view of the mapping involved in comprehending a metaphor, not the comparative view taken by the CMT and the SMT, the categorization view proposed by the ACT, the interaction view taken by the DIT, nor the integration or blending view proposed by the CBT is sufficient to unfold the mystery of metaphor comprehension. As a matter of fact, a more synthetic approach shall be taken.

In this sense, Bowdle and Gentner's Career of Metaphor Hypothesis (2005) brings new inspirations as it postulates a shift in mode of mapping from comparison to categorization as metaphors are conventionalized. In order to illustrate that the comprehension of various metaphors may involve different mapping mechanisms, they classified metaphors according to the criterion of conventionality into dead metaphors, conventional metaphors, and novel metaphors.

Bowdle and Gentner's (2005) argument that different types of metaphors involve different mapping mechanism is insightful. However, only two kinds of mapping, comparison and categorization were involved in their discussion. This is because the metaphor classification suggested by them is still too general, especially concerning the end of novelty. For instance, if aptness as well as conventionality were employed as a criterion of classification, novel metaphors could be further classified as unconventional and apt metaphors and unconventional and inapt metaphors.<sup>31</sup> Therefore, it is a crucial to ask how to classify metaphors properly in the cognitive metaphor comprehension research and what are the suitable criteria?

According to Bowdle and Gentner (2005), conventionality is largely related to the availability of an abstract metaphoric category of the vehicle. In their words, "[c]onventional metaphors can be distinguished not only in terms of whether the base term evokes an abstract metaphoric category but also in terms of how this abstraction is related to the literal base concept." (Bowdle and Gentner, 2005: 208). Jones and Estes rendered such a definition in their words as "the extent to which the concept is associated with a figurative meaning" (2006: 23).

However, several other studies have shown that the aptness of a metaphor can also influence the cognitive processing of metaphor (see e.g. Blasko and Connine, 1993; Chiappe et al, 2003; Jones and Estes, 2005; Tourangeau and Sternberg, 1982). According to Chiappe et al., the aptness of a metaphor is "the extent to which the statement captures important features of the topic" (2003: 97) or, in Blasko and Connie's definition, "how well the metaphor expresses its specific non-literal meaning." (1993: 297)

According to Jone and Estes (2005), *conventionality* differs from *aptness* because *conventionality* is largely addressed to the vehicle, but *aptness* is related to both the

---

<sup>31</sup> The comprehension of the former depends much on the creative thinking in a certain context, such as the metaphorical expressions frequently appeared in poetry, but that of the latter is hard to attain even in a concrete context unless the failed background information is imported, for instance, the relevant socio-cultural information is a must for understanding culture-specific metaphors.

topic and the vehicle. Their experiments suggest that *aptness* rather than *conventionality* mediates categorization in metaphor comprehension.

This work holds the view that whether a metaphor is conventional or unconventional, apt or inapt, does not depend on the metaphor itself but on the assessment of the metaphor addressee. Then a question emerges: Will different people take different cognitive processing mechanisms in comprehending a metaphor if their estimations of the conventionality and the aptness of the metaphor differ? To study this question is actually to study the relation between people's pre-existing knowledge concerning the topic and the vehicle and the cognitive mechanism as involved in the online understanding of a metaphor.

Standing on the shoulder of the giants, this work argues that the pre-existing conceptual knowledge of the metaphor addressee, which is actually reflected in the degree of aptness and conventionality assigned by the metaphor addressee to the metaphor, plays an important role in metaphor comprehension. Just as Ritchie argued, "[e]ach metaphor is interpreted in the particular communicative context in which it is encountered, and individual interpretations will not necessarily match unless the individuals' cognitive representations of the common ground are similar." (2004a: 265) In contrast to Bowdle and Gentner's work (2005), the present empirical study employs the two criteria, conventionality and aptness, in discussing metaphor comprehension. Here, conventionality refers to the familiarity of the metaphor as estimated by the metaphor addressee; aptness follows Jone and Estes's (2005) definition, the metaphor addressee's estimation of the suitability in describing the crucial property of the topic.

Currently, there is very little cognitive metaphor research that compares how a metaphor is understood by people whose pre-existing conceptual knowledge as decided by their socio-cultural background varies greatly from each other. For such research, it is important to use the metaphors which are considered as conventional and apt by one group of subjects but unconventional and inapt by the other group of subjects. In order to select this kind of metaphors, it is convenient to employ culture-specific metaphors and multicultural groups of subjects in the experimental study, because many culture-specific metaphors are well-known and apt metaphors in their source culture but new and difficult to comprehend for people from another culture. In this case, the culture differences can be used to study how people's pre-existing

conceptual knowledge may influence the cognitive processing mechanism involved in comprehending a metaphor.

Another argument inferred from the dynamic aspect of metaphor comprehension is that one metaphor may employ different cognitive processing mechanisms if it is provided in different contexts. In contrast to the fact that metaphors are omnipresent in people's communication, very few cognitive psychological experiments have ever been designed to study metaphor comprehension in interactive communicative contexts. This work makes the effort to fill up this gap and highly values the role of a communicative context in affecting the metaphor comprehension. This work follows Sperber and Wilson's relevance theory (2004) in that the contextual assumptions and the contextual implications based on the context in which a metaphor appears play a decisive role in metaphor comprehension. Since this theoretical argument has not been empirically studied, it would be interesting for this empirical research to test it.

In summary, this study was designed to explore how different people, who may have different estimations of the aptness and the conventionality of a metaphor, based on their pre-existing knowledge, may employ different processing mechanism in understanding metaphors in different contexts. Through exploring these two less-studied aspects of metaphor comprehension, this work took "the way less travelled by and that has made all the difference."<sup>32</sup>

According to the discussion above, the main hypothesis of the empirical research is defined as: The cognitive processing mechanism involved in comprehending a metaphor depends, on one hand, on the pre-existing conceptual knowledge of the addressees as reflected by the aptness and the conventionality that they assign to the metaphor and, on the other hand, on the context, in which the metaphor appears.

Several sub-hypotheses can be inferred from this main hypothesis:

A. The comprehension of metaphors is closely related to the conceptual knowledge of the addressee. It also suggests that different mapping processes, such as comparison, categorization or blending, can be employed by different addressees in understanding a metaphor, depending on how conventional and apt the metaphor appears to them.

---

<sup>32</sup> The sentence is cited with slight changes from Robert Frost's (1874-1963) poem, *The Road not Taken*, which was published in *Mountain Interval* in 1920. The original sentence is, "Two roads diverged in a wood, and I- I took the one less travelled by, /and that has made all the difference."

A-1: The more conventional and apt the metaphor addressees find a metaphor to be, the stronger their consensus understanding of that metaphor will be. Otherwise, greater disagreement among the metaphor addressees is expected.

A-2: The more conventional and apt a metaphor appears to the metaphor addressees, the more likely a close relation exists between the understanding of the vehicle and the understanding of the topic.

A-3: The more unconventional and inapt a metaphor appears to the metaphor addressees, the more likely that new features will emerge in comprehending that metaphor.

B. Metaphor understanding can be altered by various communicative contexts.

B-1: An encouraging context can promote metaphor understanding. Even if a metaphor is originally viewed as inapt and unconventional by the metaphor addressees, it is still possible that greater consensus can be achieved in understanding the metaphor if an encouraging communication context is provided.

B-2: A discouraging context can distract metaphor understanding. Even if a metaphor is originally viewed by the metaphor addressees as conventional and apt, the consensus among those people in understanding the metaphor can be reduced if the communicative context is discouraging.

C. The estimation of the aptness of a metaphor can be altered by the communicative context in which the metaphor is provided.

## 4.2 Method

In September 2005, the web-based experiment “Understanding Teacher Metaphors in Virtual communicative Context” was established at the Laboratory of the Online- Research (Lab.OR) at the Institute of Cognition and Communication, University Duisburg–Essen. The first subject visited and completed this online-experiment on Sept. 20<sup>th</sup>, 2005 and the last subject visited on March 23<sup>rd</sup>, 2006.<sup>33</sup>

In this experiment, the comprehension of three teacher metaphors *The teacher is a candle*, *The teacher is a captain* and *The teacher is a shepherd* were examined under various conditions. A communicative scenario was implanted into those conditions with role plays, in which participants were given the opportunity to play the

---

<sup>33</sup> This online research has been carried out under the following two links: 1) <http://heineken.uni-duisburg.de/labor/versuche/huber1> (German version); 2) <http://heineken.uni-duisburg.de/labor/versuche/dehui1> (Chinese version)

role of a class teacher after they had received one of the three teacher metaphors to orient their behaviours as a class teacher in the role play. The empirical data were gathered to test whether various conditions of the interactive role-play context may influence the participants' comprehension and acceptance of the metaphor provided in the role play; it was also designed to study how people's conceptual knowledge, as indicated by their assessment of the aptness and the conventionality of the metaphor, may affect their comprehension process of that metaphor.

#### 4.2.1 Subjects

Participants of this online study were recruited from two Chinese universities (*Wuhan Jiangnan University* and *Nanjing Normal University*) and two German universities (*University of Duisburg - Essen* and *University of Dortmund*). They were either pedagogical students, or the students who were engaged in the pre-service teacher education. They were informed about this online research and the correspondent URL address either by their lecturers or by the experimenter in lectures at their correspondent universities. Instead of doing this experiment during the lectures, all participants used their free time to attend this online research project on a voluntary basis, without the presence of the experimenter.

Among the 377 participants taken part in this experiment, 166 dropped out, with a dropout rate of 44, 03%. After the examination of the inner consistency and the time duration, the completed data sets of another 31 participants were discarded due to the lack of the validity.<sup>34</sup> Finally, altogether 90 Chinese (46 females and 44 males) and 90 Germans (49 females and 41 males) were counted as subjects. The average years for the Chinese group was 22. 4 (SD=.32) and that for the German group was 21. 9 (SD=. 375).

#### 4.2.2 Materials

The whole experiment was designed in an Internet format and implemented at the virtual experiment laboratory, Lab.OR, developed by Heineken, Schulte and Ollesch (2003) at the University of Duisburg-Essen. Three metaphors *The teacher is a candle*, *The teacher is a captain* and *The teacher is a shepherd* were involved in this

---

<sup>34</sup> A timer was anchored in the online study to record the time that the subjects took to complete the tasks from the first web page to the last. The data sets were deleted if they were deprived of insufficient inner logical consistency or if they took less than 35 minutes or more than 70 minutes to complete. More details are available in 4.3.

online research. To explore how subjects understood them, both the affective impression and the conceptual representation of metaphors and its related concepts were studied. To evaluate the affective impression of the metaphors, this study adopted the well-accepted Self-Assessment Manikin (SAM) devised by Lang (1985). To explore the conceptual representation of the concepts involved in those metaphors, a two-mode network analysis aside with the cluster analysis were employed to track the inner structure of 33 features in reference to metaphors and their concepts under different conditions.

#### **4.2.2.1 The Online Settings**

In the past few years, the Internet has been discovered as a new means to conduct psychological research (Reips, 2002). Recent studies on Internet research (see e.g., Birnbaum, 2001; Reips, 2002) have brought insight to this online study with a number of recommendations on what precautions and techniques have to be undertaken in web design to avoid typical errors and misconceptions in web experimentation. Moreover, my colleagues' years of work (Heineken, Ollesch and Schulte, 2002, 2003; Ollesch, Schulte and Heineken, 2003, 2004, 2006) on reconstructing the classic psychological empirical studies in virtual settings have shown that the quality and the validity of online psychological experiments can be ensured with a reliable experiment design. Due to those convincing results from the validity and plausibility studies of the Internet research, the decision was made to implement this cross-cultural metaphor study through the World Wide Web.

In order to implement this metaphor study as a web-experiment, the whole experiment was designed in Internet format with the possibility to record all the inputs in a large database. With its big capacity, the Laboratory for Online Research (Lab.OR) developed by Heineken, Ollesch and Schulte (2003) at the University of Duisburg-Essen embodies all the features needed by this metaphor study and provides an ideal platform for it, independent of time and location restrictions. During the whole implementation, the Lab.OR enabled the experimenter to design, construct and store all conditions for the experiments. It assigned participants automatically to different conditions according to various filters and set limit for participation numbers for each condition according to the experiment design. In addition, it also regulated the display of each Internet page when a time restriction for the task was required.

According to Batinic (2004), a web-based research is economical, flexible, objective, independent from time and space, and easy to implement and document.

Actually, the ubiquity and the low costs make the World Wide Web the optimal choice for this cross-cultural metaphor research. Reips (2002b) argued that online-researches bring the experiment to the participants and enable a much more geographically and culturally diverse population of participants than what is possible in traditional laboratory research. For this online research, the World Wide Web actually bridged a geographic distance of thirteen flight hours between China and Germany. Since the experimenter's presence is not required, a large number of the Chinese and the German participants could take part in the study in a synchronizing way as far as the system capacity would allow. Besides, they could also choose their own convenient time and place to go through the experiment. The costs in terms of lab space, person-hours, equipments, and administration have all been saved.

Another important reason to carry out the research through the World Wide Web is the requirement of the research design itself. Actually, this experiment did not only need to measure concepts through graphic differentials and attributes but also needed to get the participants involved in a series of role-play scenarios. The web format has created an ideal virtual setting in which the participants could play the role of a class teacher who was to interact with their virtual pupils through "email exchange."<sup>35</sup>

In all, this experiment was carried out through the World Wide Web, not only because of the validity and the benefits that current online researches promise, but also due to the specific requirements of the design of this cross-cultural metaphor research itself.

#### 4.2.2.2 The Metaphors

Three teacher metaphors<sup>36</sup> were used in this experiment: *The teacher is a candle*, *The teacher is a captain*, and *The teacher is a shepherd*. Of course, there are many other possible images for the concept *teacher*, such as *father*<sup>37</sup>, *artist*, *compass*, *gardener*, *stem of a tree*, *general* and so on. However, this experiment needed a metaphor that would be estimated as conventional and apt by most Chinese subjects but as unconventional and inapt by most German subjects, a metaphor that would be

---

<sup>35</sup> The email replies from the virtual students were retrieved from the scripts saved in the system according to the condition that the subjects were assigned to.

<sup>36</sup> Teacher metaphors were investigated in this cognitive research of metaphor comprehension, because teacher metaphors were comparatively one of the most relevant metaphors to the participants who were pedagogical students. The relevance to their own major was helpful to motivate them to participate in this experiment and complete it seriously.

<sup>37</sup> For instance, *The teacher is a father* is a typical Chinese teacher metaphor.

estimated as conventional and apt by most German subjects but unconventional and inapt by most Chinese subjects, and a metaphor that would be estimated similarly conventional and apt by both the Chinese and the German subjects.

In order to find the appropriate metaphors suitable for this research, pilot study I (see Appendix A) was conducted at the end of 2003. In that study, 30 Chinese and 30 German students at the University of Duisburg – Essen, were asked to list at least three teacher metaphors on a questionnaire sheet with a pen. Meanwhile, they were also asked to rate how familiar this metaphor appeared to them and how suitable this metaphor was to describe the teacher on a five point Likert scale.

The results have shown that 25 out of 30 Chinese participants associated teacher with *a candle* and 21 out of 30 German participants associated *teacher* with a *shepherd*. Interesting, there were 17 out of 30 Chinese and 22 out of 30 German participants who listed the metaphor *The teacher is a captain*. The metaphor *The teacher is a candle* was estimated by the Chinese as an apt and conventional metaphor (conventionality: Mean= 4.72 SD=.023; aptness: Mean=4.02 SD=.552 ). In contrast, no German ever associated *teacher* with *a candle*. The metaphor *The teacher is a shepherd* was estimated by the German as an apt and conventional metaphor (conventionality: Mean= 4.34 SD=.125; aptness: Mean= 3.82 SD=.317). However, no Chinese ever associated *teacher* with *a shepherd*.<sup>38</sup> The metaphor *The teacher is a captain* was estimated both by the German (conventionality: Mean=2.25 SD=.446; aptness: Mean=4.25 SD=.025) and by the Chinese (conventionality: Mean=1.8 SD=.749; aptness: Mean=3.5 SD=.726) as less conventional but apt metaphors.

It is quite important that these teacher metaphors should embody unique image schemata (Huber, 2006). Tatzki (2003) claimed in her empirical study that the metaphor *The teacher is a shepherd* involved unique consistent schemata among German. This metaphor can be traced back to Christianity, in which Jesus Christ is both a good *teacher* and a good *shepherd* for his disciples.<sup>39</sup> As a shepherd may do for his herd, the *shepherd - teacher* protects, leads, takes care of, and holds his pupils together.

---

<sup>38</sup> Later in an interview, the German participants expressed their perplexity in understanding the metaphor *The teacher is a candle*, as *candle* is often related to Christmas or mourning events in the German culture. The Chinese showed difficulty in mastering the meaning of *shepherd*. Several Chinese subjects said that a *shepherd-teacher* should be open-minded and tolerant, because a shepherd would allow his sheep to wander around.

<sup>39</sup> For instance, it is written in the bible. "I am the good shepherd, and know my sheep, and am known of mine." (John 10:14)

In Chinese culture, a *candle* burns down itself and gives light to others. This metaphorical meaning of *candle* originates from the popular poem from Li, Shangyin<sup>40</sup>, who is a renowned poet of the late Tang Dynasty. As *candle* symbolizes sacrifice, devotion and enlightenment in Chinese culture, the *candle- teacher* is expected to devote his or her time and energy to the students and pass all his knowledge to them. Through the Internet, a number of language expressions concerning the metaphor *The teacher is a candle* are provided here as examples. (see Table 3)

**Table 3: Chinese expressions of the metaphor *The teacher is a candle*.**

Original text in Chinese	Literary translation version in English language	Internet source (retrieved datum: 22.10.06)
康妮在课堂上燃烧的激情， 尤如火种播撒在学生们的心里。	The flame of passion that Conny ignited in the class spread sparks into the hearts of her students.	<a href="http://edu.sina.com.cn/en/2005-04-25/173032945.html">edu.sina.com.cn/en/2005-04-25/173032945.html</a>
教师在燃烧着自己， 照亮了别人。	The teachers burn out themselves and bring lights to others.	<a href="http://www.sjzpc.edu.cn/~gh/webs/lilun6.htm">www.sjzpc.edu.cn/~gh/webs/lilun6.htm</a>
教师...不断发出光和热， 照亮了别人，却消耗了自己。	The teachers continue to generate light and warmth; They bring light to others and burn out themselves.	<a href="http://www.gxjs.com.cn/wjck.asp?id=200496140626&amp;js=41356-12k">www.gxjs.com.cn/wjck.asp?id=200496140626&amp;js=41356-12k</a>
沈老师点燃了我爱写作的火花。	Ms. Shen ignited my loving sparks for writing.	<a href="http://www.mdnkids.com/teacher/t1.htm-7k">www.mdnkids.com/teacher/t1.htm-7k</a>
马祖光—永不熄灭的生命之光	Mr. Ma Zhuguan (a teacher): a life with the eternal burning light.	<a href="http://www.people.com.cn/GB/jiaoyu/8216/37216/37219/2764807.html">www.people.com.cn/GB/jiaoyu/8216/37216/37219/2764807.html</a>

Unlike *candle* and *shepherd*, the figurative meaning of the concept *captain* is not a culture-specific one. In both the German and the Chinese culture, the image of a *captain* suggests strong authoritative leadership. A *captain* requires discipline and obedience from his sailors. Thus, it is not hard to infer that a *captain-teacher* gives

<sup>40</sup>Li, Shangyin (李商隐) is also known as Li Yishan (李義山). He is a very famous Chinese poet who lived between 813 and 858). That poem, in which the metaphorical meaning of the candle is originated from, was entitled "No title". This is my translation: *Hard to meet, and harder to part / See, the east wind is weak and hundred flowers wither/ Till the end of life a silk worm keeps spinning silk/Till out burning itself a candle goes on lighting us/ Mornings in her mirror she sees her hair-cloud grey/Yet she dares the chill of moonlight with her evening song rhythms/The Enchanted Mountain though thousand miles away is not far / O dear blue-bird, fly, fly away and bring me what my lover says!* Here the original Chinese text is also provided: 相见时难别亦难，东风无力百花残/春蚕到死丝方尽，蜡炬成灰泪始干/晓镜但愁云鬓改，夜吟应觉月光寒 / 蓬莱此去无多路，青鸟殷勤为探看。

strict direction and instruction to his pupils just as a *captain* constantly directs his sailors and calls for effective team work.

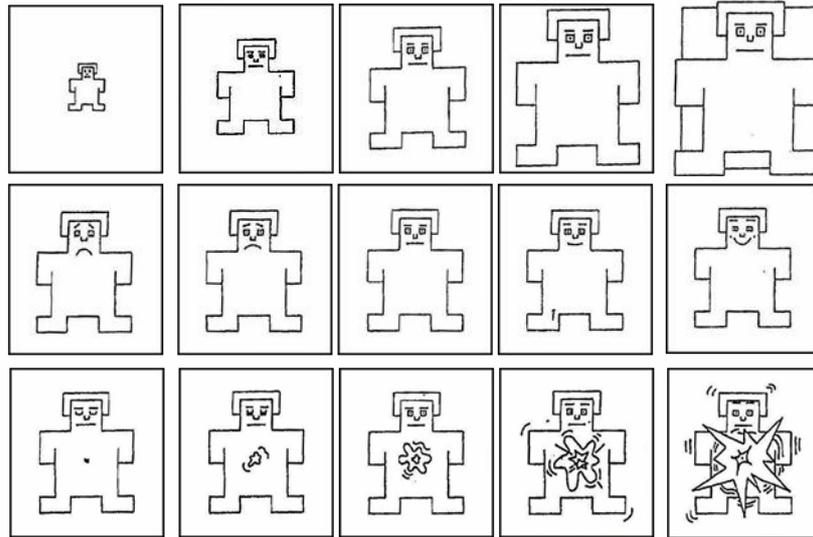
#### **4.2.2.3 Affective Impression: Ratings of the Self- assessment Manikin**

As stated in section 3.5.3, one of the crucial functions that a metaphor serves in the communication is its effectiveness in expressing and generating people's affection. In order to evaluate the emotional impression of the three teacher metaphors and their related concepts, this experiment adopted the so-called Self-Assessment Manikin (SAM) devised by Lang (1985) rather than the classic affective evaluation method, Osgoods' (1957) Semantic Differential (SD) method.

The SD method is the typical method used to measure the affective meaning of a concept. It consists of bipolar adjective-pairs (i.e., 18 bipolar adjectives applied by Russell and Mehrabian, 1977) that generate scores on *valence*, *arousal* and *dominance* dimensions according to a seven-point Likert scale. It plots the differences between individuals' connotations for concepts and thus map the psychological "distance" between them. The SD method has long been applied to compare the affective meanings of concepts in different cultures. For instance, Tzeng, Rumjahn, and Osgood (1987) used this method to analyse 23 emotion concepts across 23 different human societies at Osgood Laboratory for cross-cultural research. However, the translation of the adjective pairs might in itself cause different understanding and make the experiment inaccurate.

There are two reasons why this study used the graphic SAM rather than the well-known verbal Semantic Differential (SD) (Osgood et al, 1957; Russell & Mehrabian, 1977) method for measuring the affective meaning of a concept. First, several studies have shown that the SAM is as reliable as the SD in measuring affective meaning. In his study, Lang (1985) found that there were positive correlations between the scores obtained using SAM and those from SD for dominance (.66), pleasure (.94) and arousal (.94). Morris and Bradley (1994) adopted the SAM to re-evaluate 135 emotion adjectives that were factor analysed by Mehrabian and Russel and obtained similar results. Second, compared with the SD, the SAM is argued to be a culture-free and language free measure that costs less time to complete and causes less respondent wear-out. (see.e.g., Bradley & Lang, 1994).

The SAM (see Figure 3) is a five-point Likert pictorial scale, allowing for direct ratings of dominance, pleasure and arousal dimensions. The SAM is supposed to be an equal-interval scale, which is dependent on the way people perceive the pictorial manikins of the scale. In this online cross-cultural metaphor study, Lang's SAM was used to measure people's affective meaning of the concepts involved in a metaphor.



**Figure 3: The Self- Assessment Manikin.**  
(see Lang, 1985)

#### 4.2.2.4 Conceptual Representation: Feature Ratings

The comprehension of metaphor has long been studied through analysis of its features. According to Becker (1997), four types of features were involved in metaphor comprehension: common features (included in the representation of both tenor and vehicle), topic-shared features (only included in the representation of the tenor, but not the vehicle), vehicle-shared features (only included in the representation of the vehicle, but not the tenor) and emergent features (not part of the representation of either tenor or vehicle).<sup>41</sup>

Through analyzing the features associated with a metaphor, predictions from various metaphor theories can be tested. The traditional comparative metaphor theory argues that a common ground consisting of shared features dominates the metaphor comprehension process. The SMT proposes that interpreting metaphors

<sup>41</sup> Nueckles and Janetzko (1997) categorized the features of metaphors into similar four types as Becker (1997) but in different terms: redundant features (only belong to the tenor), transferred features (only belong to the vehicle), the convergent features (shared by both) and the emergent features (belong to neither).

requires shared systematic relations rather than shared features. In Gentner and Clament's (1988) experiments, they found that more relational information rather than attributional information was generated in understanding metaphors.

A number of cognitive psychological experiments have provided evidence for the interactive theory which asserts that new features that are not associated with the topic or vehicle of the metaphor emerge in the metaphor comprehension process. For instance, Gineste, Indurkha and Scart (2000) found that over 60% of the features produced during metaphor processing are emergent features.<sup>42</sup> Becker (1997) suggested that emergent features are influenced mostly by one's representation of the vehicle, as altering a metaphor's vehicle produced greater changes in emergent content than altering the topic did. According to Coulson and Matlock (2001), emergent features should arise in the course of conceptual integration in metaphor processing and are more crucial to the meaning of the metaphor than common features. Nückles and Janestzko's (1997) experiments showed that emergent features were encouraged when the similarity between the tenor and the vehicle of a metaphor was low or when the metaphor was more difficult to understand.

In experimental research on metaphor comprehension, features can be generated directly. For instance, Becker (1997) requested the subjects to list features not only of individually presented topic and vehicle words but also of the metaphors. Gineste, Indurkha and Scart (2000) obtained the features through similar production task.

In the feature-generating study carried out by Coulson and Matlock (2001), subjects were asked to list the features for a series of target words that appeared either in a null context or in three sentential contexts, namely the so-called literal, metaphoric or literal mapping conditions. For example, subjects read the target word *anchor* in its literal sense in the literal condition, *last time he went sailing, he almost forgot about the anchor*. In the metaphoric condition, *the anchor* appeared in its metaphoric sense, i.e., *Amidst all the trappings of success, his wife was his anchor*. In the literal mapping condition, i.e., *We were able to use a barbell for an anchor*, the *anchor* was used for its literal sense but appeared in a way that required the subjects

---

<sup>42</sup> Another interesting finding in Gineste, Indurkha and Scart's (2000) study is that those emergent features took a longer time to respond than topic-only features and vehicle-only features under the priming condition topic or vehicle. In contrast, under the prime condition of complete metaphors, the topic-only and vehicle-only features showed long response times, whereas the emergent features did not show any significant change in response time from one prime condition to another.

to perform integration operations similar to metaphor comprehension. The results showed that the topics in each of the three sentential conditions evoked substantially unique features. Most importantly, metaphors generated significantly more unique features than they did in the literal or literal mapping contexts.

In other cases, features of metaphors are not generated directly but rather collected in an indirect way. For instance, Tourangeau and Sternberg (1982) attained features by asking questions concerning a metaphor. In Gentner and Clament's (1988) experiments, subjects' objective description of individual terms of eight metaphors were further subjected to trained judges to assess the proportion of the attributional or relational information implied in subjects' interpretation. Nückles and Janetzko (1997) requested their subjects to produce descriptions of both the tenor and the vehicle concept of metaphors in simple sentences or phrases. Their descriptions were subjected to a content analysis so as to have them well categorized into redundant features, transferred features, convergent features and emergent features.

The features used from this experiment were directly generated by the participants in pilot study II (see Appendix B). In February 2004, a total of 60 Chinese students and 60 German students at the University of Duisburg-Essen were asked to list out appropriate features to describe the concepts *teacher*, *candle*, *captain* and *shepherd* either with or without the association of a metaphor. Altogether, 187 different features were generated by all the Chinese and the German subjects. Among them, only those features that were generated by more than 75% of the participants in the same condition group were selected for the present studies. In this way, the 33 features most frequently listed were then selected and normalized to be used for this online research. The 33 features were originally presented in either German or Chinese in the online study. The English translation of those 33 features is provided here: *thoughtfulness*, *responsibility*, *intelligence*, *leadership*, *watchfulness*, *lightheartedness*, *delight*, *patience*, *plainness*, *enthusiasm*, *model*, *diligence*, *love*, *orientation*, *authority*, *influence*, *romance*, *helpfulness*, *unselfishness*, *experience*, *calmness*, *courage*, *quietness*, *justice*, *strictness*, *self-sacrifice*, *optimism*, *friendliness*, *tolerance*, *trust*, *warmth*, *brightness* and *care*.

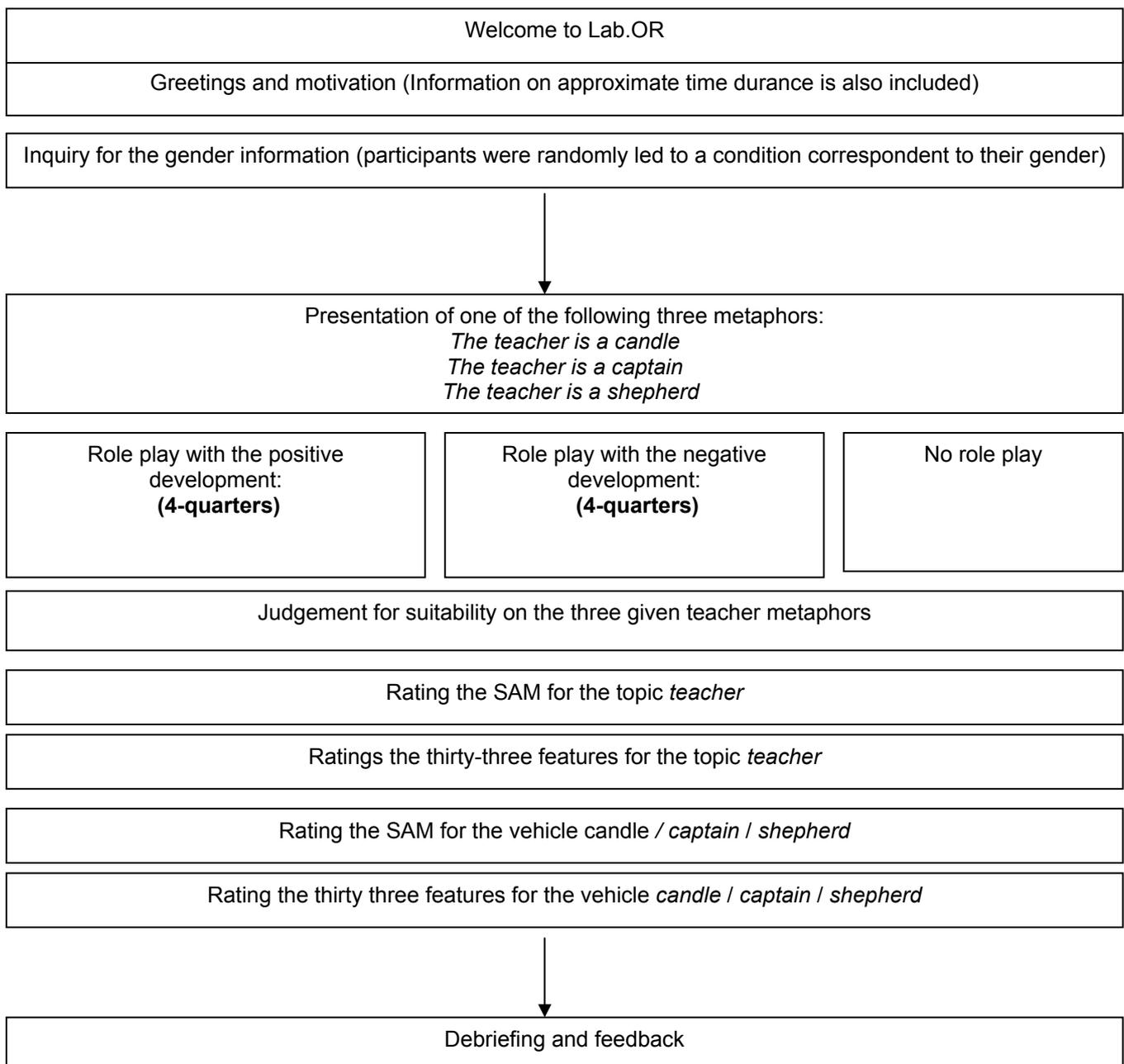
In this online experiment, the participants were asked to rate the 33 selected features according to how suitably they described the concepts involved in the

metaphors. Later, the feature ratings under various conditions underwent cluster analysis and network analysis.

#### **4.2.3 Procedure**

This web-based experiment aimed at evaluating subjects' affective impression and conceptualization of teacher metaphors under various conditions. There were altogether eighteen various conditions in German version and another eighteen in Chinese version. In order to address the participants correctly according to their genders in the role play, e.g. "Mr.(Herr) Noack" or "Ms. (Frau) Noack", each of these eighteen conditions can be subdivided into nine conditions for male participants and nine conditions for female participants. Except for the address, the content of the nine conditions for the males were identical to that of the nine conditions for the females. The participants of the nine conditions received different treatment. They were provided with either different metaphors or different role-play conditions (no role play, the role play with the positive development, or the role play with the negative development). Accordingly, different treatments were combined with different experimental procedures. An overview of the procedure is available in Figure 4. The screenshots of the web pages of the online experiment are documented in the Appendix C. In general, the opening part and the closing part of various conditions are identical.

The opening part included five webpages that were identical for all conditions involved in the experiment. Participants were first greeted at the starting page with a short introduction of the Lab. OR. On the second page, participants were informed about the time needed for the whole experiment and given the chance to drop out, if they did not have sufficient time or interest. Only the participants who did have time and interest for the experiment were encouraged to continue. At the end of this page, the participants were asked to select their gender. This page actually functioned as a filter, because the participants were to be automatically led to one of the two separate blocks of conditions for females or for males. A randomization generator further decided under which condition the participant attended the online study. The other three pages consisted of questions on personal information concerning age, education, and etc. (see Appendix C)



**Figure 4: Experimental procedure.**

On the sixth page, participants were asked to imagine a teacher after one of the three teacher metaphors *The teacher is a candle*, *The teacher is a captain*, or *The teacher is a shepherd*. From the next page on, one third of the participants involved in the experiment were randomly assigned to do a series of evaluation assignment directly under the conditions without role play. This category included six German conditions with two identical blocks of three conditions split by the factor gender and their correspondent Chinese translation versions. As various conditions were all

generated from one protocol only with the replacement of different metaphors, the procedure is to be illustrated through the protocol condition with the metaphor *The teacher is a candle*.

Under the condition with the metaphor *The teacher is a candle*, participants were asked to imagine a teacher who oriented his or her behaviour after the metaphor *The teacher is a candle*. One third of the participants were led to the no role-play condition. They were first asked to rate the three graphic dimensions (*dominance*, *valence* and *arousal*) of the SAM according to their affective impression of such a *teacher*, who can be described as a *candle-teacher*. Then they were provided with 33 attributive concepts or features (obtained from the pilot study II) and asked to judge in which degree those features were suitable to describe the concept *teacher* in the correspondent metaphor that they received. For clarity, every single page displayed only one feature. As soon as participants made their choices, the web page automatically led to the next and the feature was replaced with another one. The same tasks were repeated for the vehicle concept *candle*. Likewise, participants were asked to do the SAM judgment (three pages) again and to judge the suitability of those 33 features this time according to the vehicle concept *candle*.

For the other two-thirds of participants, they were led to the conditions with a role play. Since participants had already given their gender at the starting page, they were automatically filtered to one of the different versions of the role play. Male participants got the virtual identity of Mr. Frank Noack, whereas the female participants played the role of Ms. Julia Noack. Meanwhile, they were randomly assigned to either the role play with the positive development, or the role play with the negative development. Altogether, the conditions with a role play had 24 variations in correspondence to three teacher metaphors, two cultures, two role play situations and two gender addressings (Mr. or Ms. Noack).

In the role play, participants were asked to play the role of a new class teacher at a virtual middle school. They were also required to behave according to the teacher image that they received. That could be *The teacher is a candle*, *The teacher is a captain* or *The teacher is a shepherd*.

The next page gave a detailed description of his or her role as a class teacher of the middle school, which took part in a model project called "school on-line." The class teacher was required to write emails to their pupils in class 10a regularly.

The school board asked the new class teacher Mr./ Ms. Noack to help class 10a to achieve more in their studies and at the same time make their pupils' parents satisfied with their work. Moreover, participants got again the notice that the school required them to behave after the teacher image that they received.

The general task was provided in the next page. It instructed the participants what they should do in the coming pages.

For every quarter of a school year, they received a timely report of the class 10a. Each report appeared on the screen for only 60 seconds. The texts of the report were summarized into three aspects: **class situation**, **pupils' behaviours**, and **parents' opinions**. Among the four items of each aspect, the expression of three items reflected those three metaphorical teacher image in correspondence and the other one item was formulated in a neutral way, free from the influence of any teacher image. In order to control the primacy-recency effect<sup>43</sup>, the neutral items and the items reflecting the metaphorical teacher image appeared in a varied order as shown in Table 4. The German text for the quarterly report of the class 10a is summarized in Table C1-1 (class report in the role play with the positive development) and Table C1-2 (class report in the role play with the negative development) in Appendix C.

**Table 4: Orders of the metaphor implied texts and neutral texts in the class report.**

Items	Quarter I	Quarter II	Quarter III	Quarter IV
<b>class situation</b>	neutral	shepherd	candle	neutral
	captain	candle	captain	shepherd
	shepherd	neutral	shepherd	candle
	candle	captain	neutral	captain
<b>students' behaviours</b>	captain	neutral	shepherd	candle
	shepherd	candle	captain	neutral
	candle	captain	candle	captain
	neutral	shepherd	neutral	shepherd
<b>parents' opinions</b>	captain	candle	captain	shepherd
	neutral	shepherd	candle	neutral
	candle	neutral	neutral	captain
	captain	captain	shepherd	candle

After reading the report of each quarter, participants were given four minutes to write an email to all the students in the class. They also received feedback from one

<sup>43</sup> Ebbinghaus, Hermann (1850-1909) is the first one who discovered that people tend to remember most easily what they learn at the beginning of a session or at the end.

of the virtual pupils, the class representative. For consistency, the participants who automatically got the role play version of the positive development were provided with continuously good news from the four quarterly class reports and four encouraging email replies from their pupils. On the contrary, the participants who were assigned to the role play version with negative development had to face constant depressing news from the class report and discouraging email replies from their virtual pupils. The German text for the email replies is documented in Table C1-3 (Pupils' Email replies in the role play with the positive development) and Table C1-4 (Pupils' Email replies in the role play with the negative development) in Appendix C.

After four quarters, the role play ended. Participants were asked whether they remembered the teacher image for the role play and how suitable the metaphorical teacher image appeared to them. In this case, they were first asked to judge how suitable the metaphor *The teacher is a candle* appeared to them. They were given two other metaphors *The teacher is a captain* and *The teacher is a shepherd* for further suitability judgement.

Then the participants were asked to estimate their understanding of the topic concept *teacher* both according to the SAM and the 33 features. Likewise, the vehicle concept, for instance *candle*, was also evaluated according to both the SAM and the suitability of the 33 features. Those were all the tasks that were involved in the condition with the metaphor *The teacher is a candle*.

The other correspondent conditions with the role play were more or less the same, except that the metaphor *The teacher is a candle* was replaced by *The teacher is a shepherd* or *The teacher is a captain*. As a result, the correspondent SAM ratings and the feature ratings of the topic and the vehicle were also replaced accordingly. The text of the web pages is documented in Appendix C.

In this online experiment, several timers were added to the web pages that the participants read. This helped to track the time necessary for the subjects to complete one specific task or all the tasks. With one timer integrated on the starting task page and another on the last task page, the duration that each subject took to complete all the tasks in a study was calculated. This measure is important to control the validity of the data sets in examining how much time each participant spent on completing all the tasks.

The closing part was simple and again identical for all conditions. Short background information about the experiment was available. On the last page, participants not only got the email address of the experimenter, but also got a chance to type down their comments or feedback to the experimenter directly if they wanted. The German text for the closing part is available in Appendix C1. The screen shots of the correspondent Chinese experimental web pages were documented in Appendix C2.

#### **4.2.4 Experimental Design**

This cognitive online research of metaphor comprehension was designed as a three-factorial experiment with the factors, “metaphor,” “cultural group,” and “role play.” The factor “metaphor” has three levels (1: *The teacher is a candle*; 2: *The teacher is a captain*; 3: *The teacher is a shepherd*), the “cultural group” two levels (1: Chinese; 2: German) and the factor “role play” three levels (1: no role play; 2: the role play with positive development; 3: the role play with negative development). According to the design, 90 German subjects and 90 Chinese subjects were distributed equally into 18 cells, with each cell including 10 subjects. The role play with the positive development means that the participants would get at the end of each of the four quarters a positive class report and an email reply that indicated the continual progress and success of the class 10a, in which the participant played the role of the class teacher. By contrast, the participants who were assigned to the role play with the negative development would get at the end of each of the four quarters a negative class report and an email reply that indicated problems and dissatisfactory status of the class. The Lab. OR system randomly assigned whether the teaching activities of the virtual class 10a as a success or a failure, independent from the emails written by the participants.

In this study, the Lab. OR system automatically separated the subjects according to their gender for the addressing convenience. Such an arrangement aimed at respecting the participants and making it easier for them to accept their roles and get involved in the role play. However, gender was not regarded as a factor for the following two reasons: First, the research from my colleague Dr. Andreas Huber did not show that the factor “gender” plays a significant role in metaphoric cognition (Huber and Heineken, 2006). Second, all the participants whom we recruited were students engaged in their pre-service teacher education. In view of the fact that those majors are female dominated domains both in Germany and in China, the gender

distribution of the female: male ratio was inevitably biased. Since gender is not only unnecessary but also inconvenient to be employed in this metaphor study, it was only used to group participants for appropriate name address of the class teacher in the role play but not investigated as a factor in statistical analysis of the research data.

### 4.3 Results

As a matter of fact, not all data sets obtained from the participants' online input were valid. Even if the participants had clicked through all the online task pages, unwanted interference, distraction or irresponsible clicks may endanger the data validity. In order to have the data validity possibly under as much control as possible, the collected data sets were carefully examined according to two criteria before being counted as the valid for further data analysis, namely the time duration and the logic consistency.

The timers integrated in the web pages of the online experiment recorded the whole time that a participant spent on the experiment. The minimum, the maximum and the average time that the Chinese participants and the German participants needed to complete all the tasks in the experiment are listed in Table 5.

**Table 5: Time duration of the online experiment.**

Nationality	N	Minimum	Maximum	Mean	Std. Deviation
		(min.)	(min.)		
Chinese	108	13,58	124,57	54,4	16,0981
Germans	103	28,5	85,43	56,54	14,3439

In this experiment, 108 Chinese participants completed all the tasks in an average 54,4 minutes (with the variation from 13,58 to 124,57 min.) and the 103 German participants used on average 56,54 minutes (with a variation from 28,5 to 85,43 min). Taking the cognitive demands and the number of tasks into consideration, participants were expected to complete all the tasks in a time range of 20-30 minutes for no role-play conditions or 40-60 minutes for role-play conditions. Data sets that took less than 20 minutes (for no role-play conditions ) or 40 minutes (for role-play conditions) to complete were suspected to be obtained through constant blind clicks without responsible consideration. On the contrary, data sets of excessive duration may indicate unwanted disturbance or distraction of the concentration, which could happen in web-based experiments without the presence of the experimenter.

Moreover, the logic of the ratings was also examined. For instance, the feature *responsibility* and the feature *lightheartedness* are almost antonyms of each other. It would be hardly logical for a responsible participant to rate both two features at the

same rate as equally suitable for describing a concept. In this study, the irresponsible data sets that lack logic consistency were discarded.

Under these two criteria, out of 211 complete data sets, 31 data sets were judged as invalid and discarded. Access to the online experiment was closed after exactly 90 valid data sets from the Chinese and 90 valid data sets from the German were obtained.

In the following, the results attained from the SAM ratings, the feature ratings, and the estimation of the metaphor acceptance are presented. Then, the hypotheses raised in 4.2 are to be examined in detail. A brief discussion of the empirical findings is also available at the end of this chapter.

### **4.3.1 Affective Impression: SAM ratings**

In this experiment, subjects were divided into three groups to rate their affective impressions of the topic concept and the vehicle concept according to the graphic SAM for one of the three teacher metaphors, namely *The teacher is a candle*, *The teacher is a captain* and *The teacher is a shepherd*. Each of these groups were subdivided into another three groups, depending on the situation in which the teacher metaphor was provided. The second set of three groups were: one, the condition of no role play; two, after the role play, in which the subjects experienced continuous positive feedback in their communication with their virtual students, or, three, after the role play with continuous negative feedbacks.

#### **4.3.1.1 Affective Impression Ratings of the Topic Concept *Teacher***

The means of the SAM ratings under the condition of no roleplay are summarized in Table 6. Under the condition of no role play, it is obvious that the topic *teacher* in the metaphor *The teacher is a candle* elicited a more influential and more pleasant affection by the Chinese subjects (dominance dimension: Mean=3.91, SD=.831; pleasure dimension: Mean=4.36, SD=.809) than by the German subjects (dominance dimension: Mean=2.00, SD=.926; pleasure dimension: Mean=3.38, SD=1.302). Moreover, the value of the standard deviation by the Chinese subjects was significantly smaller than that for the German subjects, which indicates that the Chinese subjects agreed with each other more on their affective impressions of the topic *teacher* in the metaphor *The teacher is a candle* than the German subjects did. In contrast, the topic *teacher* in the metaphor *The teacher is a shepherd* exerted a more influential and more active affection by the German subjects (dominance

dimension: Mean=3.25, SD=.707; arousal dimension: Mean=2.38, SD=.518) than by the Chinese subjects (dominance dimension: Mean=1.88, SD=1.126; arousal dimension: Mean=1.88, SD=.835). As expected, the difference between the German and the Chinese affective impressions on the topic *teacher* in the metaphor *The teacher is a captain* was not so obvious.

**Table 6: The means and the standard deviations of the SAM ratings of the concept *teacher* in different teacher metaphors under the condition of no role play.**

	<i>The teacher is a candle</i>		<i>The teacher is a captain</i>		<i>The teacher is a shepherd</i>	
	Chinese	Germans	Chinese	Germans	Chinese	Germans
Dominance	3.91 (.831)	2.00 (.926)	3.70 (.949)	3.75 (1.035)	1.88 (1.126)	3.25 (.707)
Pleasure	4.36 (.809)	3.38 (1.302)	3.60 (.843)	3.75 (.463)	3.63 (1.061)	3.88 (.354)
Arousal	2.73 (1.191)	2.38 (1.188)	1.80 (.919)	2.38 (.916)	1.88 (.835)	2.38 (.518)

Comparing the condition of the role play with the positive development to the condition of no role play (compare Table 6 and Table 7), the means of German subjects' SAM ratings of the topic concept *teacher* in the metaphor *The teacher is a candle* rose from 2.00 to 4.00 on the dominance dimension, from 3.38 to 3.67 on the pleasure dimension, and from 2.38 to 3.89 on the arousal dimension. The Chinese subjects also showed a significant increase in their ratings on the pleasure dimension (from mean= 4.36, SD= .809 to mean= 5.00, SD= .00) and arousal dimension (from mean= 2.73, SD= 1.191 to mean= 4.44, SD= .726). It is worth noticing that the *teacher* in the metaphor *The teacher is a candle* under the role play with the positive development is pleasant to all Chinese subjects with no exceptions. Comparing the condition of the role play with the negative development to the condition of no role play (see Table 7), the Chinese subjects' feature ratings decreased to 2.89 on the dominance dimension and 3.89 on the pleasure dimension.

By rating the topic concept *teacher* in the metaphor *The teacher is a captain* under the condition of the role play with the positive development, there was a slight increase by both the German and the Chinese on the dominance dimension and the arousal dimension. Moreover, the role play of the negative development seemed to lead both the German and the Chinese to reduce their SAM ratings on the dominance and the arousal dimension.

By rating the topic concept *teacher* in the metaphor *The teacher is a shepherd*

under the condition of the role play with the positive development, there was an increase by both the German and the Chinese on all three dimensions. Comparing the condition of the role play with the positive development with that of no role play, there was an increase from 1.88 to 3.00 on the dominance dimension and from 1.88 to 3.33 on the arousal dimension, especially for the Chinese subjects. In contrast to the SAM ratings of the topic *teacher* in the metaphor *The teacher is a candle*, the SAM ratings of the topic *teacher* in the metaphor *The teacher is a shepherd* did not seem to decrease significantly when comparing the condition of the role play with the negative development to the condition of no role play.

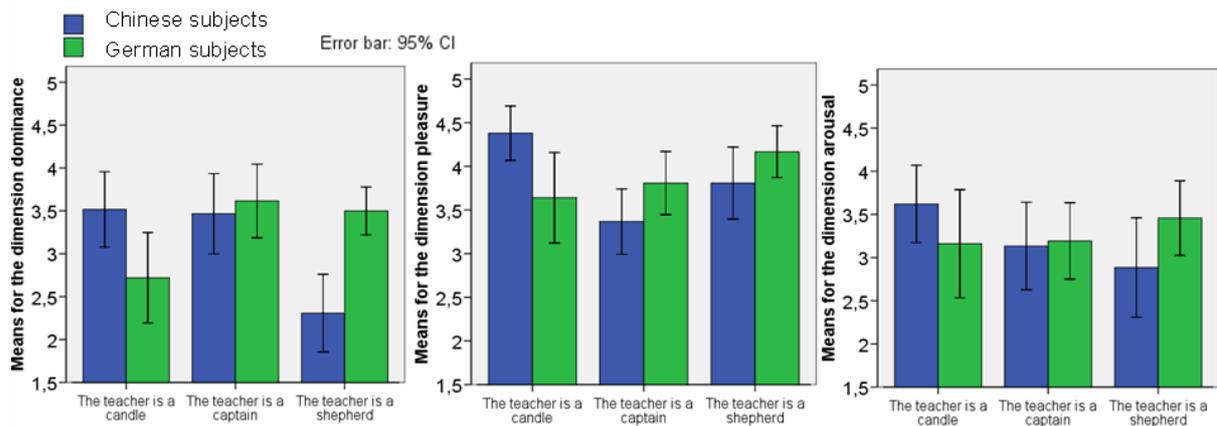
**Table 7: The means and the standard Deviations of the SAM ratings of the concept *teacher* in different teacher metaphors under the condition of the role play with positive and negative development.**

Role play- positive	<i>The teacher is a candle</i>		<i>The teacher is a captain</i>		<i>The teacher is a shepherd</i>	
	Chinese	Germans	Chinese	Germans	Chinese	Germans
groups	3.56	4.00	4.00	3.82	3.00	3.88
Dominance	(1.236)	(.866)	(1.342)	(.751)	(1.155)	(.641)
Pleasure	5.00	3.67	3.36	4.36	4.10	4.38
	(.000)	(1.000)	(1.120)	(.674)	(.738)	(.518)
Arousal	4.44	3.89	3.64	3.73	3.30	3.88
	(.726)	(1.364)	(1.027)	(.905)	(1.418)	(.641)
Role play- negative	<i>The teacher is a candle</i>		<i>The teacher is a captain</i>		<i>The teacher is a shepherd</i>	
	Chinese	Germans	Chinese	Germans	Chinese	Germans
groups	2.89	1.83	2.56	3.14	1.88	3.38
Dominance	(1.269)	(.753)	(1.014)	(1.464)	(.641)	(.518)
Pleasure	3.89	3.67	3.11	3.00	3.63	4.25
	(.928)	(1.751)	(1.054)	(1.000)	(1.302)	(1.035)
Arousal	3.89	2.83	4.00	3.29	3.38	4.13
	(.782)	(1.835)	(1.000)	(1.113)	(1.506)	(.835)

The results of a three-factorial multivariate analysis of variance (see D1-1 in Appendix D) shows that not only the factor “metaphor” ( $F(6.290)=3.34$ ,  $p<.01$ ) but also the factor “role play” ( $F(6.290)=16.18$ ,  $p<.001$ ) had a significant effect on the SAM ratings. Although the factor “cultural group” did not seem to exert a main factor effect ( $F(3.144)=.424$ ,  $p> 0.5$ ), a significant interaction between the factor “cultural group” and the factor “metaphor” ( $F(6.290)=6.31$ ,  $p<.001$ ) was observable.

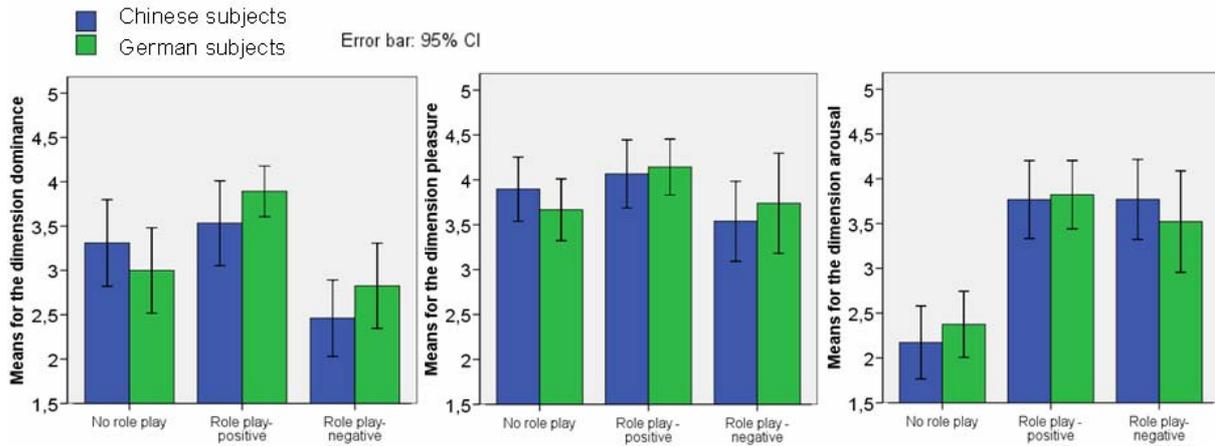
Figure 5 shows how the Chinese and the German subjects rated the SAM according to their affective impression of the concept *teacher* under the condition of three different teacher metaphors. When the metaphor *The teacher is a candle* was provided, the Chinese impression of the concept *teacher* tended to be more powerful, more pleasant and more active than that of the German subjects. The error bars of the Chinese ratings on the three SAM dimensions were shorter than those of the

German ratings. This shows that the Chinese subjects had a stronger congruence in their ratings than the German subjects. In contrast, when the metaphor *The teacher is a shepherd* was provided, the German subjects tended to rate the dominance dimension, the pleasure dimension and the arousal dimension according to their impression of the concept *teacher* higher than the Chinese subjects did. Under the condition of the metaphor *The teacher is a shepherd*, the error bars of the German ratings on the three SAM dimensions were shorter than those of the Chinese ratings. This suggests that the German subjects had a stronger congruence in their ratings of the concept *teacher* in the metaphor *The teacher is a shepherd* than the Chinese subjects did. The figure also shows that the Chinese and the German impression profiles of the concept *teacher* under the condition of the metaphor *The teacher is a captain* did not differ so much from each other as under the condition of the other two teacher metaphors. However, the German subjects seemed to have a more pleasant impression of the concept *teacher* in the metaphor *The teacher is a captain* than the Chinese subjects.



**Figure 5: The SAM ratings of the concept *teacher* under the conditions of different teacher metaphors. (The three dimensions of SAM ratings: *dominance*, *pleasure* and *arousal*)**

Figure 6 shows how the Chinese and the German subjects rated the SAM according to their affective impression of the concept *teacher* under different role play conditions. Comparing the condition of the positive role play with the conditions of no role play or of the negative role play, both the German and the Chinese subjects tended to rate higher all three dimensions of the SAM according to their affective impressions of the concept *teacher*. On the dominance and pleasure dimensions, both the Chinese and the German subjects assigned the highest ratings under the positive role-play conditions, and the lowest ratings under the negative role-play conditions. On the arousal dimension, both the Chinese and the German subjects rated much higher under the positive role-play condition than under the condition of no role play. This shows that the role play plays an important role in affecting the Chinese and the German subjects' affective impressions of the concept *teacher*.



**Figure 6: The SAM ratings of concept *teacher* under the different role-play conditions. (The three dimensions of SAM ratings: *dominance*, *pleasure* and *arousal*)**

#### 4.3.1.2 Affective Impression Ratings of Three Vehicle Concepts

In this online experiment, subjects were also asked to rate their affective impressions of the three vehicle concepts in the three teacher metaphors, namely *candle*, *captain* and *shepherd*. The means of their SAM ratings are summarized in Table 8.

In order to investigate the effect of the role-play conditions and different cultural groups on the SAM ratings of the source concepts, *candle*, *captain* and *shepherd* in the three correspondent teacher metaphors, three two-factorial multivariate analyses of variance have been carried out. The results (see D1-2 in Appendix D) show that there was a significant main effect of the factor “cultural group” ( $F(3.46)=3.67, p<.05$ ) and a significant interaction effect of the factor “cultural group” and the factor “role play” ( $F(6.94)=8.32, p<.001$ ) on the SAM ratings of the vehicle concept *candle* in the metaphor *The teacher is a candle*. Table 8 suggests that the Chinese subjects (mean=2.18 SD= .982) rated the vehicle concept *candle* in the metaphor *The teacher is a candle* lower than the German subjects did (mean=3.75 SD=1.389) on the dominance dimension without role play. Similarly, when the positive role play was provided, the Chinese subjects (mean=1.56 SD=.726) also rated lower than the German (mean= 3.56 SD=1.130) on the dominance dimension.

Likewise, D1-4 in Appendix D shows that the factor “cultural group”(F(3.42)=25,  $p<.001$ ) has a significant main effect and a significant interaction effect with the factor “role play” ( $F(6.86)=5.3, p<.001$ ) on the SAM ratings of the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd*. As shown in Table 8, German ratings of the concept *shepherd* on the dominance and pleasure dimensions were higher than the correspondent Chinese ratings of the concept *shepherd*.

**Table 8: SAM ratings of three vehicle concepts *under* various role play conditions.**

	Vehicle concepts	Role play	Cultural groups	Means	Standard deviation
Dominance	Candle	no role play	Chinese	2.18	.982
			Germans	3.75	1.389
		role play-positive	Chinese	1.56	.726
			Germans	3.56	1.130
		role play-negative	Chinese	3.67	1.414
			Germans	2.75	1.035
	Captain	no role play	Chinese	4.10	.876
			Germans	4.50	.756
		role play-positive	Chinese	4.64	1.206
			Germans	4.64	.505
		role play-negative	Chinese	4.78	.667
			Germans	4.29	.951
shepherd	no role play	Chinese	2.13	.641	
		Germans	3.63	.518	
	role play-positive	Chinese	1.70	.675	
		Germans	4.13	.641	
	role play-negative	Chinese	2.00	.926	
		Germans	3.75	1.035	
Pleasure	Candle	no role play	Chinese	4.73	.647
			Germans	2.63	1.598
		role play-positive	Chinese	2.78	1.563
			Germans	4.11	.928
		role play-negative	Chinese	4.11	1.364
			Germans	3.63	1.302
	Captain	no role play	Chinese	3.90	.994
			Germans	4.75	.463
		role play-positive	Chinese	2.91	1.300
			Germans	3.64	1.86
		role play-negative	Chinese	3.67	1.225
			Germans	2.71	.756
shepherd	no role play	Chinese	3.50	1.069	
		Germans	4.63	.518	
	role play-positive	Chinese	2.90	1.524	
		Germans	4.50	.535	
	role play-negative	Chinese	4.75	.463	
		Germans	3.63	.518	
Arousal	Candle	no role play	Chinese	3.55	1.635
			Germans	1.38	.518
		role play-positive	Chinese	1.78	.833
			Germans	2.22	1.481
		role play-negative	Chinese	1.78	.667
			Germans	2.38	1.408
	Captain	no role play	Chinese	3.80	1.229
			Germans	3.63	1.506
		role play-positive	Chinese	3.45	1.440
			Germans	2.73	1.104
		role play-negative	Chinese	2.22	.833
			Germans	2.71	1.254
shepherd	no role play	Chinese	2.00	1.069	
		Germans	3.50	.926	
	role play-positive	Chinese	3.00	1.491	
		Germans	3.38	1.188	
	role play-negative	Chinese	4.13	.991	
		Germans	3.00	1.195	

Unlike the SAM ratings on the vehicle concept *candle* in the metaphor *The teacher*

is a candle and the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd*, the SAM ratings of the vehicle concept *captain* in the metaphor *The teacher is a captain* had neither a main effect of the factor “cultural group” ( $F(3.48)=0.29, p=.835$ ) nor an interaction effect between the factor “cultural group” and the factor “role play” ( $F(6.98)=1.85, p=.098$ ). (See D1-3 in Appendix D)

In all, there were significant differences between the Chinese subjects and the German subjects in their affective impressions of the concepts *candle* and *shepherd* but not on the concept *captain* in the three teacher metaphors.

#### 4.3.1.3 Correlation between the SAM Ratings of the Topic Concept and the SAM Ratings of the Different Vehicle Concepts

As shown in section 4.3.1.1, there were significant differences between the Chinese and the German subjects in their affective impressions of the topic *teacher* in the metaphors *The teacher is a candle*, *The teacher is a shepherd* but not in the metaphor *The teacher is a captain*. The section 4.3.1.2 demonstrates that the Chinese subjects and their German counterparts differed significantly from each other in their affective impressions of the vehicle concepts *candle* and *shepherd* but not of the vehicle concept *captain* in the three teacher metaphors. This suggests that subjects' affective impressions of the topic could be related to their ratings of the vehicle. In order to explore this aspect further, the correlation between affective impression ratings of the topic concept *teacher* and its correspondent vehicle concept *candle/captain/shepherd* in three teacher metaphors was calculated. The results of the correlation coefficients are summarized in Table 9. They showed a positive correlation between the affective impression ratings of the concept *teacher* and those of the *candle* on the dominance dimension ( $r=.635^{**}, p<.05$ ) but also on the pleasure dimension ( $r=.755^*, p<.01$ ) given by the Chinese subjects when no role play was integrated. Under the condition of the role play with positive development, the SAM ratings from the Chinese subjects show a correlation between the concept *teacher* and the concept *candle* on the dominance dimension ( $r=.663^*, p<.05$ ) and on the pleasure dimension ( $r=.854^{**}, p<.01$ ). When the role play with the negative development was provided, such a correlation did not obtain in the ratings of the Chinese subjects. Interestingly, the SAM ratings given by the German subjects did not suggest any correlation between the target concept *teacher* and the vehicle concept *candle* on all three SAM dimensions, whether under the condition of no role play or of the role play with the positive development. Only under the condition of the role play with the negative development, did there seem to be a positive correlation

between the German ratings of the concept *teacher* and the vehicle *candle* on the arousal dimension ( $r=.742^{**}$ ,  $p<.01$ ).

As to the metaphor *The teacher is a captain*, both the Chinese subjects (no role play:  $r=.803$ ,  $p<.005$ ; role play-positive:  $r=.742$ ,  $p<.01$ ) and the German subjects (no role play:  $r=.913$ ,  $p<.005$ ; role play-positive:  $r=.722^{**}$ ,  $p<.01$ ) showed a positive correlation between their ratings of the topic concept *teacher* and the vehicle concept *captain* on the dominance dimension. Such a correlation was not found when the role play with the negative development was provided.

**Table 9: Summary of the two-tailed Pearson correlation test between the SAM ratings on the topic *teacher* and the SAM ratings of the correspondent vehicles in three teacher metaphors.**

			<i>The teacher is a candle</i> teacher & candle	<i>The teacher is a captain</i> teacher & captain	<i>The teacher is a shepherd</i> teacher & shepherd
No role play	Chinese	dominance	$r=.635^*$ , $p=.036$	$r=.803^{**}$ , $p=.004$	$r=-.371$ , $p=.365$
		pleasure	$r=.755^{**}$ , $p=.000$	$r=.344$ , $p=.330$	$r=.315$ , $p=.447$
		arousal	$r=.392$ , $p=.233$	$r=-.344$ , $p=.345$	$r=.701^*$ , $p=.017$
	Germans	dominance	$r=.333$ , $p=.420$	$r=.913^{**}$ , $p=.002$	$r=.603^*$ , $p=.022$
		pleasure	$r=.626$ , $p=.097$	$r=.333$ , $p=.420$	$r=.556^*$ , $p=.025$
		arousal	$r=.436$ , $p=.281$	$r=-.531$ , $p=.176$	$r=.447$ , $p=.267$
Role play (positive)	Chinese	dominance	$r=.663^*$ , $p=.034$	$r=.742^{**}$ , $p=.009$	$r=-.543^*$ , $p=.019$
		pleasure	$r=.854^{**}$ , $p=.007$	$r=.368$ , $p=.225$	$r=.306$ , $p=.389$
		arousal	$r=-.259$ , $p=.553$	$r=-.215$ , $p=.525$	$r=.053$ , $p=.885$
	Germans	dominance	$r=.383$ , $p=.309$	$r=.722^{**}$ , $p=.001$	$r=.043$ , $p=.919$
		pleasure	$r=.449$ , $p=.225$	$r=.283$ , $p=.085$	$r=.645^{**}$ , $p=.003$
		arousal	$r=.199$ , $p=.607$	$r=-.531$ , $p=.176$	$r=.053$ , $p=.885$
Role play (negative)	Chinese	dominance	$r=-.302$ , $p=.430$	$r=-.209$ , $p=.596$	$r=-.241$ , $p=.566$
		pleasure	$r=.110$ , $p=.769$	$r=-.323$ , $p=.397$	$r=-.415$ , $p=.307$
		arousal	$r=.189$ , $p=.631$	$r=-.150$ , $p=.700$	$r=-.392$ , $p=.337$
	Germans	dominance	$r=.548$ , $p=.160$	$r=-.187$ , $p=.631$	$r=-.154$ , $p=.742$
		pleasure	$r=.609$ , $p=.109$	$r=-.271$ , $p=.480$	$r=-.661$ , $p=.106$
		arousal	$r=.742^*$ , $p=.035$	$r=.591$ , $p=.056$	$r=.474$ , $p=.282$

Under the condition when the metaphor *The teacher is a shepherd* was provided without the role play, there was a positive correlation between the Chinese SAM ratings of the topic *teacher* and those of the vehicle *shepherd* on the arousal dimension ( $r=.701$ ,  $P<.01$ ). In comparison, the German SAM ratings showed a positive correlation on both the dominance dimension ( $r=.603$ ,  $p<.05$ ) and the pleasure dimension ( $r=.556$ ,  $p<.05$ ). When the role play with the positive development was provided, the SAM ratings of the Chinese subjects showed a negative correlation between the topic *teacher* and that of the vehicle *shepherd* on the dominance dimension ( $r=-.543$ ,  $P<.05$ ), whereas the German ratings showed a positive correlation on the pleasure dimension ( $r=.645$ ,  $p<.05$ ). Under the condition

when the role play with the negative development was provided, no correlation between SAM ratings of the topic *teacher* and the vehicle *shepherd* was ever found either by Chinese subjects or by the German subjects.

In summary, there was a stronger correlation between SAM ratings of the topic *teacher* and those of the vehicle *candle* in the metaphor *The teacher is a candle* by the Chinese than by the German. Conversely, there was a stronger correlation between the SAM ratings of the topic *teacher* and those of the vehicle *shepherd* in the metaphor *The teacher is a shepherd* by the German subjects than by the Chinese subjects. Similar correlations were found both between the SAM ratings of the topic *teacher* and the vehicle *captain* in the metaphor *The teacher is a candle* among the German subjects as well as the Chinese subjects. Moreover, there was a stronger correlation between the SAM ratings of the topic and those of the vehicle under the condition of no role play or the role play with the positive development than under the condition of no role play with the negative development.

### **4.3.2 Conceptual representations: Feature Analyses**

#### **4.3.2.1 Analysis Methods and Tools**

As stated in section 4.2.2.4, subjects were provided a total of 33 features in attributive noun forms and asked to rate how well these features described the topic and the vehicle concepts in the metaphors. Before the presentation of the results from the data analysis, it is necessary to introduce briefly the two methods of analysis, namely network analysis and cluster analysis, and the ways to read the bipartite graphs and the dendrograms used to visualize the results.

#### **Network Analysis**

Network analysis was used to compare how the Chinese subjects and the German subjects rated the suitability of the 33 features in describing the topic and the vehicle concept of metaphors. Network analysis is also known as the social network analysis.<sup>44</sup> It is typically used to search for structures or social relations in groups, as when investigating the communication network of all the staff working at the same company. Therefore, the data used for social network analysis are commonly

---

<sup>44</sup> The term of social network was coined by Barnes, J. A in 1954. Typically, social network analysis studies specific social structures through analyzing the relationship among people, groups or organizations.

relational data among individuals. Data for instance, rate members of a group according to their popularity.

The network analysis applied here is actually the two-mode network analysis. Typically, two-mode networks process so-called “affiliation” data in another way, called two-mode, or two level of analysis, describing which actors are attending which events. That means two-mode analysis involves actor-by-event or case-by-affiliation data sets. According to Doreian, Batgeij and Ferligoj, two-mode data are defined as “two sets of social units (e.g. people and events) and contain measurements of a relation from the units in one set to units in the other set” (2004:30). For instance, the so-called deep south data, also known as ‘southern women’ data, collected by Davis et al (1941) is a typical example of two-mode network, with data on the attendance records of a set of women (actors) in various social activities (events) over 9-month period.

In this study, “events” referred to the ratings of the 33 features; “actors” referred to the subjects under the correspondent experimental condition. To express it in a more mathematical way, the bipartite networks  $N = (V_1, V_2, E)$  involved in these two studies actually had their vertex  $V$  set partitioned into two subsets  $V_1$  (actors, including Chinese subjects or German subjects) and  $V_2$  (events, the ratings of the 33 features). Each edge ( $E$ ) had one end in  $V_1$  and one end in  $V_2$ .

For the quantitative description of the networks, the *network degree centralization index* and the *density* of the networks are calculated through the *UCINET 6* software package (Borgatti et al, 2002). For each experiment condition, there were ten German subjects and ten Chinese subjects. Since networks constructed under all conditions shared the identical numbers of the vertices ( $V_1$ :10 subjects and  $V_2$ : 33 features), the *network degree centralization index* and the *density* can thus be employed to compare the bipartite networks constructed by the correspondent German and the Chinese subjects under various experimental conditions.

The *network degree centralization index* is a number between 0 and 1. The index is 0 when all vertices have equal centrality value and 1 when one vertex completely dominates all other vertices having more connections than others. Thus, the network degree centralization is related to a compactness property of a network. Freeman (1979) set the measure of general network centralization index as:

$$C_X(G) = \frac{\sum_{i \in V} (C_X(*) - C_X(i))}{\max \sum_{i \in V} (C_X(*) - C_X(i))}$$

where  $C_x(*)$  is the highest value of a selected vertex centrality measure  $C_A(x)$  in the set of vertices of a network. For this study, the *network degree centralization*  $C_D$  was calculated according to the following measure:

$$C_D = \frac{\sum_{x \in E} (C_D^* - C_D(x))}{n - 2}$$

where  $C_D^*$  is the highest value of selected vertex degree centrality measure  $C_D(x)$ . A normalized degree centrality is defined by Freeman (1977) as

$$C_{D,norm}(i) = \frac{\sum_{j \in V} a_{ij}}{n - 1}$$

where the  $a_{ij}$  are the coefficients of the adjacency of the network.

Like the *network degree centralization index*, the *density* of the network also takes on a value between 0 and 1. It is a measure of the connectedness of the network. In the bipartite networks constructed for the two studies, edges with the value less than 3 were removed from the networks.

$$Density = \frac{2 \sum_{i,j \in V} a_{ij}}{n(n - 1)}$$

When the density of a network is closer to 1, the network is considered dense. Otherwise, it is sparse. In this case, a denser network can also indicate that more subjects rated the suitability of the 33 features higher than those which were involved in a less dense network.

For this online study, the so-called *two-mode graphs* or *bipartite graphs* were drawn through the software *Pajek* (Batagelj and Mrvar, 1998, 2007; Noovy, et al, 2005) to examine how similarly or differently the Chinese subjects and the German subjects associate particular features with a certain metaphor and its correspondent concepts. The software *Pajek* was selected to draw the bipartite graphs not only because of its capacity to handle very large data sets and to locate points according to several algorithms, but also because the software is flexible enough to optimize the visualisation through changing labels, shapes, and colours of the vertices and thickness of the lines.

In the visualisation of bipartite data collected from the online experiment, actors (Chinese and German subjects) and the events (33 features) were treated as different vertices, and lines or edges were used to show the connections of actors (subjects) to the events (features). Lines connected only vertices from one set to

vertices from another set -- there were no connections within sets. That means, there were only lines between subjects and features but no lines between subjects alone and no lines between features alone. As is typical for a two-mode graph, actors that were located closer together are connected because they have a similar profile of events. In this case, actors are located closer together if they rated features similarly.

### **Cluster Analysis**

The term cluster analysis was first used by Tryon in 1939. It is also called segmentation analysis. Cluster analysis is a classification method. Its objective is to identify clusters with homogenous cases based on measured characteristics. Generally, cases of the same clusters possess more-similar characteristics than cases of different clusters.

There are various methods for determining how clusters are formed.<sup>45</sup> In this study, the *agglomerative hierarchical clustering with the complete linkage* was applied. The *agglomerative hierarchical clustering* starts with each individual case as a cluster. Then the nearest clusters are progressively combined or fused into further clusters until finally all the cases are grouped into one big cluster. When there are N cases, N-1 clustering steps or fusions are involved. During the whole process, the number of clusters is reduced at each clustering step.

By *agglomerative hierarchical clustering*, there are also several ways to compute inter-cluster distance, such as single linkage, complete linkage, group linkage and etc. In this study, the computing way of complete linkage was applied, in which the distance between two clusters is defined as the farthest distance between two cases in that two clusters:

If  $A = (A_1, A_2, A_3, \dots, A_m)$ , and  $B = (B_1, B_2, B_3, \dots, B_n)$

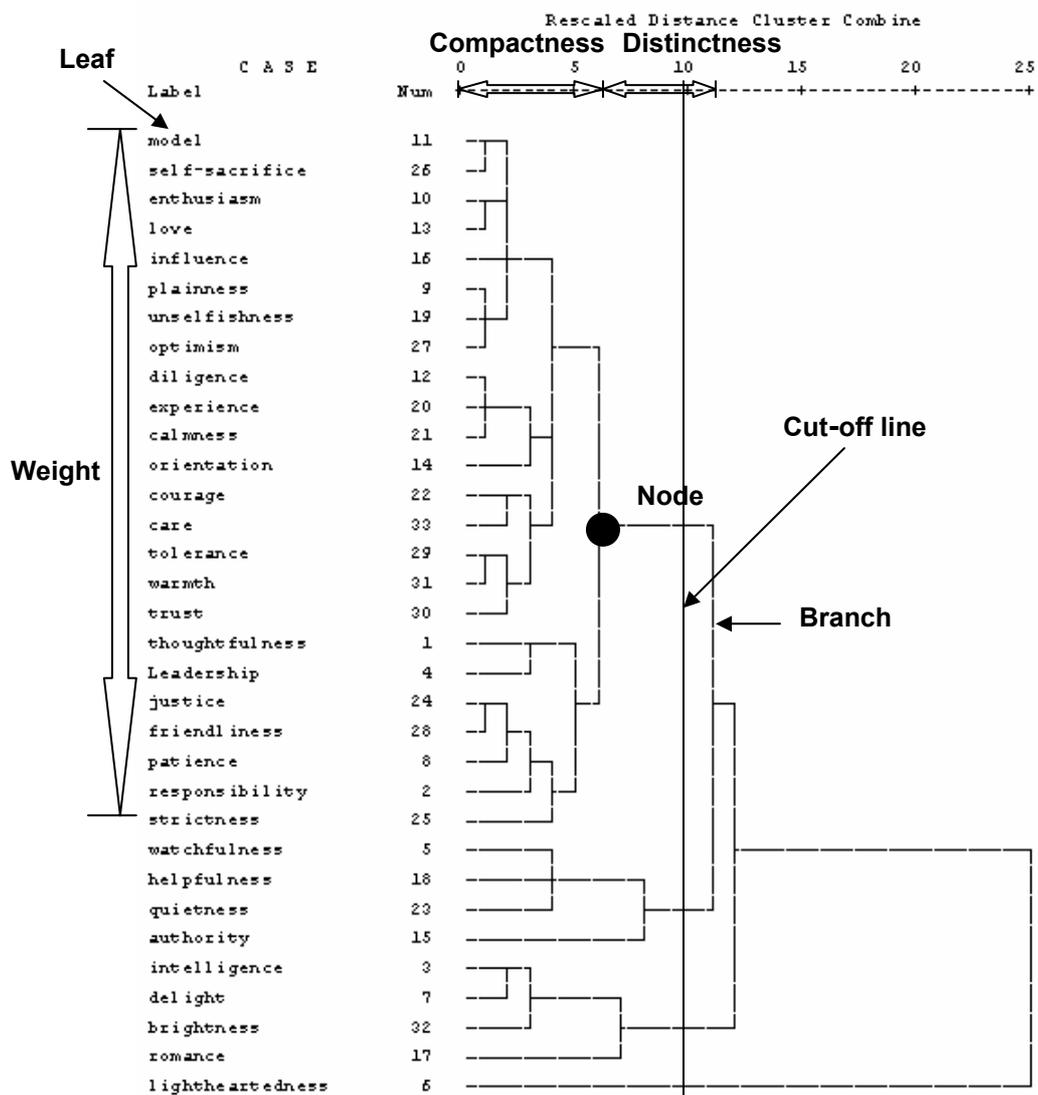
Complete linkage distance =  $\text{Max} (\text{distance}(A_i, B_j) \mid i=1, 2, \dots, m; j= 1, 2, \dots, n)$

In this study, *the hierarchical cluster analysis with the complete linkage* was used to group the 33 features according to their ratings on how suitable the features were in describing the teacher metaphors and their relevant concepts under various conditions.

---

<sup>45</sup> Three different types of cluster analysis are available in SPSS, namely hierarchical cluster analysis, K-means cluster analysis and two-step cluster analysis. Hierarchical clustering has two different hierarchical techniques, divisive and agglomerative. K-means cluster analysis uses Euclidean distance. The desired number of clusters is decided by researchers in advance. Two-step cluster analysis involves as its name suggests, two steps. Step one is to group cases into pre-clusters. In step two, hierarchical clustering is applied to the pre-clusters. This method is typically used for very large data sets.

According to the results of the cluster analysis, dendrograms or hierarchical trees were produced directly through the statistical software package SPSS (Statistical Product and Service Solution). All dendrograms used the so-called “rescaled distance”, a relative scale from 0 to 25, at which the clusters combine. Image drawing a vertical line through a dendrogram; different distinct clusters can be found, as the line moves from the right side to the left side. In this study, a vertical line with its value of 10 at the relative scale was drawn throughout all dendrograms as the cut-off line. In this case, distinct clusters can be identified by observing the sub trees on the left side of the line.



**Figure 7: Major terms involved in describing a dendrogram.**

In Figure 7, a total of four distinct clusters are observable on the left side of the cut-off line. The 33 features were named as leaves of the dendrogram, with each feature as one *leaf*. The point at which two leaves is clustered or two small clusters are regrouped together as a big cluster is called a *node*. The *branches* are those that

finally connect all big clusters together. The *weight* of each cluster is indicated by the number of leaves within it. It is its percentage of the total height of the dendrogram. In this case, the weight is the percentage of all features that fall within each cluster. The *compactness* of a cluster is decided by the minimum distance at which the cluster comes into being. It shows how similar the elements of a cluster are. On the contrary, *distinctness* represents the difference between one cluster and its closest neighbour. It can be observed on the dendrogram as the length of a branch along the horizontal axis. In other words, it is the distance along the X-axis from the point at which the cluster is formed to the point at which it is further aggregated into a larger cluster.

#### 4.3.2.2 Feature Analyses of the Topic Concept *Teacher*

In this experiment, the subjects were first provided with one of the three teacher metaphors, namely *The teacher is a candle*, *The teacher is a captain* and *The teacher is a shepherd*. With the correspondent teacher metaphor they received in the experiment, one third of the subjects were invited to act out the role as a class teacher in a virtual class with the positive development, and the last one third executed their role of a class teacher in a virtual class with negative development, and the rest one third actually received no role play at all. After the role play, or directly after the appearance of the teacher metaphor under the condition of no role play, each of them was asked to rate the SAM and the 33 features on the topic concept *teacher* and then repeat the ratings on the correspondent vehicle concepts. In the following, the results of the feature ratings are presented.

The method introduced in 4.3.2.1 was applied and the network degree centralization index ( $C_D$ ) and the network density were calculated, based on each correspondent network according to the feature ratings under various conditions. The results are listed in Table 10. The Chinese network constructed for the topic *teacher* under the condition of the metaphor *The teacher is a candle* under the condition of no role play is both more compact ( $C_D: 0.4223 > 0.3992$ ) and more dense ( $0.7553 > 0.4889$ ) than that of the correspondent German network. This indicates that the Chinese subjects agreed with each other more than the German subjects in their ratings and that the Chinese rated most of these features much higher than the German. Interestingly, the  $C_D$  and the density attained after the role play with the positive development shows an increase by the German subjects ( $C_D$ : from 0.3992 to 0.4125 and *density*: from 0.4889 to 0.6375), which results in a

decrease of the Chinese and the German differences. By comparison with the condition of the role play with the negative development, the network centralization of the German ratings was decreased to 0.3950 and the density to 0.6179. In this sense, the role play with the positive development produced stronger congruence among the subjects in their ratings and produced higher ratings. In contrast, the negative role play produced lower ratings and less congruence among the subjects in their ratings.

**Table 10: The network degree centralization index values and the density values of the bipartite networks constructed according to the 33 feature ratings for the topic *teacher* in the three teacher metaphors.**

Teacher Metaphors	Role plays	Cultural groups	network degree centralization ( $C_D$ )	Density
The teacher is a candle	No role play	Chinese	0.4423	0.7553
		Germans	0.3992	0.4889
	Role play-positive	Chinese	0.4227	0.7664
		Germans	0.4125	0.6357
	Role play-negative	Chinese	0.4560	0.6750
		Germans	0.3950	0.6179
The teacher is a captain	No role play	Chinese	0.4383	0.7171
		Germans	0.4227	0.7011
	Role play-positive	Chinese	0.4272	0.7674
		Germans	0.4109	0.6872
	Role play-negative	Chinese	0.4832	0.7054
		Germans	0.4525	0.6833
The teacher is a shpherd	No role play	Chinese	0.3965	0.6262
		Germans	0.4532	0.7054
	Role play-positive	Chinese	0.4084	0.6694
		Germans	0.4501	0.7010
	Role play-negative	Chinese	0.4262	0.6506
		Germans	0.4053	0.7243

The German network for the topic concept *teacher* in the metaphor *The teacher is a shepherd* is more compact (0.4532) and more dense (0.7054) than the Chinese network (0.3965 resp. 0.6262) when no role play was involved. It shows that the German subjects seemed to agree with each other more than did the Chinese in their ratings and that the German gave generally much higher ratings than the Chinese. After the role play with the positive development was provided, the network centralization index of the Chinese network increased to 0.4084, and the density increased to 0.6694. Thus, the difference between the Chinese network and its German counterpart on the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development was actually

decreased than under the condition when no role play was integrated. It also indicates that the positive role play produced higher ratings and stronger congruence among the subjects in their ratings. Thus, it also reduces the cultural differences existing in the feature ratings to a degree.

Compared with the two metaphors mentioned above, the topic *teacher* in the metaphor *The teacher is a captain* did not exert such obvious cultural differences. Under each role play condition when the metaphor *The teacher is a captain* was provided, both the  $C_D$  and the density of the networks constructed for the Chinese ratings had slightly higher values than those constructed for their German counterparts, which indicates that the Chinese subjects tended to agree with each other in feature ratings a little more than the Germans did. In the following, the visualization of those networks in bipartite graphs together with the dendrograms generated from the cluster analysis for the topic *teacher* in different metaphors under each role play conditions are presented in sequence.

#### **The Topic Concept *Teacher* in the Metaphor *The Teacher is a Candle*:**

In Figure 8, it is obvious that the white vertices (Chinese subjects) are located in a more condensed manner than the black vertices (German subjects), which shows that a stronger congruence among the Chinese subjects in the feature ratings is available. On the contrary, the German subjects differed greatly from each other in their ratings, which indicates the lack of a consistent view on the topic *teacher* in the metaphor *The teacher is a candle* among the German subjects.

In Figure 9, a cut-off line at the value 10 distinguishes six clusters of the features according to the ratings by the Chinese subjects and five clusters by their German counterparts. The comparison of the first cluster in the two dendrograms showed that the Chinese not only highlighted features such as *friendliness*, *warmth*, *brightness* and *plainness* as the Germans did, but they also rated very highly features associated with the metaphoric category of *candle*, which stem from Chinese culture, such as *unselfishness*, *self-sacrifice*, *tolerance*, *care*, *diligence*, *patience*, and *model*. In contrast, those features associated with the features in such a metaphoric category of *candle* were regarded by the Germans as almost the least appropriate features for describing the topic *teacher* in the metaphor *The teacher is a candle*. Moreover, the structure of the left dendrogram is more compact and less distinctive than in the right, which indicates that the Chinese subjects' ratings of the features

involved in the same cluster are more similar than the feature ratings of the German subjects.

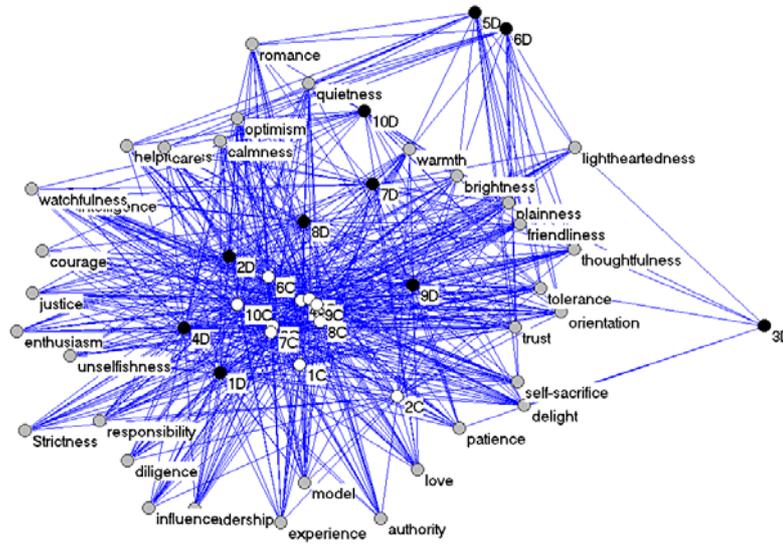


Figure 8: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a candle* under the condition of no role play.<sup>46</sup>

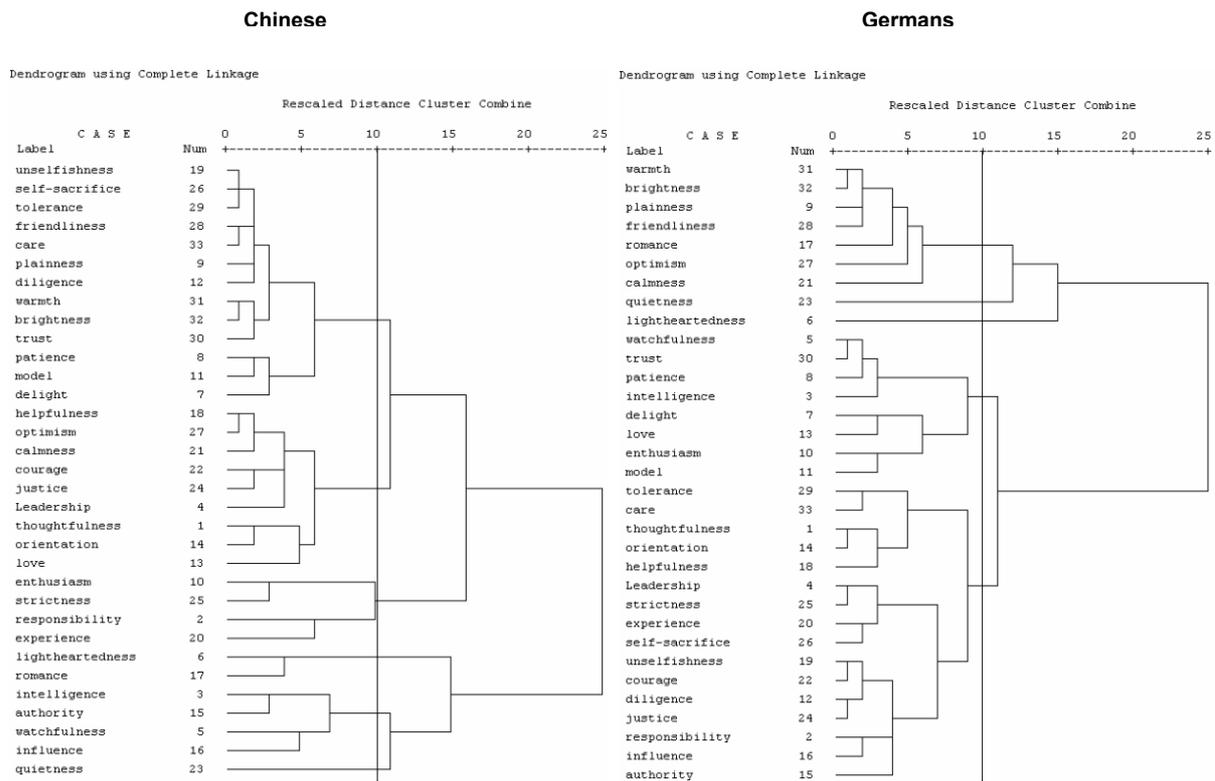
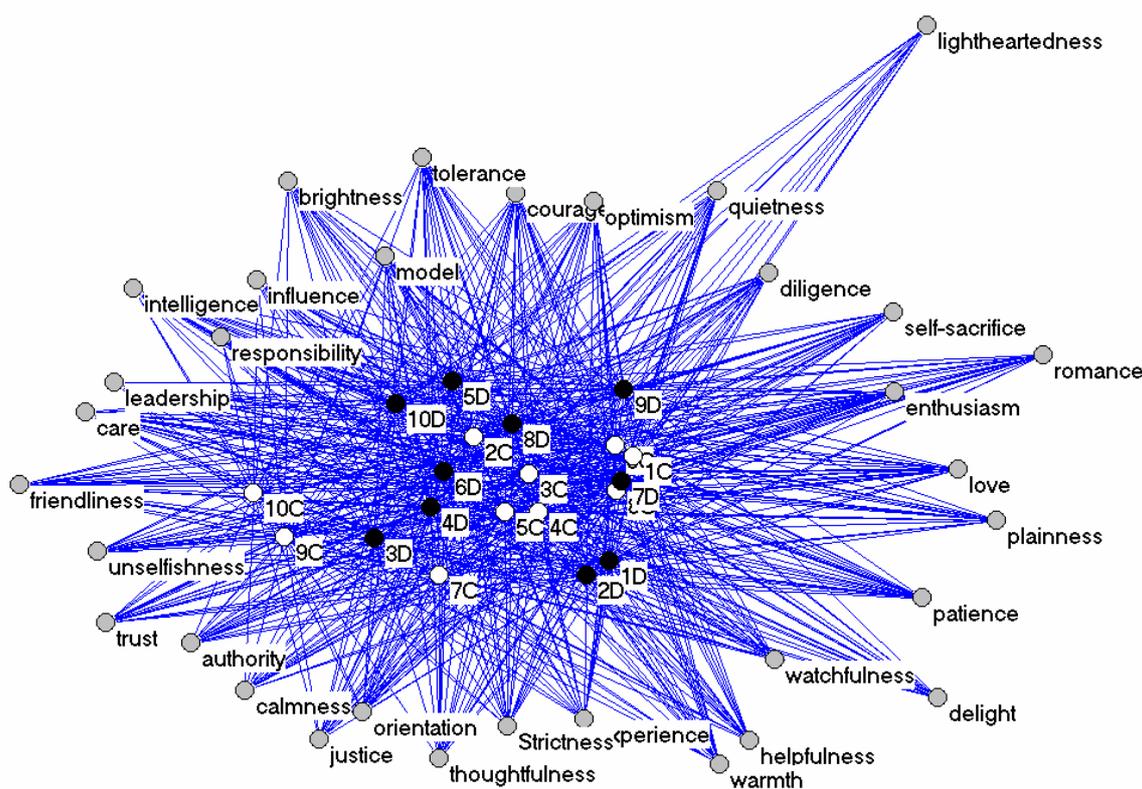


Figure 9: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of no role play.

<sup>46</sup> In this bipartite graph, and in the bipartite graphs coming after, black vertices refer to the German subjects (D); white vertices refer to the Chinese subjects(C); grey vertices refer to the 33 features; and lines refer to relationship between the vertices. Actually, the initiative form for the German subjects is "G". Since "G" is visually too similar to "C", the initial form for the Chinese subjects. "D"s (Deutsche) instead of "G"s (Germans) are used to symbolize the German subjects.

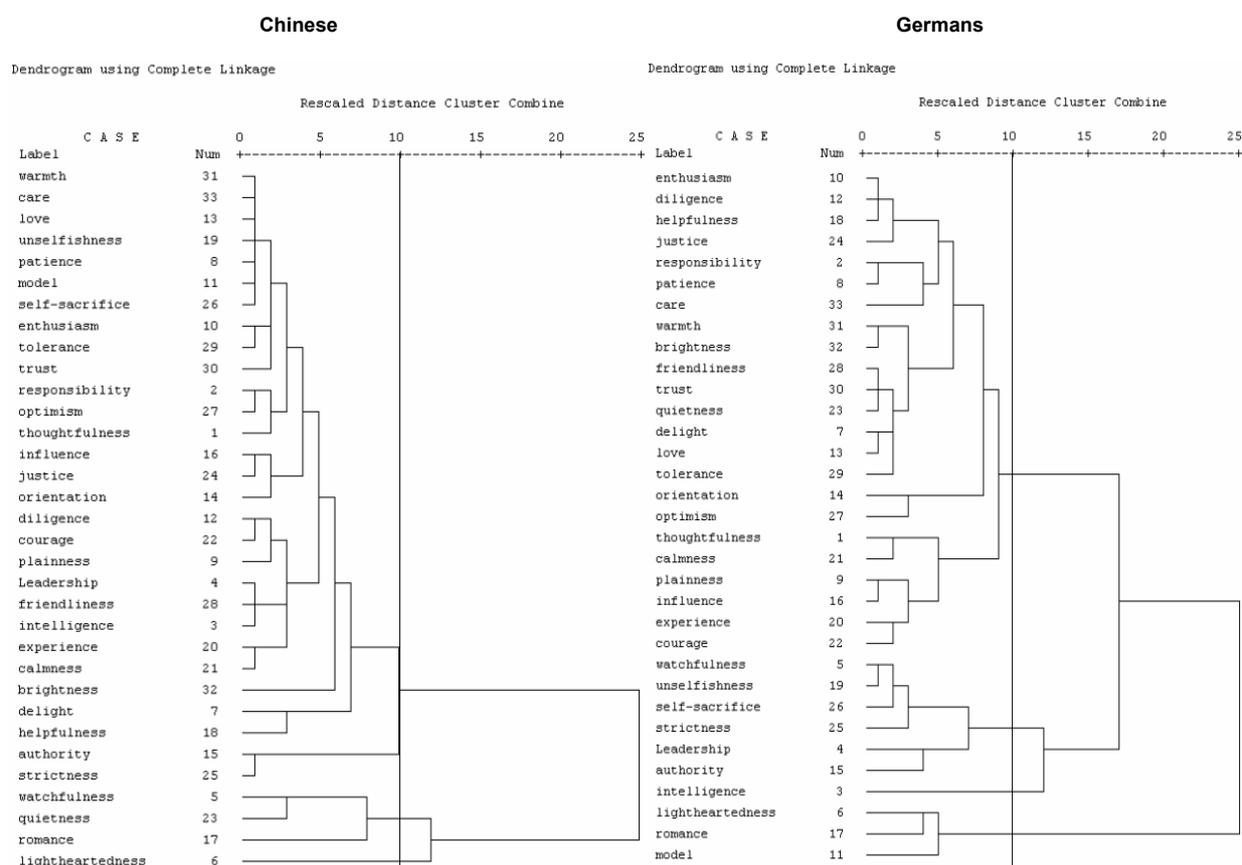
Under the condition of the role play with the positive development, the cultural differences of the feature rating were not so obvious. In Figure 10, the black vertices representing the German subjects do not spread so widely from each other as shown in Figure 8. Some black vertices are even located quite closely to the white vertices. In this sense, the German subjects tended to agree with each other more and also agreed with the Chinese more in rating the appropriateness of the 33 features according to topic *teacher* in the metaphor *The teacher is a candle* under the condition of the role play with the positive development.



**Figure 10: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a candle* under the condition of the role play with the positive development.**

In Figure 11, the cut-off line distinguishes four clusters of features in both dendrograms. The structure of both two dendrograms are quite compact, with the left dendrogram just slightly more compact than the right one, which indicates that not only the Chinese subjects but also the German subjects have rated a number of features quite similarly. Astonishingly when the first clusters of their correspondent dendrograms are compared (see Figure 11), the Chinese and the German subjects (after playing the part of a class teacher in the role play with the positive development) commonly rated a number of features as appropriate for describing the topic *teacher* in the metaphor *The teacher is a candle*. Those common features were

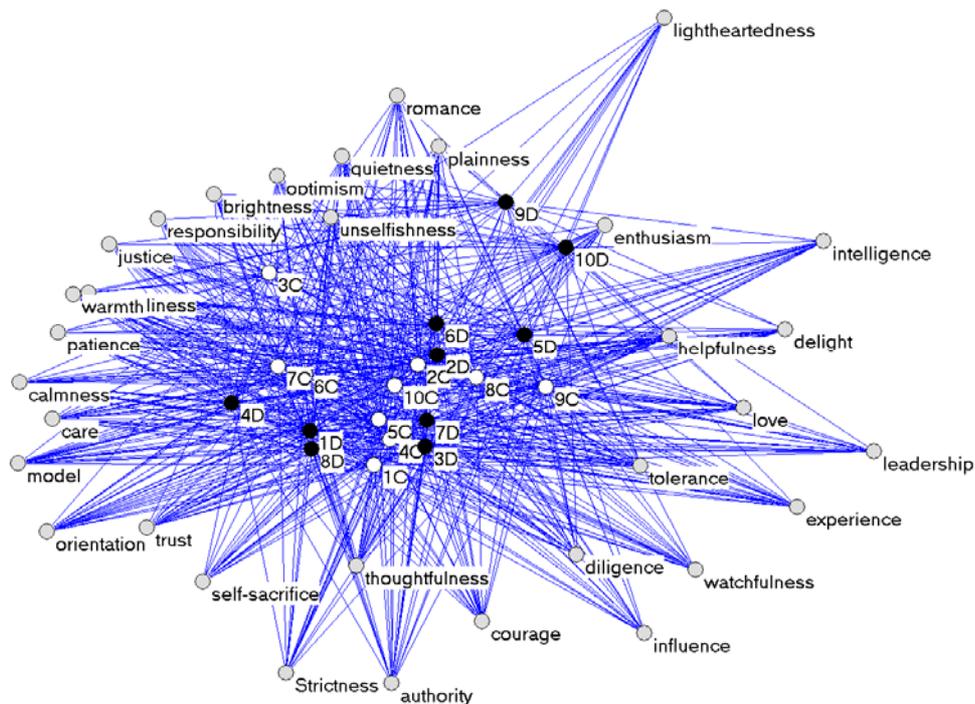
not only *warmth*, *brightness*, *plainness* and *friendliness* as under the condition of no role play, but also included the features like *care*, *love*, *patience*, *enthusiasm*, *tolerance*, *trust*, *responsibility*, *optimism*, *thoughtfulness*, *influence*, *justice*, *orientation*, *diligence* and *courage*. Although most German subjects did not associate the topic *teacher* in the metaphor *The teacher is a candle* with the features of *unselfishness* and *self-sacrifice* as the Chinese did after the role play of the positive development, at least the German subjects did not regard those features as the least appropriate features for describing the topic *teacher* in the metaphor *The teacher is a candle*. After their positive experience as the class teacher in the role play and unlike under the condition of no role play, the German subjects even agreed with the Chinese subjects that the feature *lightheartedness* was inappropriate to be employed to describe this metaphor.



**Figure 11: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of the role play with the positive development.**

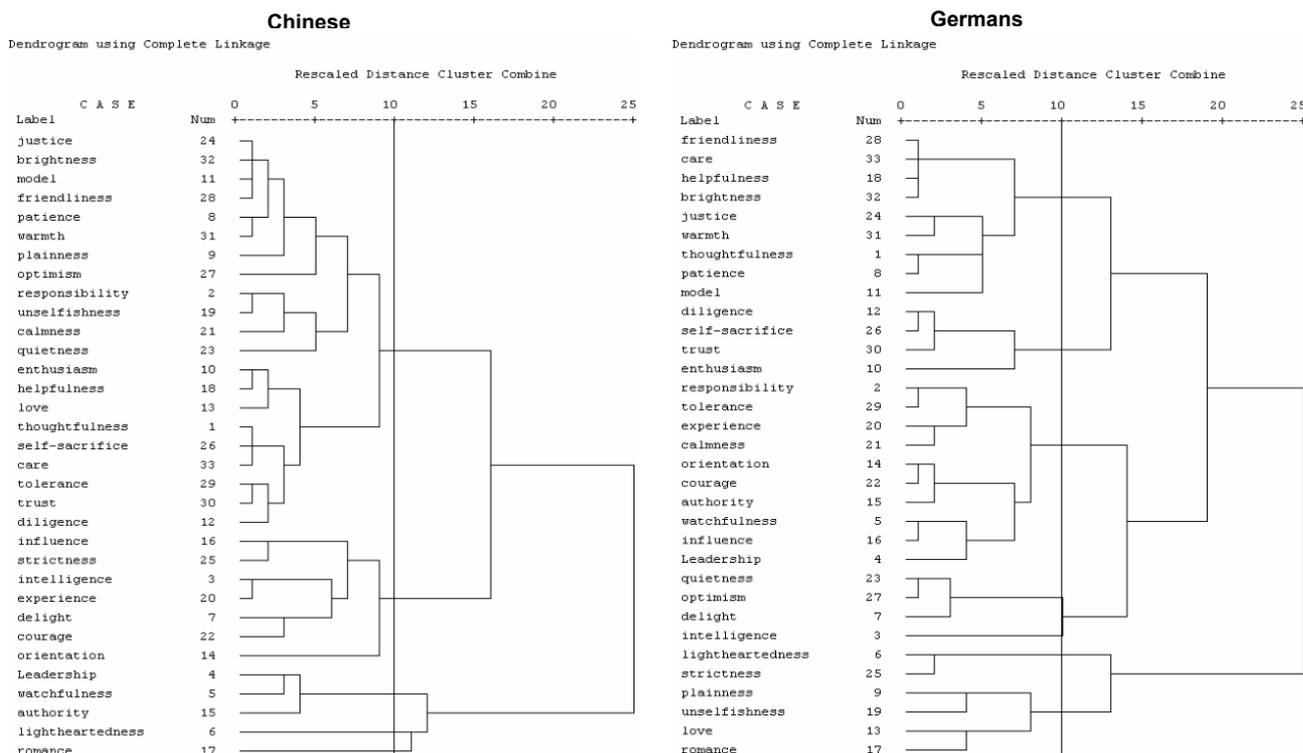
The bipartite network constructed according to the feature ratings by the subjects after the role play with the negative development shows that the white vertices of the Chinese subjects were no longer located in such a condensed way as when no role

play was involved (compare Figure 8 with Figure 12). It suggests that the negative development of the role play shook the base of Chinese subjects' congruent understanding of the topic *teacher* in the metaphor *The teacher is a candle*.



**Figure 12: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a candle* under the condition of the role play with the negative development.**

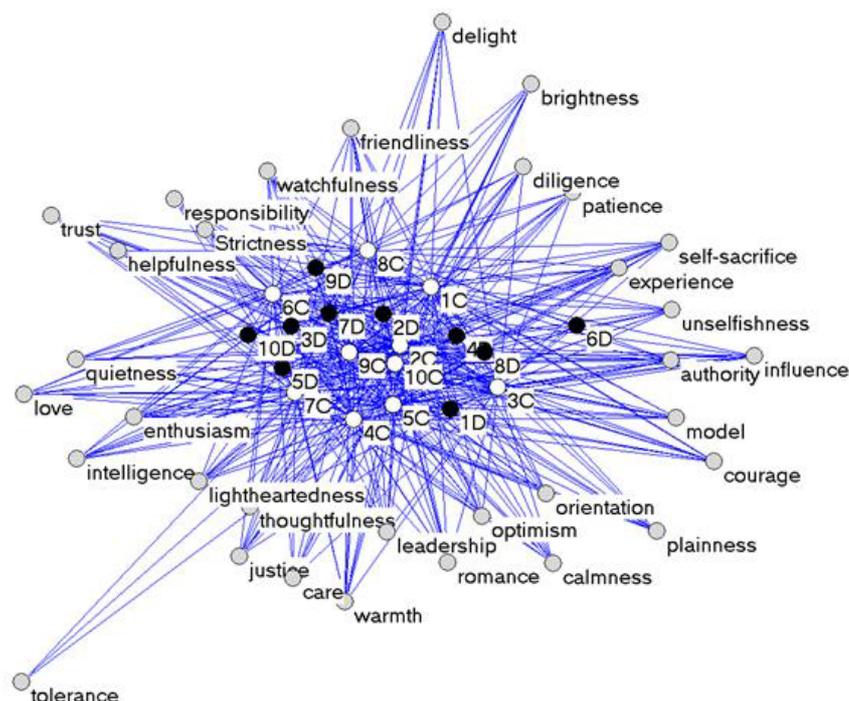
In Figure 13, the cut-off line distinguishes five clusters in the left dendrogram and seven in the right. Compared with the structures of the dendrograms in Figure 11, the structures of the two dendrograms in Figure 13 are less compact but more distinct, which indicates that the ratings of the 33 features varied to a larger degree under the condition of the role play with the negative development than they did under the condition of no role play. By comparison with the condition of the role play with the positive development and the condition of no role play, under the condition of the role play with the negative development, there were far few features that were commonly held by both the Chinese and the German subjects as the most appropriate features (*brightness, model, friendliness, patience, warmth, thoughtfulness* and *care*) for describing the topic *teacher* in the metaphor *The teacher is a candle*. Other features like *plainness, unselfishness* and *love* that the Chinese subjects rated as the most appropriate features for describing the topic *teacher* in the *candle-teacher* metaphor were considered by the Germans as the least appropriate features which were included in the cluster formed last.



**Figure 13: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of the role play with the negative development.**

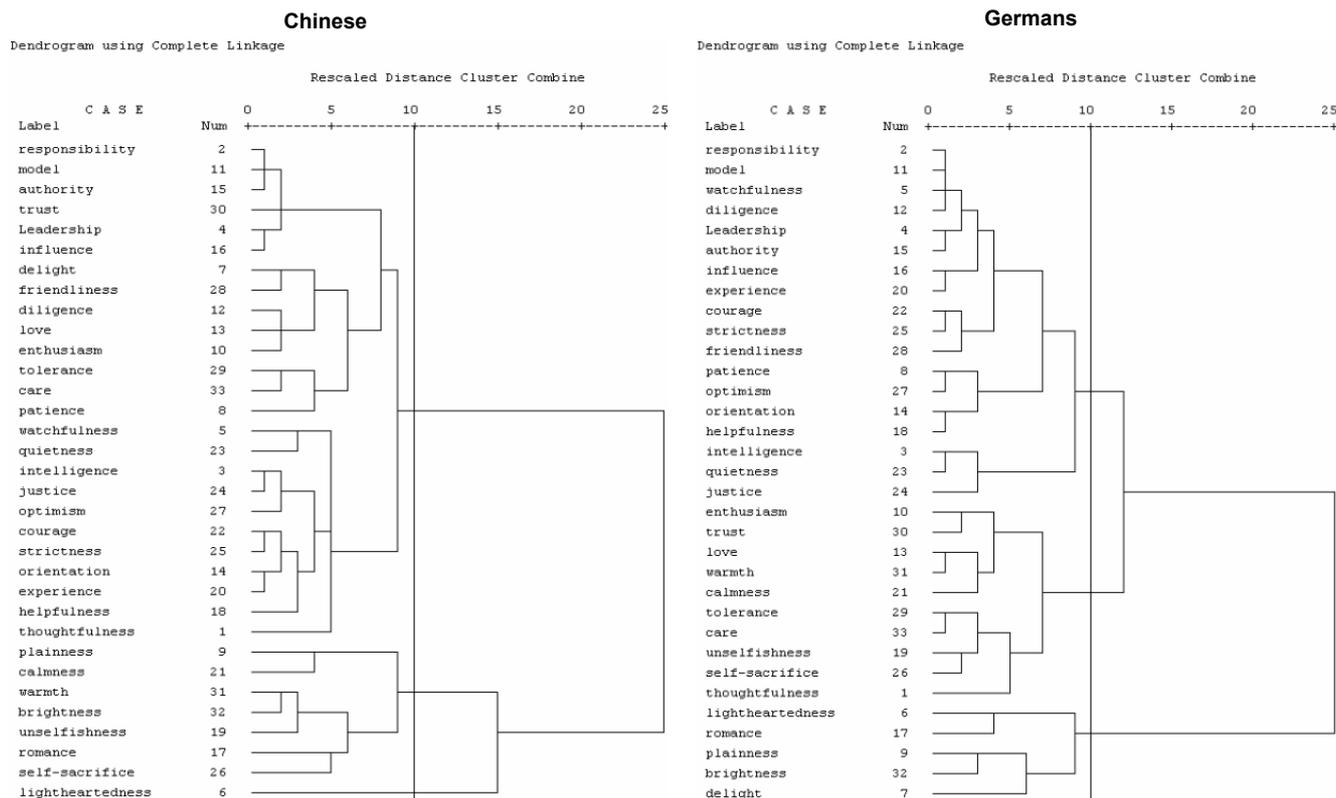
### **The Topic Concept *Teacher* in the Metaphor *The Teacher is a Captain*:**

For the metaphor *The teacher is a captain*, when no role play was presented (see Figure 14), there were few obvious cultural differences between subjects' feature ratings of the topic *teacher*. The spread of the white vertices (the Chinese subjects) and the black vertices (the German subjects) suggests that the Chinese subjects did not vary dramatically from each other in their ratings and so did the German subjects. Moreover, within the same cultural group, there was consensus to a degree among the feature ratings by both the German subjects and the Chinese subjects.



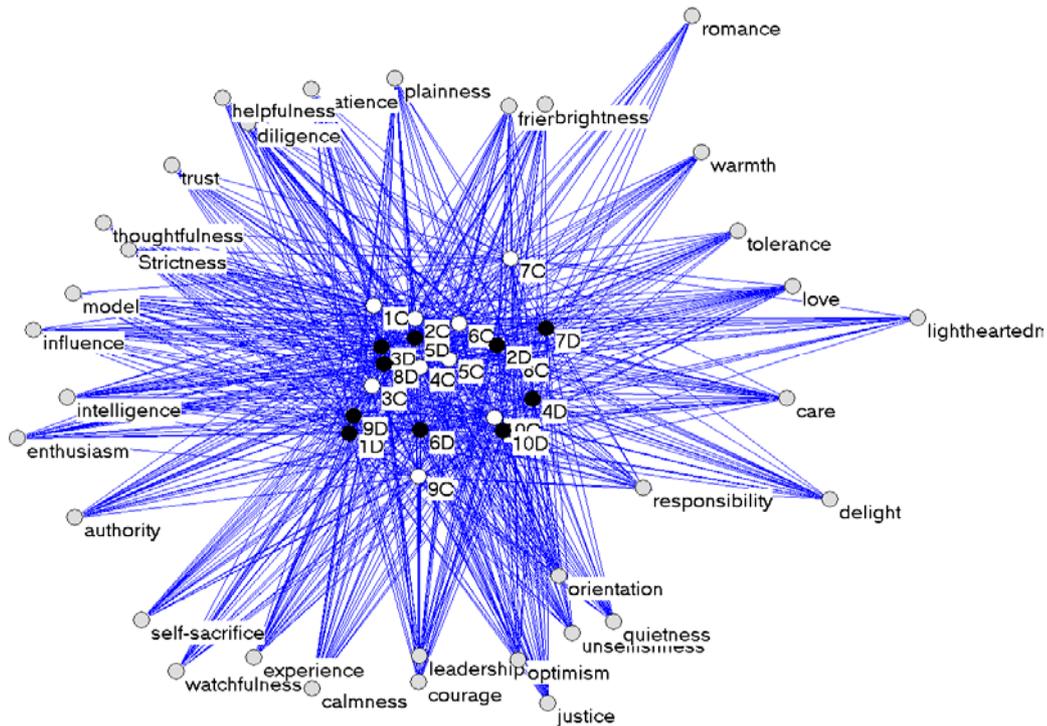
**Figure 14: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a captain* under the condition of no role play.**

Under this condition, two corresponding dendrograms are presented in Figure 15. According to the cut-off line, the 33 features in both dendrograms are categorized into three clusters. The structures of both dendrograms are quite compact. The Chinese subjects agreed with each other in their high ratings of features such as *responsibility*, *model*, *authority*, *trust*, *leadership*, *influence*, etc., and the German subjects agreed with other in their high ratings of the features like *responsibility*, *model*, *watchfulness*, *diligence*, *leadership*, *authority* and etc. Obviously, what most German subjects regarded as the most relevant features to describe the topic *teacher* in the metaphor *The teacher is a captain* were also features that were highly rated by the Chinese subjects. To be concrete, both the Chinese and the German subjects associated features like *responsibility*, *model*, *watchfulness*, *diligence*, *leadership*, *authority*, *influence*, *experience*, *courage*, *strictness*, *friendliness*, *patience*, *optimism*, *orientation*, *helpfulness*, *intelligence*, *quietness* and *justice* as the appropriate features and *light-heartedness* as the least appropriate feature to describe the topic *teacher* in the metaphor *The teacher is a captain*. By contrast with the German subjects, the Chinese subjects rated the features like *love*, *tolerance* and *enthusiasm* as the most appropriate features to describe the topic *teacher* in the metaphor *The teacher is a captain* under the condition of no role play.



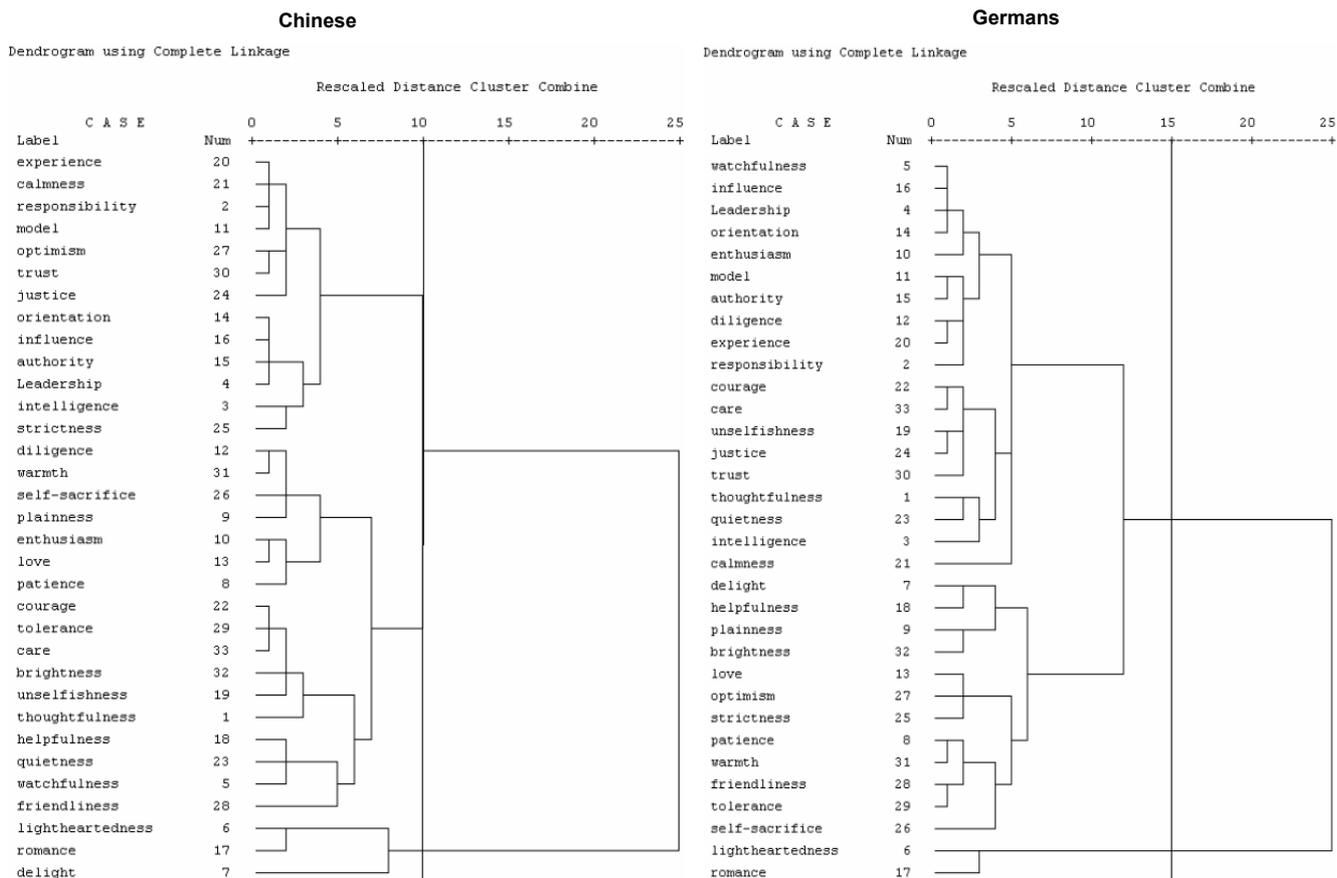
**Figure 15: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of no role play.**

According to the features rated after the role play with the positive development, a bipartite network was established. As shown in Figure 16, the white and the black vertices are located more or less in a condensed and even an overlapped way. This indicates that the subjects within the German group shared similar feature ratings with the Chinese group. Moreover, there were no significant cultural differences between the German and the Chinese in their feature ratings on the topic *teacher* in the metaphor *The teacher is a captain*.



**Figure 16: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a captain* under the condition of the role play with the positive development.**

In Figure 17, the cut-off line distinguishes two clusters of the features in both dendrograms. The structure of the items within the same cluster in both dendrograms is even more compact than in Figure 15, which shows that more features under the condition of the role play with the positive development have been rated similarly by both the Chinese and the German subjects. Just as under the condition of no role play, all the features that the German subjects took as crucial to describe the topic *teacher* in the metaphor *The teacher is a captain* were also rated highly by the Chinese subjects, such as *watchfulness*, *influence*, *leadership*, *orientation*, *enthusiasm*, *model*, *authority*, *diligence*, *experience*, *responsibility*, *courage*, *care*, *unselfishness*, *justice*, *trust*, *thoughtfulness*, *quietness*, *intelligence* and *calmness* (compare the first clusters of both dendrograms in Figure 17).

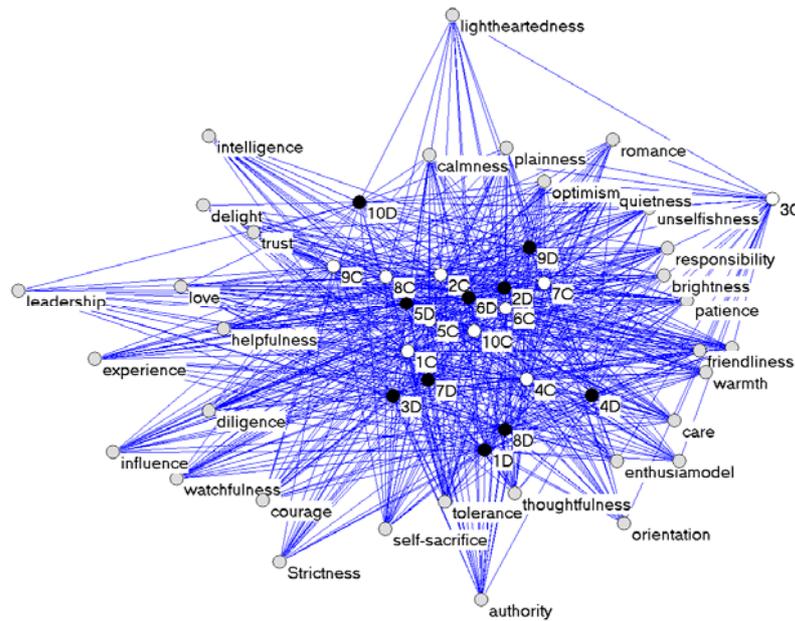


**Figure 17: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of the role play with the positive development.**

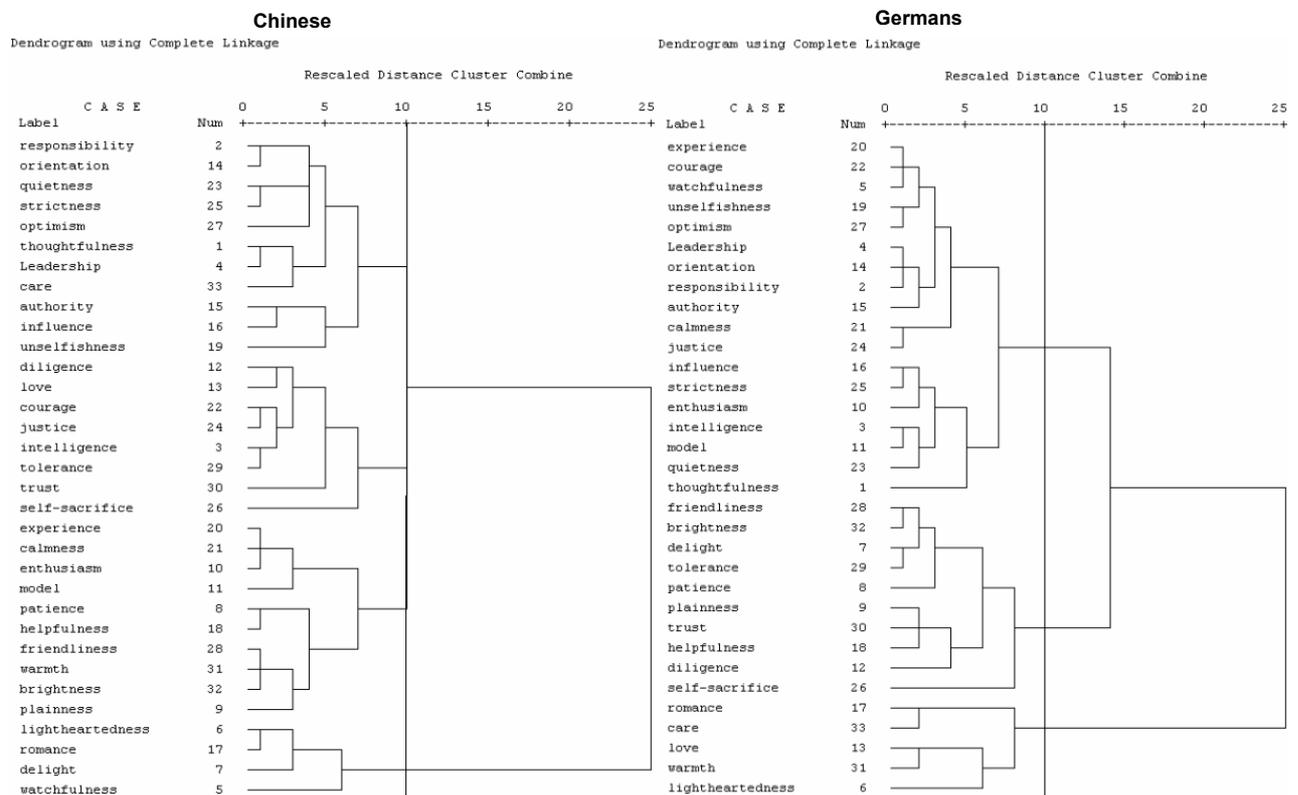
When the subjects were asked to rate the suitability of the 33 features for describing the topic *teacher* in the metaphor *The teacher is a captain* after the role play with the negative development, the German subjects as well as the Chinese subjects showed less congruence among each other in their ratings, as both the white vertices and black vertices are located in a much less compact way (see Figure 18) than under the condition of no role play (see Figure 14) or the condition of role play with the positive development (see Figure 16).

In Figure 19, the cut-off line distinguishes four clusters of the features in the left dendrogram according to the ratings of the Chinese and three clusters in the right dendrogram according to those of the German. Comparing the first cluster of the features attained correspondingly from the Chinese and the German ratings, both the Chinese and the Germans gave high ratings to the features *responsibility*, *orientation*, *quietness*, *strictness*, *optimism*, *thoughtfulness*, *leadership*, *authority*, *influence* and *unselfishness*. However, the Germans also rated other features relatively high, *experience*, *courage*, *watchfulness*, *calmness*, *justice*, *enthusiasm*,

*intelligence and model*. Interestingly, *watchfulness* is one of the most appropriate features to describe the topic *teacher* in the metaphor *The teacher is a captain* for the German subjects but it was rated as the least appropriate feature for the Chinese subjects.



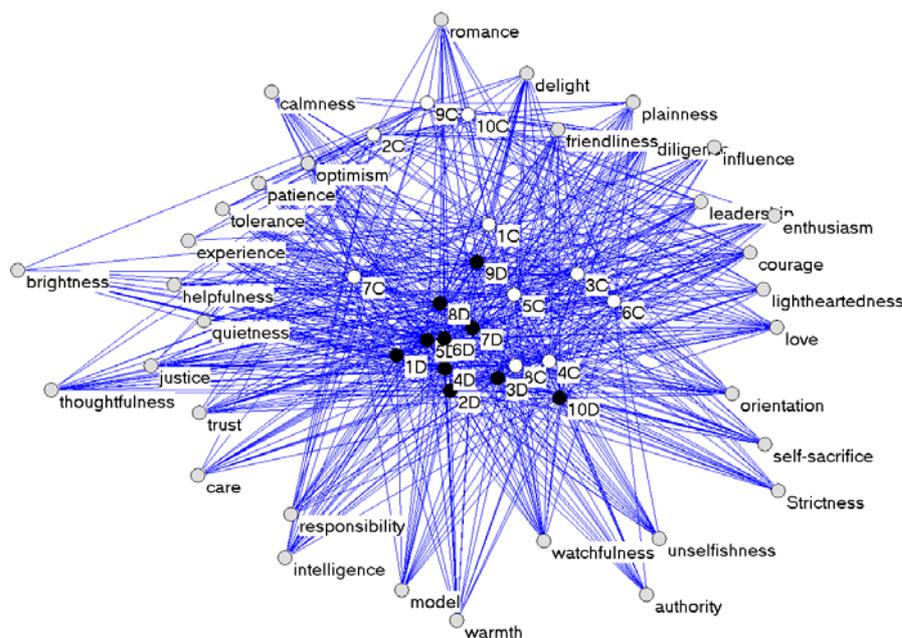
**Figure 18:** Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a captain* under the condition of the role play with the negative development.



**Figure 19:** Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of the role play with the negative development.

### The Topic Concept *Teacher* in the Metaphor *The Teacher is a Shepherd*:

When the features were rated according to the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of no role play, the members of the German group seemed to agree with each other more than did those of the Chinese group. In Figure 20, the black vertices are located in a relatively more condensed way, but the white vertices are located in an obviously more expanded way.



**Figure 20: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a shepherd* under the condition of no role play.**

In Figure 21, the cut-off line distinguishes eight clusters of features in the left dendrogram and six clusters in the right dendrogram. Obviously, the right dendrogram embodies a more compact structure than the left one, which indicates that the German rated more features similarly than the Chinese did. The two dendrograms showed that both the Chinese and the German subjects took *optimism*, *friendliness*, *helpfulness* and *experience* as the most appropriate features to describe the topic *teacher* in the metaphor *The teacher is a shepherd*. Unlike the German subjects, the Chinese subjects did not rate highly the features (such as *love*, *orientation*, *care*, *leadership*, *watchfulness*, *responsibility*, *courage* and *intelligence*) that are associated with the metaphorical meaning of the *shepherd* that stems from the German culture. It is especially unlikely for Chinese subjects to associate the *teacher* image in the *shepherd-teacher* metaphor with *care* and *responsibility*; they rated them as the least appropriate features. In contrast, for the German subjects,

those two features are central to understanding the topic *teacher* in the metaphor *The teacher is a shepherd*.

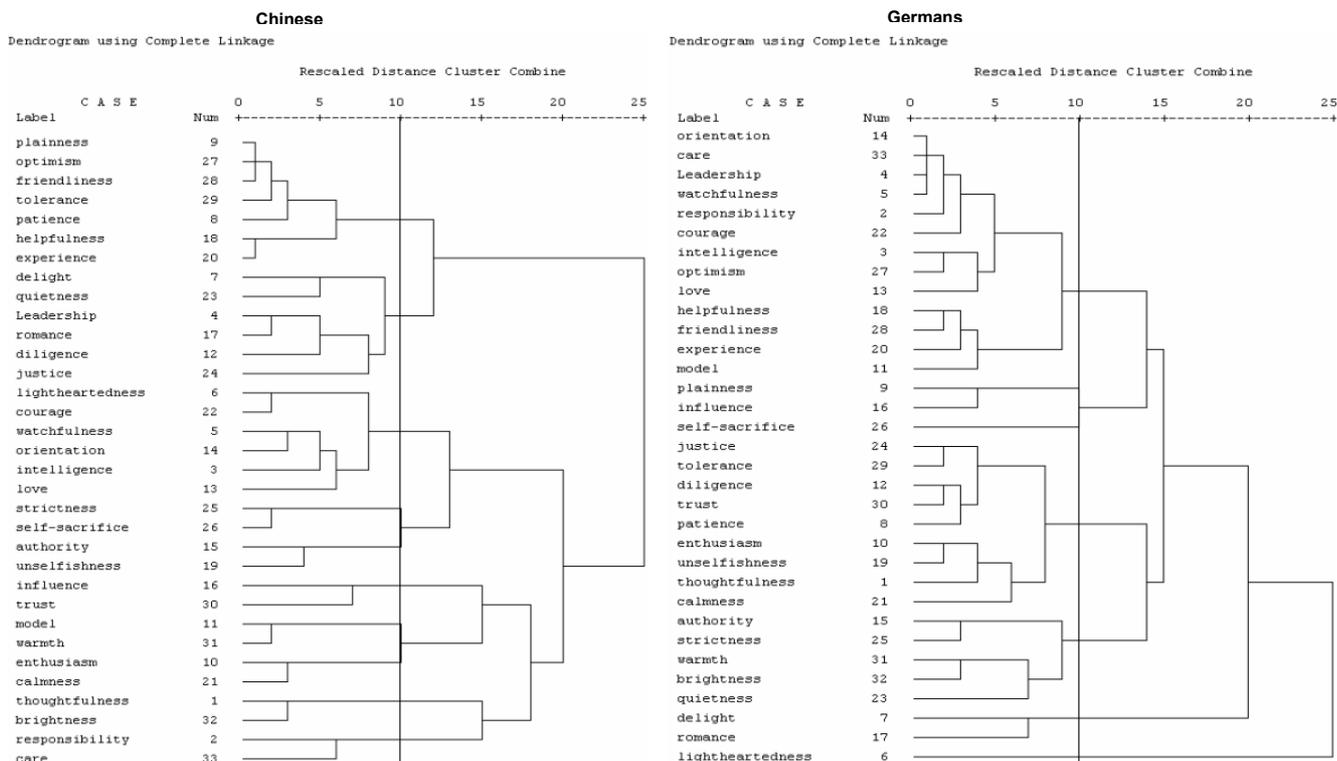


Figure 21: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of no role play.

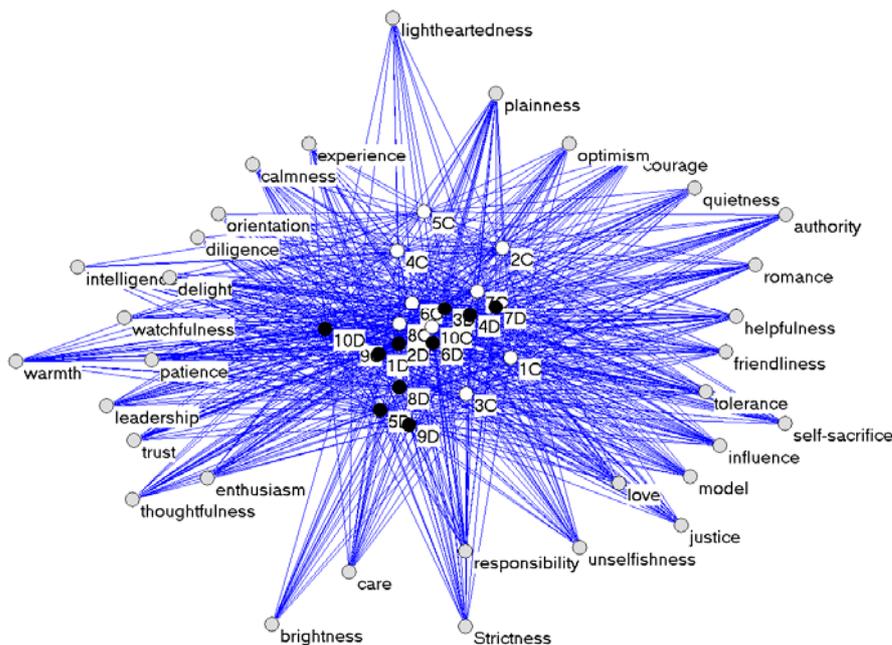
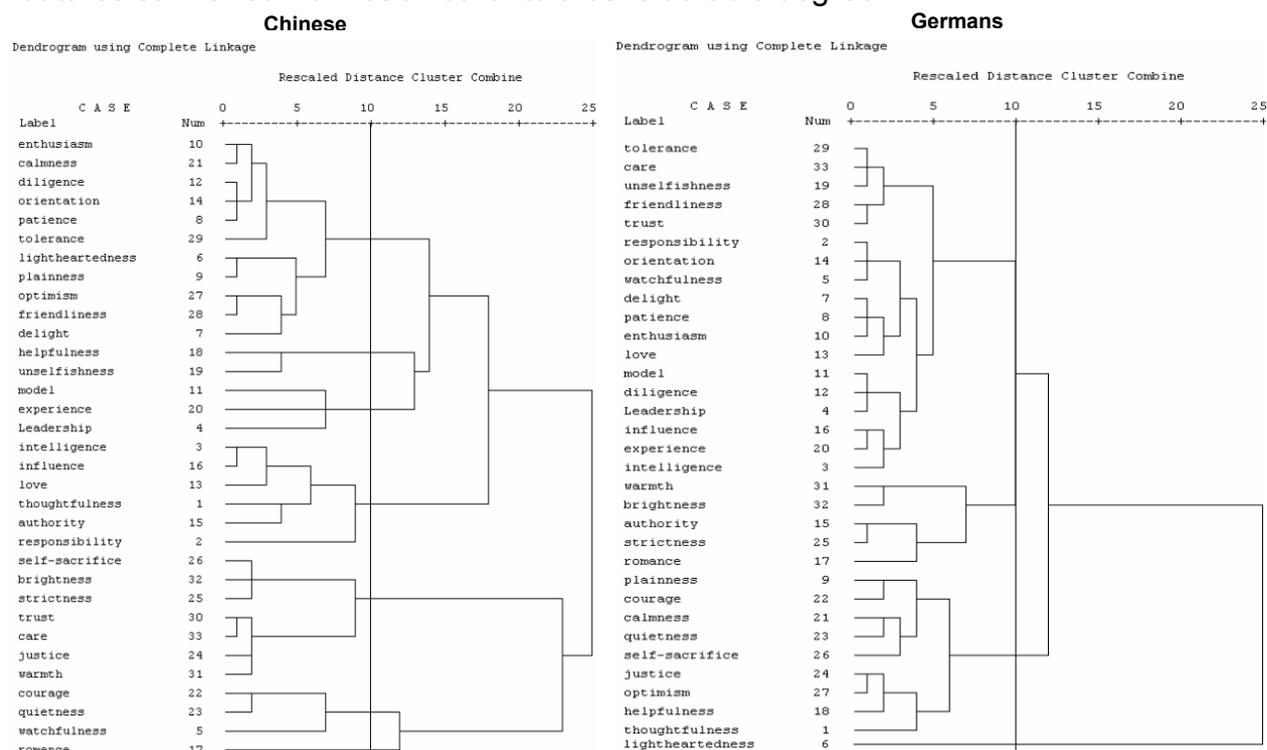


Figure 22: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development.

In Figure 22, the white vertices are no longer spread outside of each other as in Figure 20, which shows a more reliable congruence among the Chinese subjects and among the German subjects in rating the features according to their suitability of describing the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development.

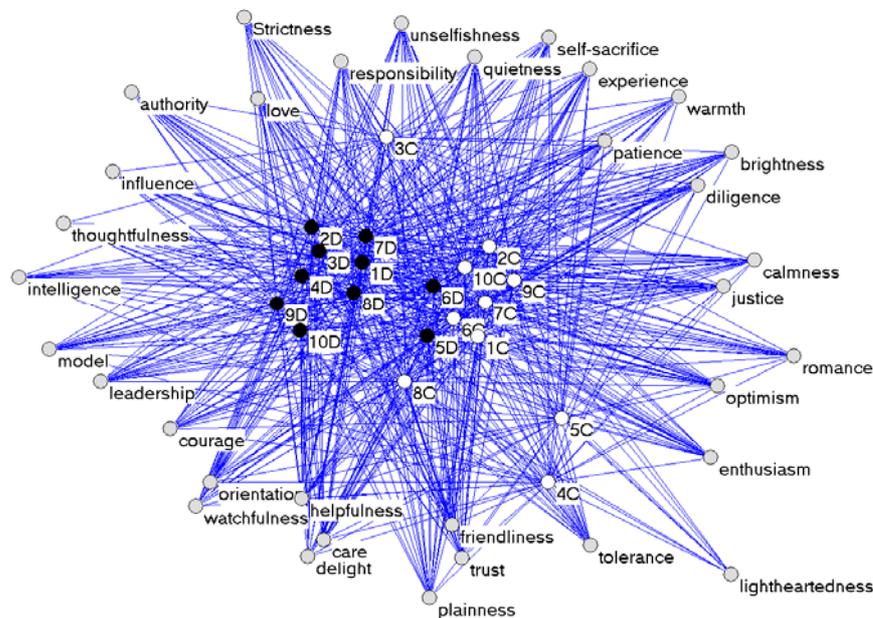
In Figure 23, the cut-off line distinguishes seven clusters of features in the left dendrogram and four clusters of features in the right. The structure of the right dendrogram is more compact than that of the left, which shows that the German rated more features similarly than the Chinese for the topic concept *teacher* under the condition of the role play with the positive development. However, the Chinese and the German commonly agreed on more features as appropriate to describe the topic *teacher* in the metaphor *The teacher is a shepherd*, such as *enthusiasm, diligence, orientation, patience, tolerance, friendliness, and delight*, than under the condition of no role play. However, the German and the Chinese ratings of those features still varied from each other to a considerable degree.



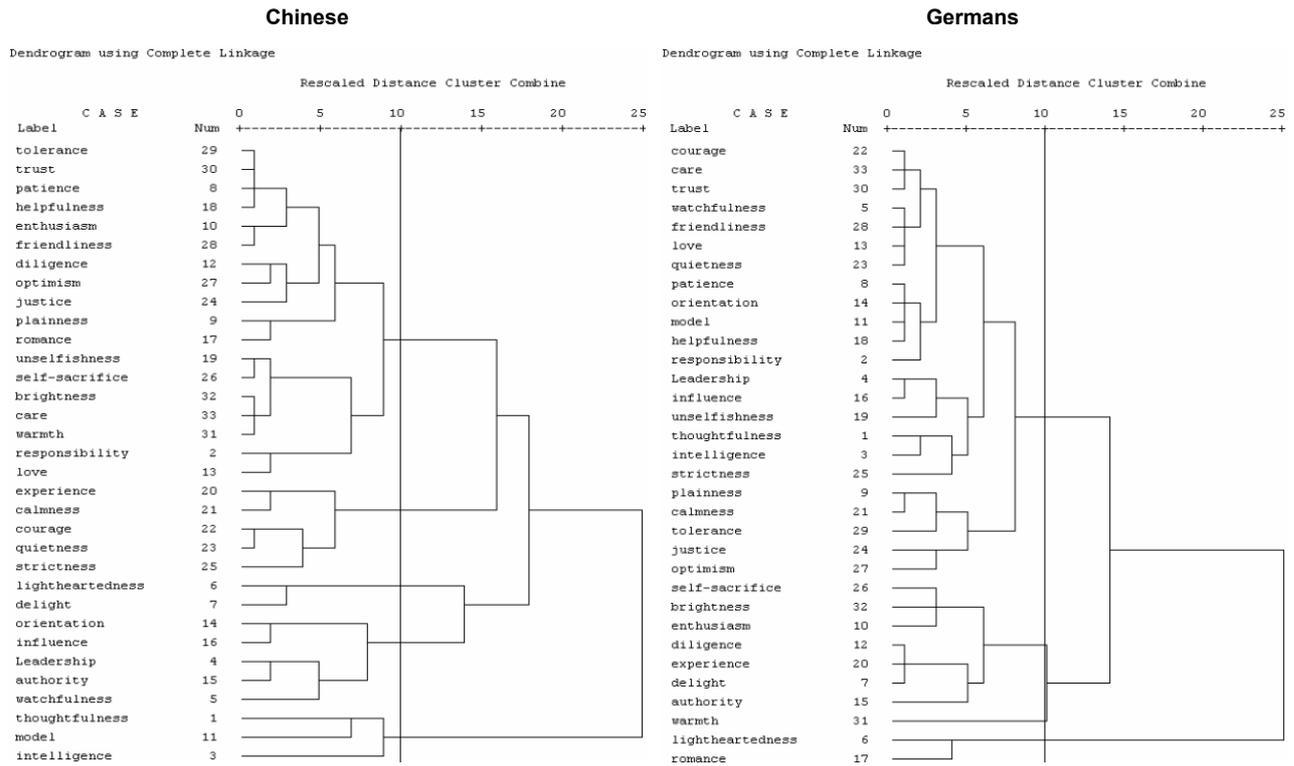
**Figure 23: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of the role play with the positive development.**

When the role play was provided with the negative development, the Chinese subjects seemed again to disagree with each other on feature ratings, as the location of white vertices spread out from each other (see Figure 24).

In Figure 25, the cut-off line distinguishes five clusters of features according to the ratings by the Chinese and four clusters by the German. Obviously, the structure of the right dendrogram is again more compact than the left, which indicates that the Germans rated more features similarly than the Chinese did, according to the concept *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the negative development. When the features involved in the first clusters by both the Chinese and the Germans are compared, the Chinese emphasized *tolerance, trust, patience, helpfulness, enthusiasm, friendliness, diligence, optimism, justice, plainness, romance, unselfishness, self-sacrifice, brightness, care, warmth, responsibility* and love, whereas the German focused more on *courage, care, trust, watchfulness, friendliness, love, quietness, patience, orientation, model, helpfulness, responsibility, leadership, influence, unselfishness, thoughtfulness, intelligence, strictness, plainness, calmness, tolerance, justice* and *optimism*. In other words, a *shepherd-teacher* was viewed by the Chinese as kind and tender, but it was viewed the Germans as more loving and influential.



**Figure 24: Bipartite graph of the feature network for the concept *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the negative development.**



**Figure 25: Dendrograms of the feature ratings for the concept *teacher* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of the role play with the negative development.**

When no role play was provided, the Chinese and the German subjects differed significantly from each other in rating the features of the topic *teacher* in the metaphor *The teacher is a candle* and *The teacher is a shepherd*. As to the topic *teacher* in the metaphor *The teacher is a captain*, no big distinction was found between the feature ratings from the German group and those from the Chinese group. In subjects' feature ratings of the topic *teacher* in the metaphor *The teacher is a candle*, the congruence among the subjects in the Chinese group was stronger than that of the Germans. For the metaphor *The teacher is a shepherd*, the situation was reversed. Under the condition of the role play with the positive development, even the German subjects tended to share stronger congruence by rating features according to the topic concept *teacher* in the metaphor *The teacher is a candle* and the Chinese shared stronger congruence by rating features according to the topic concept *teacher* in the metaphor *The teacher is a shepherd* than when no role play was provided. When the role play was positive and the metaphor was *The teacher is a captain*, the Chinese subjects also tended to agree more with each other as did the Germans within their group. When the role play was negative, less congruence was

achieved in comparison to the condition of no role play by every cultural group in their feature ratings of the topic *teacher* in each of the three teacher metaphors.

#### 4.3.2.3 Feature Analyses of Three Vehicle Concepts

The suitability of the features for describing the three vehicle concepts of each teacher metaphor was rated. Again the network centralization index and the network density were calculated based on each corresponding network according to the ratings under various conditions.

The results were presented in Table 11. The Chinese network constructed according to the feature suitability ratings of the vehicle concept *candle* in the metaphor *The teacher is a candle* under the condition of no role play is both more compact (0.4487) and more dense (0.7043) than the corresponding German network (0.3653 resp. 0.4983). It indicates that the Chinese shared stronger agreement than the Germans did in their ratings and the Chinese rating of the features were comparatively higher than those of the Germans. The network degree centralization and density attained under the condition of the role play with the positive development show an increase by the German subjects ( $C_D$ : from 0.3653 to 0.3970 and *density*: from 0.4983 to 0.5775), which results in a decrease of the Chinese and the German differences. Under the condition of the role play with the negative development, there is even an increase in the network centralization of the network constructed according to the German subjects ratings (from 0.3653 to 0.4055) and a decrease by the density (from 0.6179 to 0.5930) compared with the case when no role play was provided. Nevertheless, in both role plays with the positive and negative development, the cultural differences were still very obvious.

In contrast, the German network constructed from the feature ratings on the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd* is more compact (0.4986) and more dense (0.7281) than the Chinese network (0.4117 resp. 0.6257) when no role play was involved. It indicates that the German subjects showed a stronger congruence in understanding the concept *shepherd* than the Chinese and the German tended to rate more features highly than the Chinese. After the role play with the positive development was provided, the network centralization index of the Chinese network increased to 0.4413, and the density increased to 0.6501. Thus, the difference between the Chinese network and its German counterpart on rating the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development was

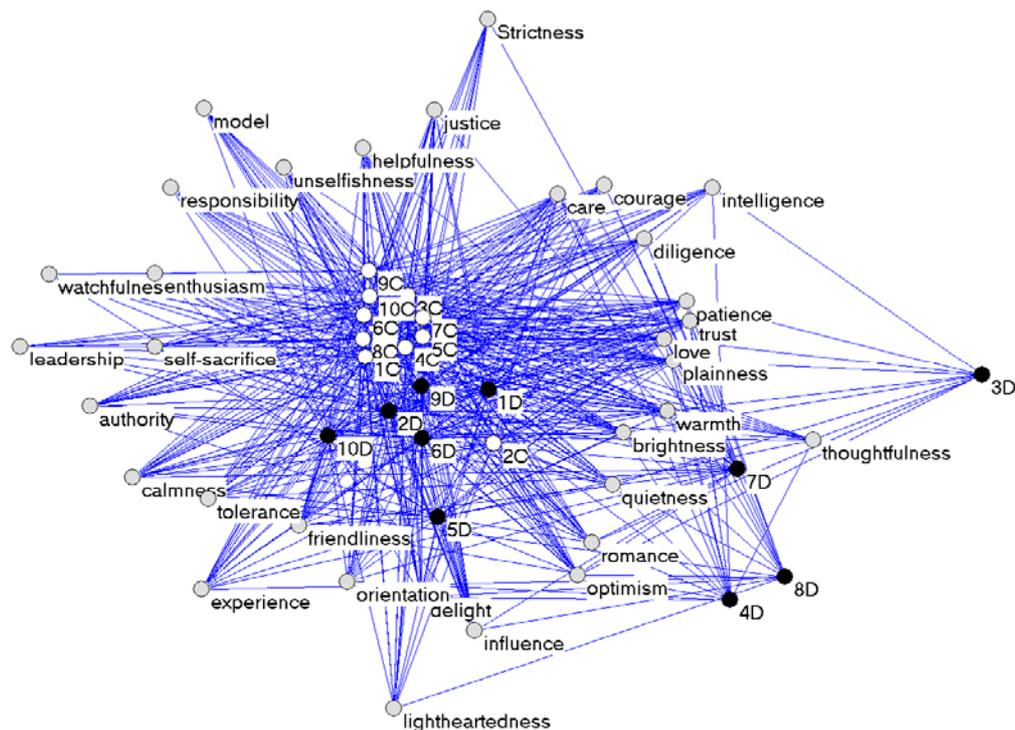
actually decreased than under the condition when no role play was ever provided. Under the condition of the role play with negative development, the network centralization index was decreased by both the networks constructed according to the Chinese and the German feature ratings, which indicates less congruence of ratings among the subjects of the two cultural groups. Thus, the integration of the role play with the positive development exerted an increasing effect on the subjects' congruence and their ratings, but the role play with the negative development exerted a converse effect on subjects' ratings.

**Table 11: The  $C_D$  and the *Density* of the bipartite networks constructed according to the 33 feature ratings of the vehicles from the three teacher metaphors.**

Vehicle concepts of various teacher metaphors	Role plays	Cultural groups	network degree centralization ( $C_D$ )	Density
Candle	No role play	Chinese	0.4487	0.7043
		Germans	0.3653	0.4983
	Role play-positive	Chinese	0.4302	0.6174
		Germans	0.3970	0.5775
	Role play-negative	Chinese	0.4228	0.6113
		Germans	0.4055	0.5930
Captain	No role play	Chinese	0.4226	0.6949
		Germans	0.3980	0.6584
	Role play-positive	Chinese	0.3808	0.6993
		Germans	0.3971	0.6606
	Role play-negative	Chinese	0.5096	0.6899
		Germans	0.3810	0.6633
Shepherd	No role play	Chinese	0.4117	0.6257
		Germans	0.4986	0.7281
	Role play-positive	Chinese	0.4315	0.6501
		Germans	0.4413	0.6938
	Role play-negative	Chinese	0.3867	0.6938
		Germans	0.3955	0.7121

Compared with the two metaphors mentioned above, the vehicle *captain* in the metaphor *The teacher is a captain* did not exert such obvious cultural differences. Under the condition of no role play and negative role play when the metaphor *The teacher is a captain* was provided, both the network degree centralization and density of the networks constructed according to the Chinese ratings were slightly higher than their German counterparts, which indicates that the Chinese subjects tended to agree with each other in their feature ratings a little more than the German. Under the condition of the positive role play. On the contrary, the network centralization according to network based on the German ratings is higher ( $0.3971 > 0.3808$ ), but the density is lower ( $0.6606 < 0.6993$ ) than those of the Chinese .

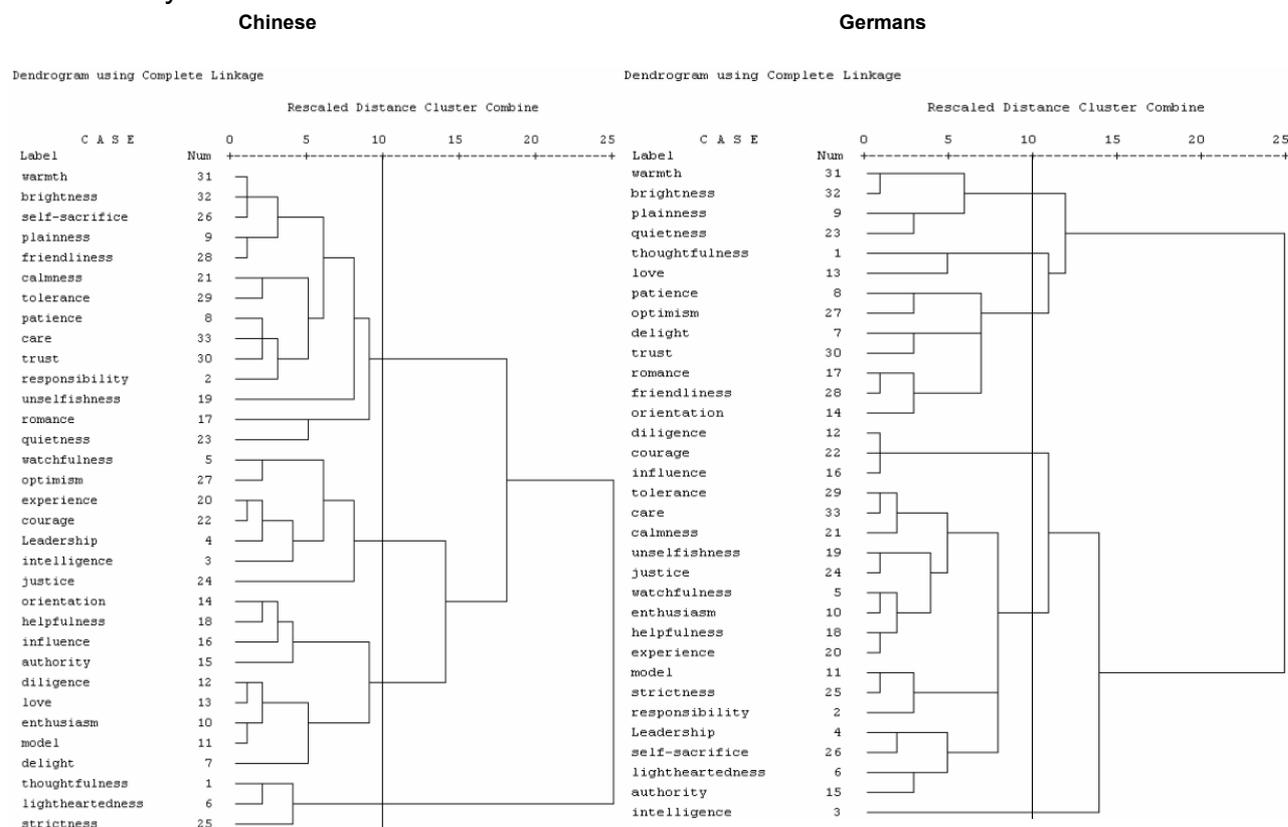
In Figure 26, it is clear that most white vertices (Chinese subjects) except for 2C are located closer together, whereas the black ones are set in a more expanded way away from the centre of the white vertices. Such a display of location not only indicates that there was a stronger congruence of the feature ratings among the Chinese subjects than the German subjects but also shows that the Germans rated the features differently from the Chinese on the vehicle concept *candle* in the metaphor *The teacher is a candle*, when no role play was involved.



**Figure 26: Bipartite graph of the feature network for the concept *candle* in the metaphor *The teacher is a candle* under the condition of no role play.**

In Figure 27, the cut-off line distinguishes four clusters of features in the left dendrogram and six clusters in the right dendrogram. The structure of the left dendrogram is more compact than the right, which shows that the Chinese ratings of the features differed not so dramatically as the German. In the first cluster of the two dendrograms, obviously both most of the Chinese and the German subjects have highly rated four features, *warmth*, *brightness*, *plainness* and *quietness*. By contrast with the German subjects, the Chinese subjects have also considered a number of features as the most appropriate features in describing the vehicle *candle*. They are *self-sacrifice*, *friendliness*, *calmness*, *tolerance*, *patience*, *care*, *trust*, *responsibility*, *unselfishness* and *romance*. Obviously, the features associated with the metaphorical meaning of *candle*, such as *self-sacrifice*, *care* and *unselfishness*, were also

included. Clearly, the vehicle concept *candle* exerted in the Chinese conceptual system the pre-existing metaphoric category of the concept *candle*, which was not available by the German.



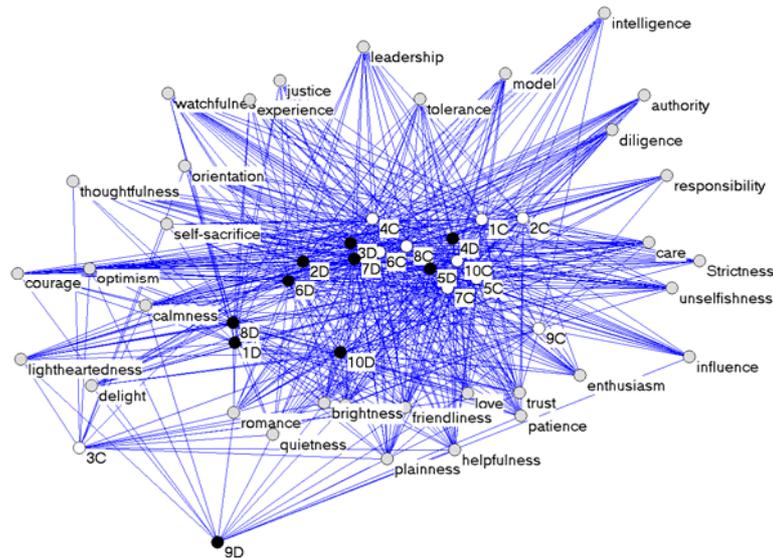
**Figure 27: Dendrograms of the feature ratings for the concept *candle* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of no role play.**

Figure 28 shows how the German and the Chinese rated the 33 features for the vehicle concept *candle* after the role play of positive development. Obviously, the white vertices are located in a compact way while the black vertices are located in an expanded way just as in Figure 26. That means that under the role play with the positive development, the Chinese ratings were different from the German ratings and that the Chinese subjects agreed with each other more in their ratings than the subjects did within the German group.

The cut-off line in Figure 29 distinguishes five clusters in both dendrograms. Obviously, the structure of the left dendrogram is more compact than the right one, which again demonstrates that more features were rated similarly by the Chinese than by the Germans. When the first cluster of the two dendrograms in Figure 29 is compared, it is clear that the Chinese took *self-sacrifice*, *unselfishness*, *diligence*, *trust*, *tolerance*, *orientation* and *justice* along with *warmth* and *brightness* as the most appropriate features to describe the vehicle concept *candle*. In contrast, the German

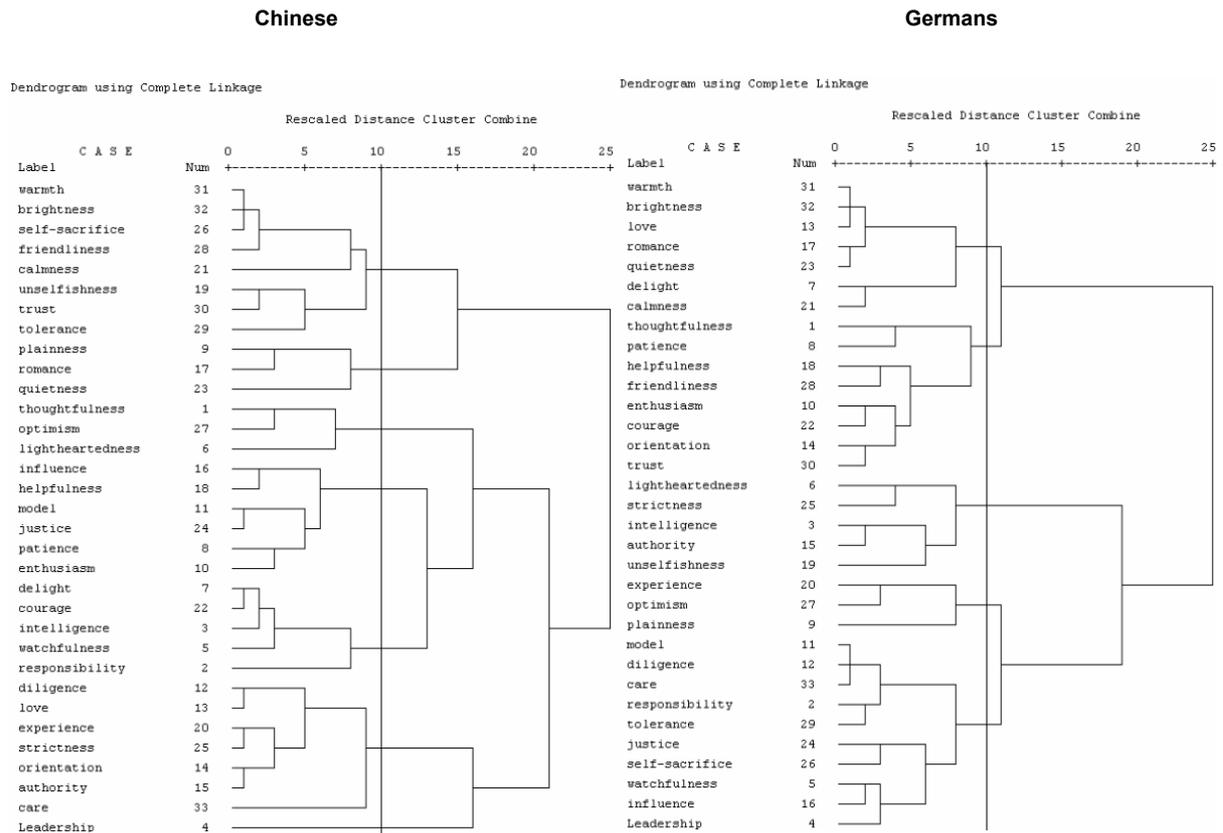


Under the condition of the role play with the negative development, it seems that even the Chinese tended to disagree with each other in their ratings as Figure 30 shows that the white vertices (Chinese) are located in an expanded way. Furthermore, the white vertices (Chinese) are still located in a more expanded way than the black vertices (Germans).



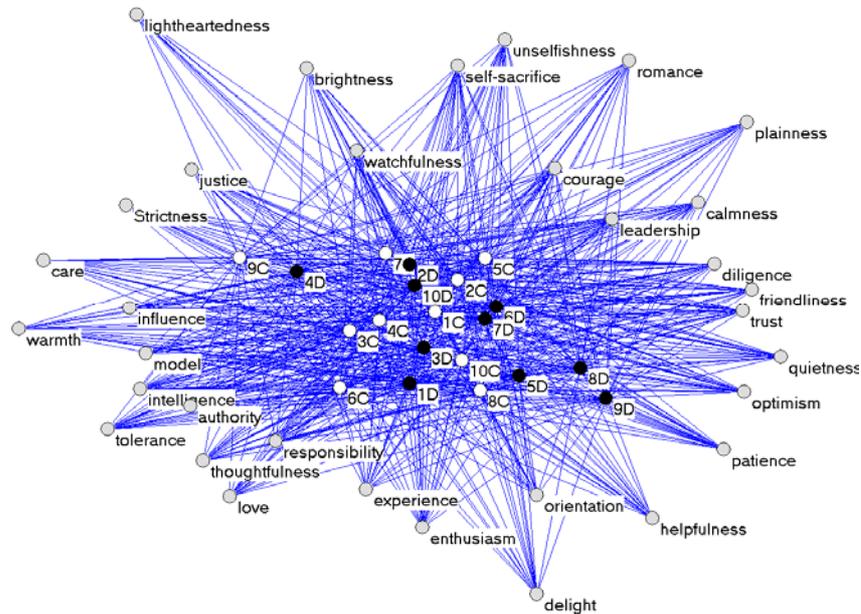
**Figure 30: Bipartite graph of the feature network for the concept *candle* in the metaphor *The teacher is a candle* under the condition of the role play with the negative development.**

In Figure 31, the cut-off line distinguishes seven clusters of features in the left dendrogram and five clusters in the right. The constructed structure of both dendrograms in Figure 31 are more distinctive and less compact in comparison to those in Figure 27, which indicates that fewer features were rated similarly under the condition of the role play with negative development. The inner structure of the features, as shown by the dendrogram constructed according to the Chinese ratings also varies greatly from that of the Germans (see Figure 31). Especially those features that are associated with the figurative meaning of candle, like *tolerance* and *self-sacrifice*, were rated by the Chinese as the most appropriate features but by the Germans as the least appropriate features.



**Figure 31: Dendrograms of the feature ratings for the concept *candle* in the metaphor *The teacher is a candle* by the Chinese and the German subjects under the condition of the role play with the negative development.**

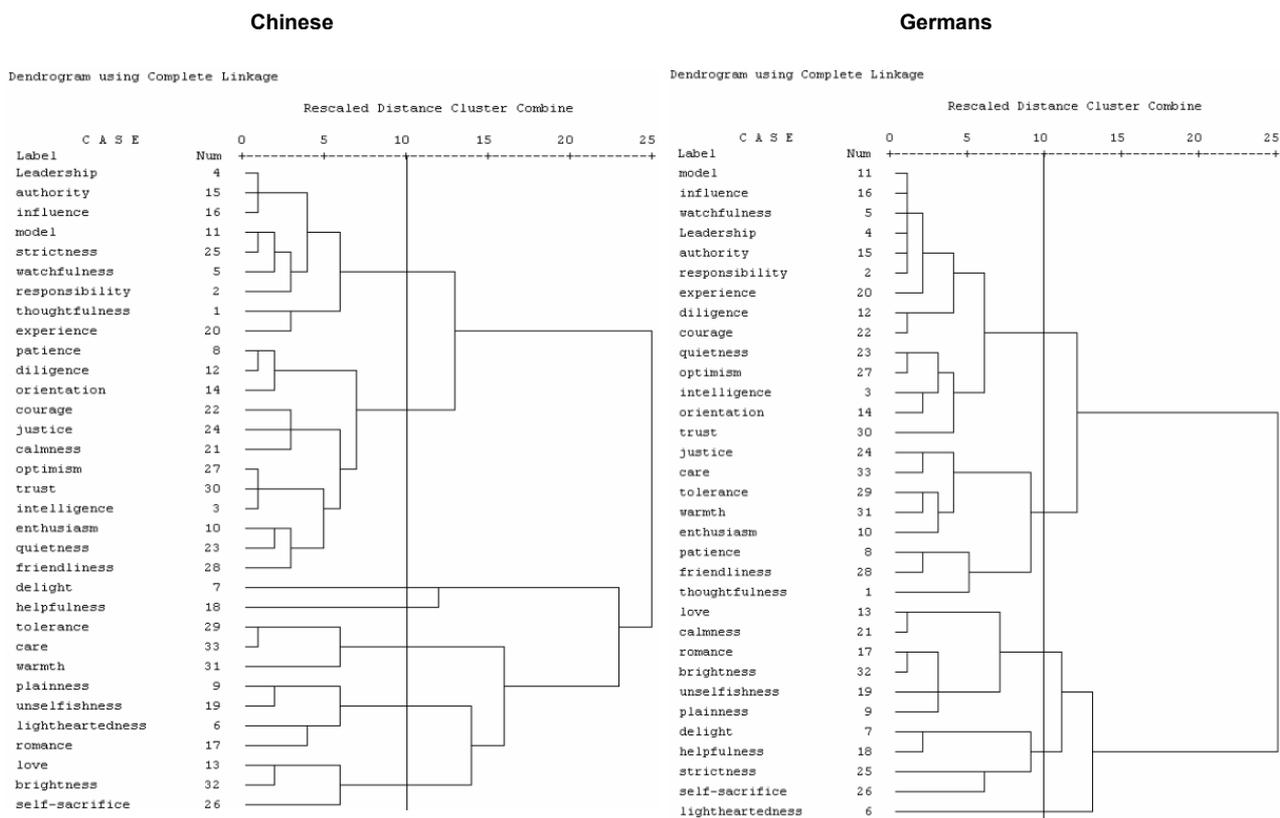
In Figure 32, most of the white vertices are located on the left side while more black vertices are located on the right side of the network. However, there is an area in the middle shared by both the black and the white vertices. This indicates that under the condition of no role play the Chinese and the German feature ratings on the vehicle concept *captain* have both similarities and differences.



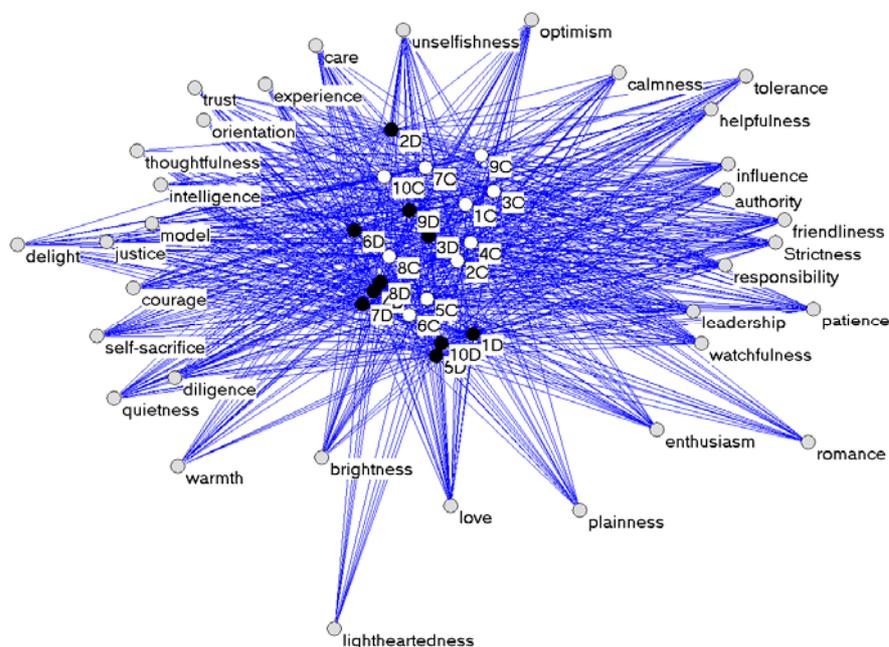
**Figure 32: Bipartite graph of the feature network for the concept *captain* in the metaphor *The teacher is a captain* under the condition of no role play.**

In Figure 33, the cut-off line distinguishes four clusters of features in both dendrograms. The structure of the right dendrogram is slightly more compact than the left one, which indicates that a few more features were rated similarly by the Germans than by the Chinese. The comparison of the first clusters in the two dendrograms shows that the Chinese and the Germans agreed with each other on the features *model*, *influence*, *watchfulness*, *leadership*, *authority*, *responsibility* and *experience* as appropriate to describe the vehicle *captain* in the metaphor *The teacher is a captain* under the condition of no role play.

Under the condition of the role play with the positive development (see Figure 34), there was no obvious change as compared with the condition of no role play. There were no obvious cultural differences between the Chinese and the Germans in rating the 33 features according to the vehicle concept *captain* in the metaphor *The teacher is a captain*.

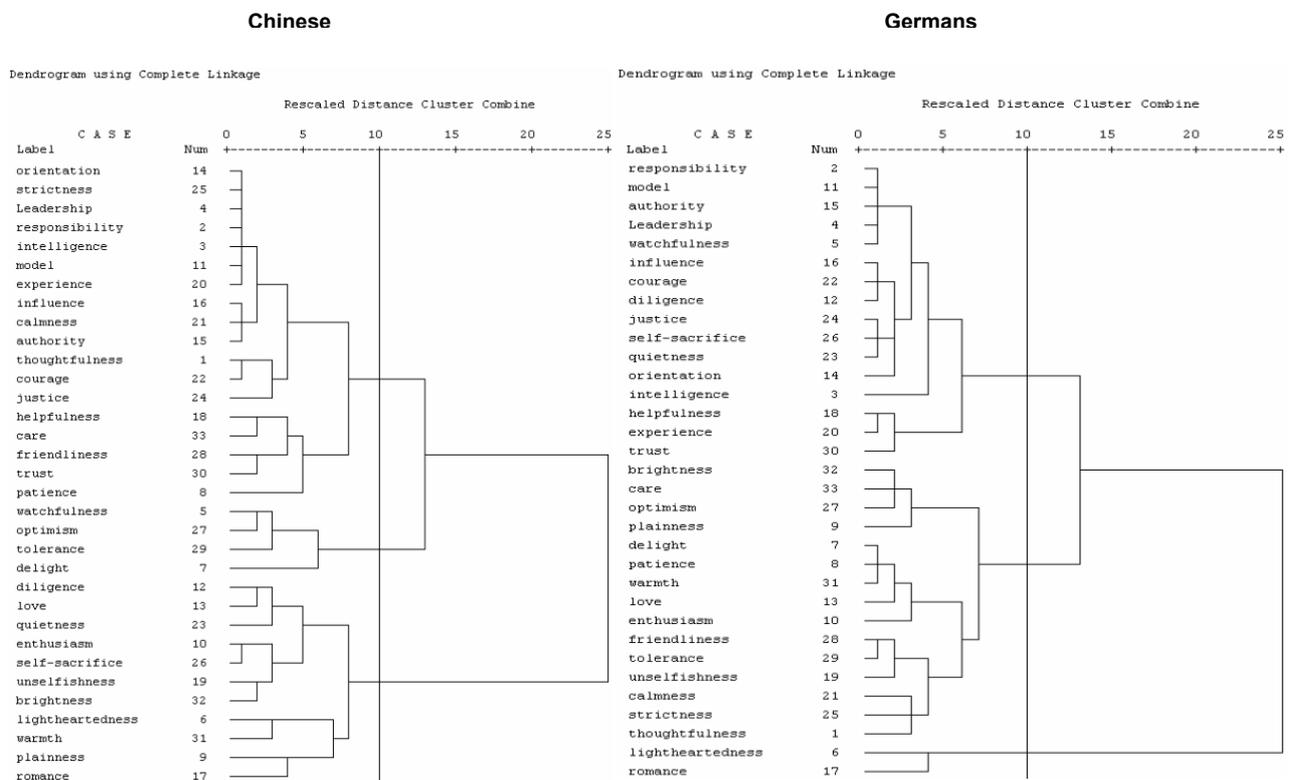


**Figure 33: Dendrograms of the feature ratings for the concept *captain* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of no role play.**

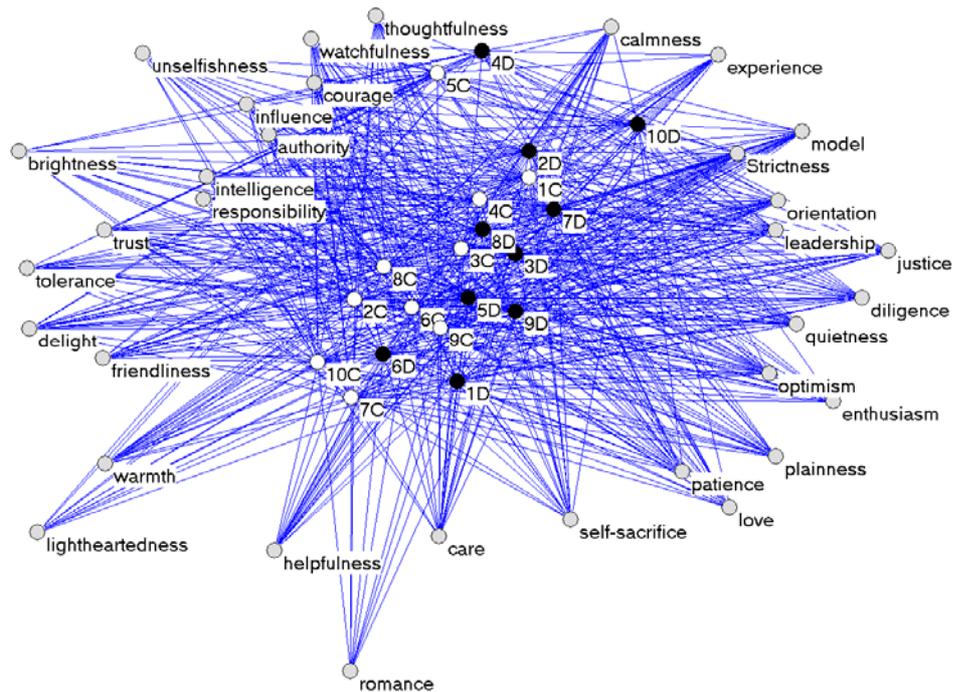


**Figure 34: Bipartite graph of the feature network for the concept *captain* in the metaphor *The teacher is a captain* under the condition of the role play with the positive development.**

In Figure 35, the cut-off line distinguishes the features in three clusters of features in both dendrograms as constructed according to the ratings from the Chinese and the German. The structure of both dendrograms is very compact, which indicates that many features were rated similarly both by the Chinese subjects and the German subjects for the vehicle concept captain under the condition of the role play with the positive development. When the first clusters of the two dendrograms are compared, obviously the features *orientation, leadership, responsibility, intelligence, model, experience, influence, authority, courage, justice, helpfulness* and *trust* were agreed to be important in understanding the vehicle concept *captain* in the metaphor *The teacher is a captain* under the condition of the role play with the positive development by the Germans as well as the Chinese.



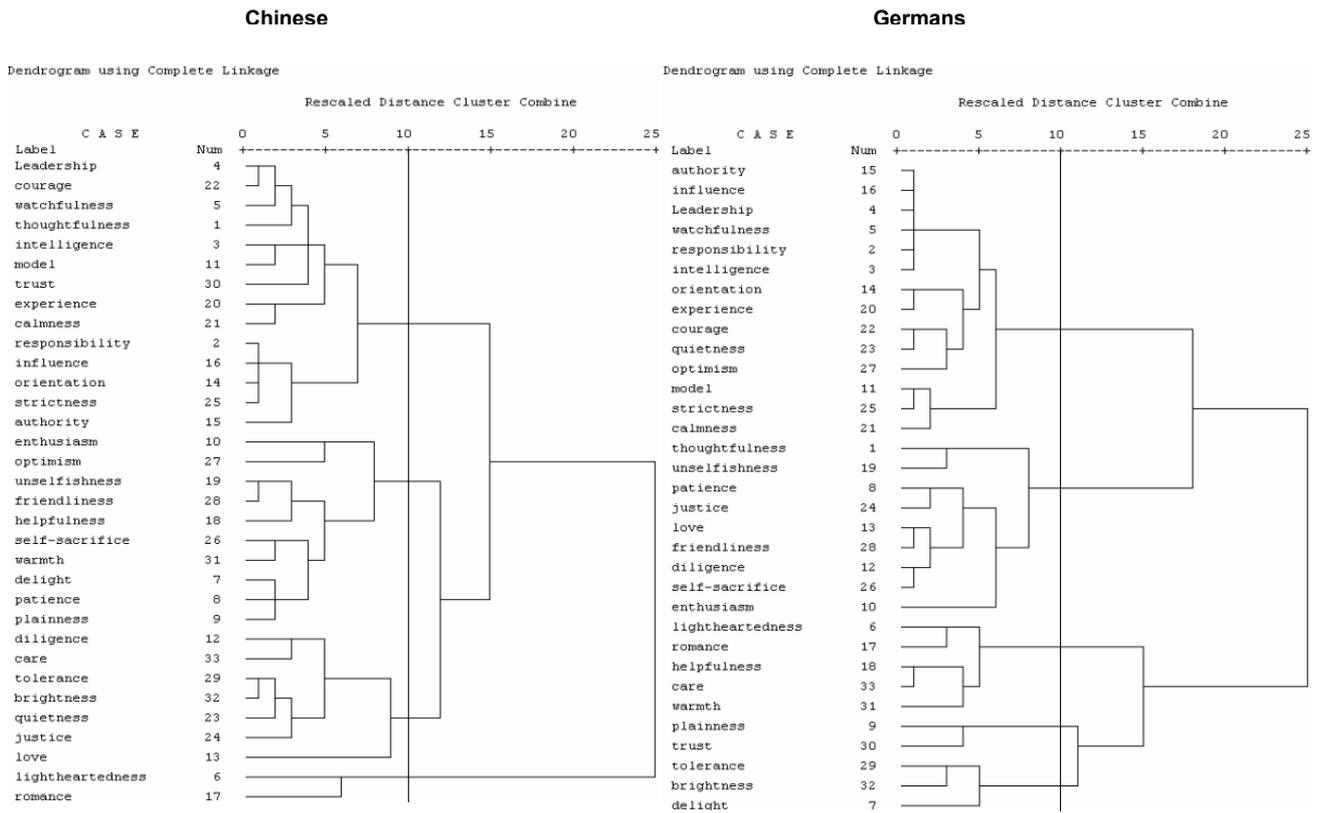
**Figure 35: Dendrograms of the feature ratings for the concept *captain* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of the role play with the positive development.**



**Figure 36: Bipartite graph of the feature network for the concept *captain* in the metaphor *The teacher is a captain* under the condition of the role play with the negative development.**

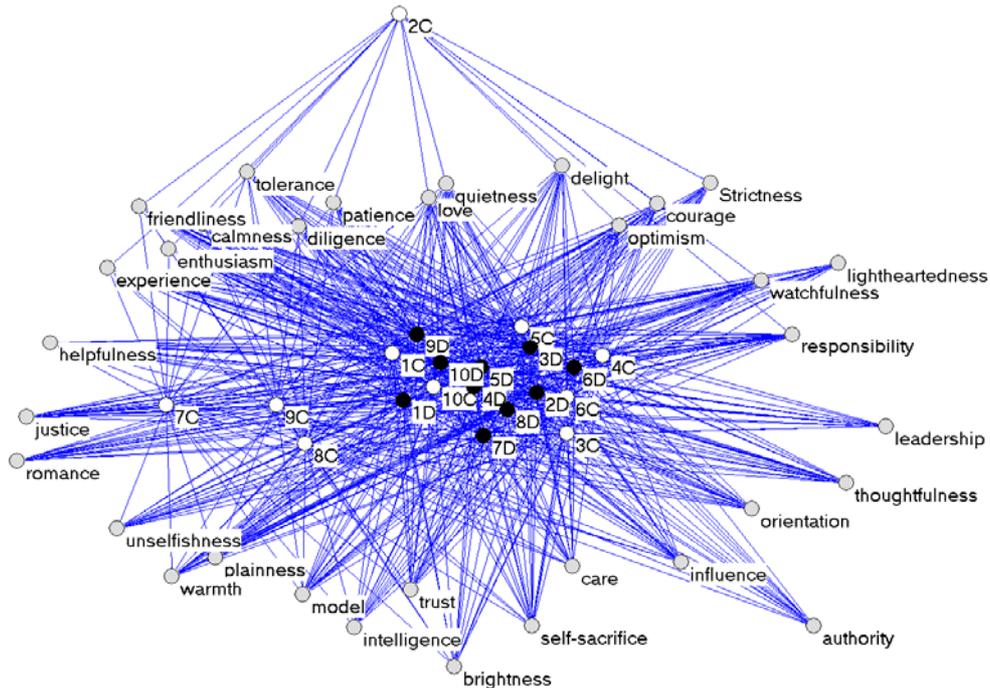
After the subjects played the role of a class teacher in the role play with the negative development, the subjects in the Chinese group seemed to disagree with each other more than did the subjects in the German group, in comparison with the situation under the condition of no role play. As shown in Figure 36, neither the white vertices (the Chinese subjects) nor the black vertices (the German subjects) are located in a compact way as they are under the condition of no role play.

Similarly to the subjects involved in the condition of no role play or of the role play with the positive development, both the Chinese and the Germans of the condition of the role play with the negative development have rated the following features comparatively high, including *leadership*, *watchfulness*, *responsibility*, *intelligence*, *orientation*, *experience*, *courage*, *model*, *strictness* and *calmness*. In the dendrograms obtained (see Figure 37), the ratings of the features listed above were so similar that they come to form the first cluster.



**Figure 37: Dendrograms of the feature ratings for the concept *captain* in the metaphor *The teacher is a captain* by the Chinese and the German subjects under the condition of the role play with the negative development.**

When the appropriateness of the features was rated according to the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd* under the condition of no role play, it is obvious that the subjects of the German largely agreed with each other in their ratings. In contrast, the Chinese subjects showed less congruence among each other. In Figure 38, the black vertices are located in a much more condensed way than the white vertices.



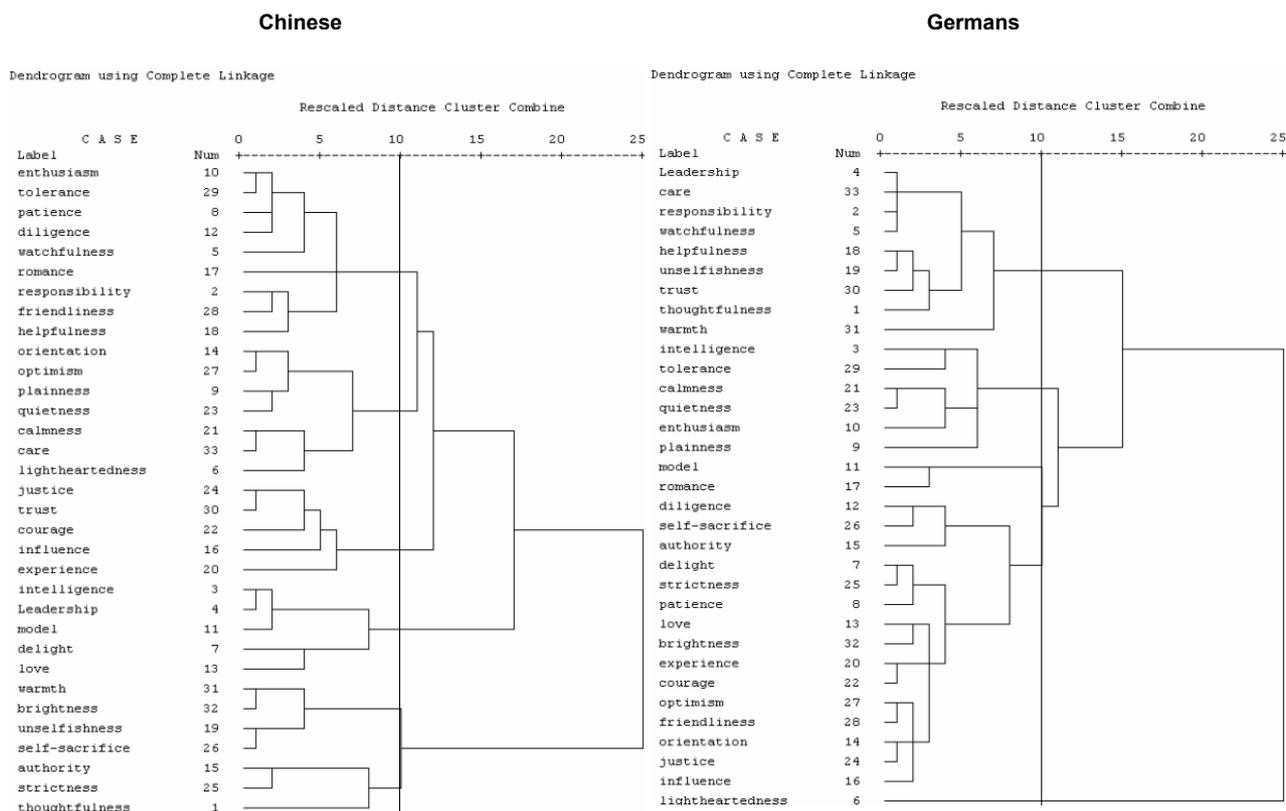
**Figure 38: Bipartite graph of the feature network for the concept *shepherd* in the metaphor *The teacher is a shepherd* under the condition of no role play.**

In Figure 39, the cut-off line distinguishes six clusters of features in both dendrograms. The first cluster of features distinguished by the cut off line in the right dendrogram (German) is compared to that of the left (Chinese). Obviously, the German subjects not only rated *love*, *enthusiasm*, *patience*, *friendliness* and *tolerance* as appropriate features to describe the vehicle concept *shepherd in the metaphor the teacher is a shepherd*, but they also rated as appropriate many other features like *orientation*, *care*, *influence*, *responsibility*, *watchfulness*, *plainness*, *diligence*, *model*, *optimism*, *delight*, *helpfulness*, *justice*, *experience* and *unselfishness*. Especially the features *orientation*, *care*, *influence*, *responsibility*, *watchfulness* and *courage* were very similarly highly rated by the Germans as the appropriate features to describe the vehicle concept *shepherd* under the condition of no role play. This shows that more rich connotative or figurative properties were activated by the vehicle concept *shepherd* in the conceptual system of the German subjects than were activated in the conceptual system of the Chinese subjects.



After the role play with the positive development, there seemed to be more congruence among the Chinese subjects as shown in Figure 40, as the white vertices are located in a more compact way in Figure 40 than in Figure 38.

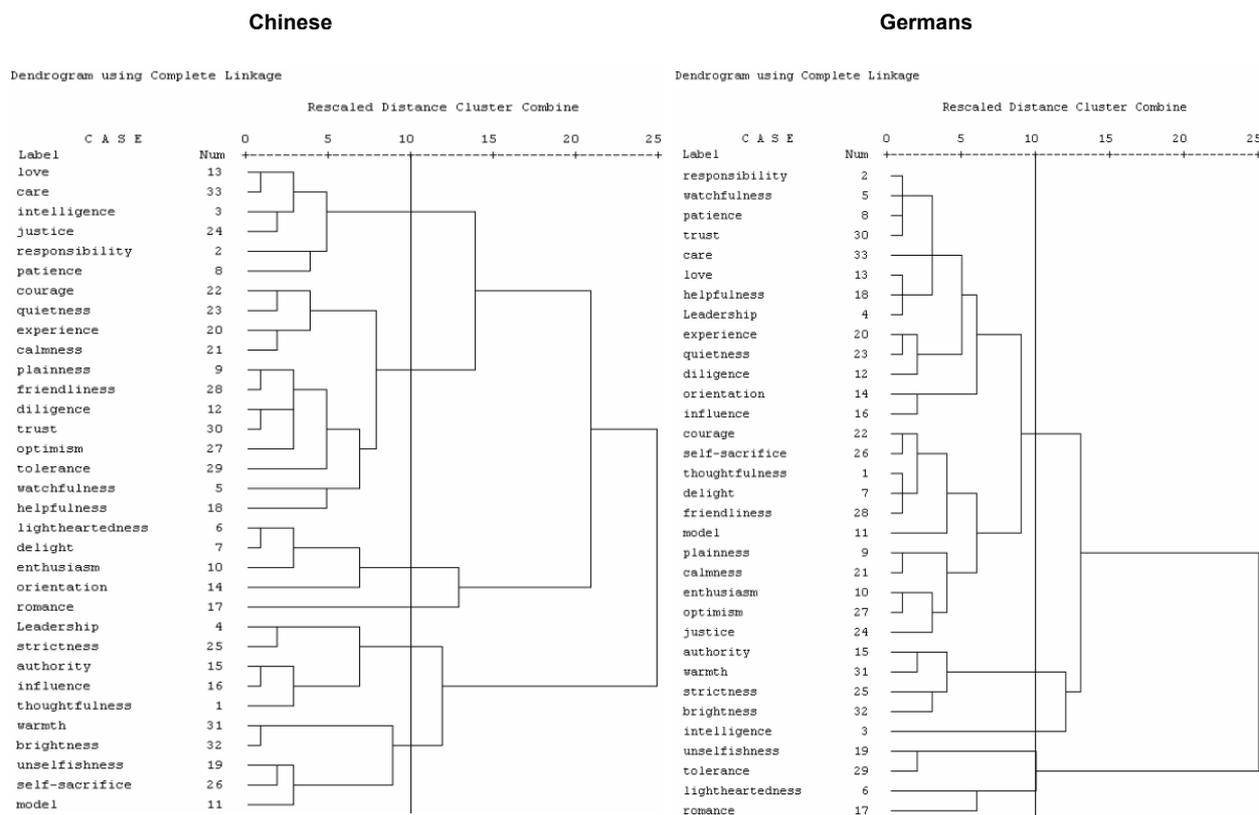
Although there is a relatively consistent understanding of the concept *shepherd* not only by the German subjects but also by the Chinese subjects, there still exist obvious differences in how they understand the vehicle concept *shepherd*. In Figure 41, the cut-off line distinguishes five clusters of features in the left dendrogram and four clusters of features in the right dendrogram. The Chinese were more likely to use *enthusiasm, tolerance, patience, diligence, watchfulness, romance, responsibility, friendliness, helpfulness* to describe the vehicle *shepherd* in the metaphor *the teacher is a shepherd*, but the Germans were more likely to associate it with *leadership, care, responsibility, watchfulness, helpfulness, unselfishness, trust, thoughtfulness* and *warmth*.



**Figure 41: Dendrograms of the feature ratings for the concept *shepherd* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of the role-play with the positive development.**

After the role play with the negative development, the Chinese subjects show disagreement rather than congruence in rating the appropriateness of the features, as Figure 42 shows that the white vertices (the Chinese subjects) are spread out.





**Figure 43: Dendrograms of the feature ratings for the concept *shepherd* in the metaphor *The teacher is a shepherd* by the Chinese and the German subjects under the condition of the role play with the negative development.**

In general, the congruence of the Chinese subjects' ratings of the features on the vehicle concept *candle* in the metaphor *The teacher is a candle* was stronger than that of the German subjects' ratings. By contrast, the congruence of the German subjects' ratings of the features on the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd* was stronger than that of the Chinese subjects. The three role-play conditions did not seem to influence the features ratings according to the vehicle concepts so much as they did the feature ratings of the topic concepts of the metaphor. In any case, the positive role-play condition had a tendency to generate a stronger congruence in the feature ratings of the vehicle concept, and the negative role-play condition causes more differences in subjects' ratings on the vehicle concept.

#### 4.3.3 Metaphor Suitability

At the end of the experiment, subjects were asked to rate the suitability of the three teacher metaphors *The teacher is a candle*, *The teacher is a captain*, and *The teacher is a shepherd* according to a five-point Likert scale. The means of their ratings are summarized in D3-1 of the Appendix D.

In general, the Chinese subjects rated the suitability of the metaphor *The teacher is a candle* much higher than did the German subjects. When the metaphor *The teacher is a candle* was provided, it is obvious that the Chinese subjects' suitability ratings of this metaphor under the condition of the role play with the negative development (Mean= 2.6 SD=0.843) were very much lower than that under the condition of no role play (Mean= 5.0 SD=0) or the role play with the positive development (Mean=4.8 SD=.442). As to the German subjects, the suitability ratings of the metaphor *The teacher is a candle* were much lower than the corresponding ratings of the Chinese. Especially when the German subjects received the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development, their suitability ratings of the *candle-teacher* metaphor (Mean=1.6 SD=0.843) were the lowest.

By comparison, the Chinese suitability ratings of the metaphor *The teacher is a captain* were similar to a degree to those of the German ratings. Especially when the metaphor *The teacher is a captain* was provided in the role play with the negative development, both the Germans and the Chinese tended to lower significantly their suitability ratings of the metaphor *The teacher is a captain* than they did under the condition of no role play (Germans: from Mean=3.6 SD= .966 to Mean=2.4 SD=1.265; Chinese: from Mean=3.9 SD=.919 to Mean=2.22 SD=1.202).

Moreover, the German subjects under various conditions seemed to rate the suitability of the metaphor *The teacher is a shepherd* much higher than the Chinese groups. Interestingly, when the metaphor *The teacher is a shepherd* was provided under the condition of the role play with the negative development, even the German subjects seemed to reduce their suitability ratings of the metaphor *The teacher is a shepherd* compared with those of the other two various role-play conditions (under no role play condition: Mean=4.9 SD=.316; under the positive role-play condition: Mean=4.9 SD=.316; under the negative role-play condition: Mean=2.8 SD=1.135). In contrast, when the metaphor *The teacher is a candle* was provided under the condition of the role play with the negative development, the Chinese subjects seemed to increase their suitability ratings of the *shepherd-teacher* metaphor in comparison to those of the other two various role play conditions.

A three-factorial multivariate analysis of variance has been carried out and the results are presented in D3-2 (in Appendix D). The results show that the factor, "cultural group" ( $F(3.159)=98.44$ ,  $p<.001$ ) and the factor "role play" ( $F(6.32)=3.51$ ,

$p < .01$ ) had main effects on influencing the suitability ratings of the three teacher metaphors. Moreover, there was a strong interaction effect of the factor “role play” and the factor “metaphor” ( $F(12.48) = 9.81$ ,  $p < .001$ ) as well as a strong interaction effect of the factor “cultural group” and the factor “metaphor” ( $F(6.32) = 3.79$ ,  $p < .01$ ) in influencing the suitability ratings of the teacher metaphors.

The tests of the between-subject effect (See D3-2 in Appendix D) show that there were significant differences between the Chinese and the German in their suitability ratings of the metaphor *The teacher is a candle* and the metaphor *The teacher is a shepherd* but not in the ratings of the metaphor *The teacher is a captain*. This is consistent with the correlation test (see D3-3 in Appendix D) that shows a significant correlation between the cultural groups and the suitability ratings of the metaphor *The teacher is a candle* metaphor ( $r = .625^{**}$ ,  $p < .001$ ) and the cultural groups and the suitability ratings of the metaphor *The teacher is a shepherd* ( $r = .615^{**}$ ,  $p < .001$ ). The tests of the between-subject effect (See D3-2 in Appendix D) shows that the suitability of the metaphor *The teacher is a shepherd* was influenced most by the factor “role play”, as the correlation test results (see D3-3 in Appendix D) show that the correlation between the role play and the *shepherd-teacher* metaphor was ( $r = .182^*$ ,  $p < .05$ ).

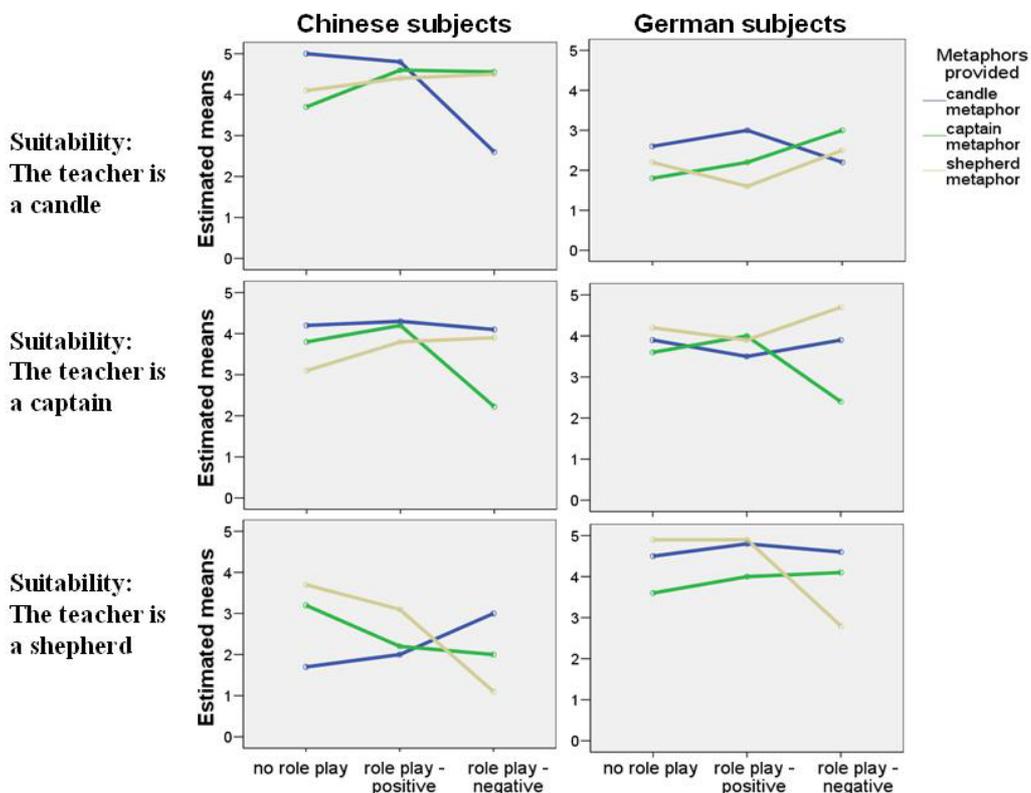


Figure 44: The interaction of the factors “role play” and “metaphor” on the suitability ratings of three teacher metaphors.

Figure 44 shows the interaction effect of the factor “metaphor” with the factor “role play” on the suitability ratings of various teacher metaphors. As to the suitability ratings of the metaphor *The teacher is a candle*, both the Chinese and the German subjects (under the condition, in which the metaphor *The teacher is a candle* was provided) tended to rate the suitability of the metaphor *The teacher is a candle* the highest, the second highest when the metaphor *The teacher is a shepherd* was provided, and the lowest when the metaphor *The teacher is a captain* was provided. Under the condition of the role play with the positive development, the German subjects who were provided with the metaphor *The teacher is a candle* or the metaphor *The teacher is a captain* showed a tendency to generate relatively higher ratings of the suitability of the metaphor *The teacher is a candle*, but those who were provided with the metaphor *The teacher is a shepherd* gave a lower suitability rating of the metaphor *The teacher is a candle*. Under the condition of the role play with the negative development, the German subjects who were provided with the metaphor *The teacher is a candle* also rated the suitability of the metaphor *The teacher is a candle* much lower in comparison with the other two role play conditions, but those who were provided with the *captain-teacher* metaphor or the *shepherd-teacher* metaphor otherwise tended to generate relatively higher ratings. As for the Chinese subjects, there was also an obvious decrease of the suitability ratings of the metaphor *The teacher is a candle* when it was provided under the condition of the role play with the negative development.

On rating the suitability of the metaphor *The teacher is a captain*, both the German and the Chinese subjects have shown similarly high rating tendencies when they received the metaphor *The teacher is a captain* in the experiment. When the role play with a positive development was provided, both the Chinese and the German subjects who got the metaphor *The teacher is a captain* tended to rate the suitability of the metaphor *The teacher is a captain* higher when the role play was positive but lower when the role play was negative. Interestingly, the Chinese subjects who got the metaphor *The teacher is a candle* rated the metaphor *The teacher is a captain* the highest whereas the Germans who were provided the metaphor *The teacher is a shepherd* rated the metaphor *The teacher is a captain* the highest.

On rating the suitability of the metaphor *The teacher is a shepherd*, both the Chinese and the German rated the suitability of this metaphor the highest when the metaphor *The teacher is a shepherd* was provided under the condition with no role

play. Moreover, both the German and the Chinese subjects who got the metaphor *The teacher is a shepherd* tended to increase their suitability ratings of the metaphor *The teacher is a shepherd* when the role play was positive, but tended to decrease their ratings when the role play was negative. The Chinese subjects who were provided with the metaphor *The teacher is a candle* rated the suitability of the metaphor *The teacher is a shepherd* the lowest. In contrast, when the metaphor *The teacher is a candle* was provided in the role play with the negative development, the Chinese seemed to increase their suitability ratings of the metaphor *The teacher is a shepherd* in comparison to those under the condition of no role play.

All in all, the metaphors provided show a priming effect on subjects' suitability estimation of the metaphors provided. Moreover, the main effect of the factor, "cultural group", can also be observed in Figure 47. Generally speaking, the Chinese subjects rated the suitability of the metaphor *The teacher is a candle* much higher than the Germans and the Germans rated the metaphor *The teacher is a shepherd* much higher than the Chinese under various role play conditions. As to the ratings of the suitability of the metaphor *The teacher is a captain*; differences between the Chinese and the German were comparatively smaller.

#### **4.4 Discussion**

This experimental research differs from most prior work on metaphor comprehension in five important ways:

First, unlike most prior metaphor researches, which focus on the verification of one specific metaphor theory (Coulson and Matlock, 2001; Gentner and Clament, 1988; Gibbs and O'Brien, 1990; Glucksberg and Keysar, 1990; Ortony et al. 1985; Tourangeau and Sternberg 1981), the present empirical study has drawn the inspiration from Bowdle and Gentner's CMH (2005) and adopted a synthetic approach to integrate the most important current metaphor comprehension theories to explain the complicated metaphor comprehension processing. Unlike the CMH, this study adopted not only conventionality but also aptness as criteria to classify metaphors. Moreover, the present study specially examined the metaphor comprehension in various contexts. The empirical results not only credit categorization and comparison theories as being involved in describing the comprehension process of various metaphors but also suggest that other cognitive metaphor theories, like the interaction theory and the blending theory, may also be insightful in explaining how certain types of metaphors are comprehended.

Second, the present experiment innovatively compared how the same metaphor was understood by people whose conceptual knowledge related to the metaphor differs from each other according to the two criteria: the conventionality of the metaphor and the aptness of the metaphor. In this study, the conventionality and the aptness of metaphors do not depend on metaphors themselves but on the subjective assessment of the metaphor addressees. A metaphor which appears to some people as conventional and apt may appear to other as innovative and inapt. Because metaphors are generated in communication and evolve through the communicative uses, they should be first subject to the communicators' own estimation. The present experiment compared the cognitive comprehension processes for three teacher metaphors by two experimental groups that are distinguished from each other by different conceptual knowledge related to the metaphor. For the ease of experimental implementation, two cultural groups of subjects namely the German group and the Chinese group were employed to comprehend three teacher metaphors: the culture-specific metaphor *The teacher is a candle*, which was estimated by the Chinese subjects as a conventional and apt metaphor but by the German as an unconventional and inapt metaphor, the culture-specific metaphor *The teacher is a shepherd*, which was estimated by the Chinese subjects as an unconventional and inapt metaphor but by the German subjects as a conventional and apt metaphor, and the metaphor *The teacher is a captain*, which was estimated by both the German and the Chinese subjects as the apt but less conventional teacher metaphor.<sup>47</sup>

Third, the empirical study took efforts to fill the gap that metaphor comprehension has rarely been studied in real-time communication. The experiment employed an online communicative context in which subjects tried to execute their roles as the class teacher who shall act after the teacher image oriented by a teacher metaphor.

---

<sup>47</sup> Although the empirical research compared how the Germans and the Chinese understood the teacher metaphors, the research itself is not a cross-cultural study but a cognitive study for the following three reasons: First, the question explored in this study was a cognitive one on how metaphor is comprehended, rather than a cross-cultural question, which typically deals with cultural differences. Second, although cultural comparison is presented in this study, it did not serve as the purpose of the study. The two cultural groups were selected for this study, simply because it was the easiest way to obtain two groups of subjects, who differ from each other but at the same time share within-group similarity to a large degree in perceiving the same metaphor according to their estimation of the conventionality and the aptness of a metaphor. Third, this study used experimental methods to examine hypotheses. Two various cultural groups are designed as one factor, coupled with the other two factors "metaphor" and "situation" in this cognitive study of metaphor. The experimental method itself is more widely used in cognitive psychological studies rather than cross-cultural studies, which rely more on the field study of questionnaires and interviews. Thus, this study is not a cross-cultural study but a cognitive psychological study as examined in its purpose and methodologies.

In this experiment, the comprehension of metaphors was examined and compared under various conditions: no communicative context of the role play, the communicative context of the role play with positive development, and the communicative context of the role play with negative development.

Fourth, unlike most current metaphor comprehension studies that mainly focus on the conceptualization of the metaphors, the present empirical study explored not only the conceptual representation of metaphors through the analyses of the features that associated to the concepts in the metaphor, but also the affective meaning of metaphors through the Self-Assessment Manikin (Lang, 1985). It has been argued that metaphors are quite effective in expressing people's emotional attitude (Gibbs, 1994) and that speakers can create a link, a common ground, or feeling of commonality with addressees who share the same experience (see e.g., Gerrig and Gibbs, 1988, Gibbs, 1994; Gibbs and Gerrig, 1989). Thus, the present experiment not only used features analysis to study the conceptualization of metaphors but also employed Self-Assessment Manikin to grade the affective impression of metaphors and their correspondent topic and vehicle concepts.

Last but not least, the empirical study generated a large number of bipartite graphs derived from network analysis and dendrograms derived from the cluster analysis, which enabled the comparison of metaphor representations in visualisations. According to Ritchie (2004), metaphors are comprehended in the particular communicative context and individual interpretations can differ from each other if their cognitive representations of the common ground are different. The abundant graphs generated in the present study provide a good visualisation of the cognitive representation of metaphors, which can greatly facilitate the comparative study of metaphor comprehension coupled with various contexts.

In sum, the present experiment explored from the cognitive psychological perspective the complicated metaphor comprehension process as affected by the addressee's conceptual knowledge and by the context in which the metaphor appears.

The results attained from this cross-cultural online experiment largely confirm the main hypothesis: The cognitive processing mechanism involved in metaphor comprehension largely depends on the pre-existing conceptual knowledge of the metaphor addressees, as suggested by the conventionality and aptness that they assign to that metaphor, and on the (communicative) context, in which the metaphor

arises. Table 12 presents the testing status of the sub-hypotheses raised in 4.1 and the concrete assumptions derived from them.

**Table 12: Status of hypotheses testing.**

Main hypotheses	Sub-hypotheses	Concrete assumptions	Status	
Hypothesis A: Metaphor understanding is closely related to the pre-existing conceptual knowledge of the metaphor addressees, reflected in their assessment of the conventionality and aptness of that metaphor	A-1: The more conventional and apt the metaphor addressees find a metaphor to be, the stronger their consensus understanding of that metaphor will be..	1: Stronger consensus will be shared among the Chinese subjects than among the German subjects in assessing their affective impression of the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> .	Confirmed	
		2: Stronger consensus will be shared among the German subjects than among the Chinese subjects in assessing their affective impression of the concept <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> .	Confirmed	
		3: There will not be great differences between the Chinese and the German subjects in their affective impression of the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i> .	Confirmed	
		4: Stronger consensus will be shared among the Chinese subjects than among the German subjects in their feature ratings of the concept <i>teacher</i> in the metaphor <i>The teacher is a candle</i> .	Confirmed	
		5: Stronger consensus will be shared among the German subjects than among the Chinese in their feature ratings of the concept <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> .	Confirmed	
		6: There will not be great differences between the Chinese and the German subjects in their feature ratings of the concept <i>teacher</i> in the metaphor <i>The teacher is a captain</i>	Confirmed	
	A-2: The more conventional and apt a metaphor appears to the metaphor addressees, the more likely a close relation exists between the understanding of the vehicle and the understanding of the topic.	7: There will be a positive correlation between the affective impression of the vehicle <i>candle</i> and that of the topic <i>teacher</i> in the metaphor <i>The teacher is a candle</i> by the Chinese subjects but not by the Germans.	Confirmed	
		8: There will be a positive correlation between the affective impression of the vehicle <i>shepherd</i> and that of the topic <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> by the Chinese subjects but not by the Germans..	Marginally supported	
		9: The features which are rated as highly associated with the figurative meaning of the vehicle concept <i>candle</i> will also be rated highly on the topic <i>teacher</i> in the metaphor <i>The teacher is a candle</i> by the Chinese subjects.	Confirmed	
		10: The features which are rated as highly associated with the figurative meaning of the vehicle concept <i>shepherd</i> will also be highly rated on the topic <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> by the German subjects.	Marginally Supported	
	A-3: The more unconventional and inapt a metaphor appears to the metaphor addressees, the more likely that new features will emerge in comprehending that metaphor.	11: More emergent features (available neither by the topic nor the vehicle) are generated in understanding the metaphor <i>The teacher is a candle</i> by the Germans, but not by the Chinese.	Confirmed	
		12: More emergent features are generated in understanding the metaphor <i>The teacher is a shepherd</i> by the Chinese, but not by the Germans.	Marginally supported	
	Hypothesis B: Metaphor understanding can be altered by various communicative contexts.	B-1: An encouraging context can promote metaphor understanding.	13: The subjects will show a tendency to share a stronger consensus in rating their affective impression of the topic <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of the role play with the positive development than under the condition of no role play.	Confirmed
			14: The subjects will show a tendency to share a stronger consensus in rating their affective impression of the topic <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of the role play with the positive development than under the condition of no role play.	Confirmed

		15: The subjects will show a tendency to share a stronger consensus in their feature ratings of the topic <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of the role play with the positive development than under the condition of no role play.	Confirmed
		16: The subjects will show a tendency to share a stronger consensus in their feature ratings of the topic <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of the role play with the positive development than under the condition of no role play.	Confirmed
	B-2: A discouraging context can distract metaphor understanding..	17: The Chinese subjects will show a tendency to share a less consensus among themselves in rating their affective impression of the topic <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of the role play with the negative development than under the condition of no role play.	Marginally supported
		18: The German subjects will show a tendency to share a less consensus among themselves in rating their affective impression of the topic <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of the role play with the negative development than under the condition of no role play.	Marginally supported
		19: The Chinese subjects will show a tendency to share a less consensus among themselves in their feature ratings of the topic <i>teacher</i> in the metaphor <i>The teacher is a candle</i> under the condition of the role play with the negative development than under the condition of no role play..	Confirmed
		20: The German subjects will show a tendency to share a less consensus among themselves in their feature ratings of the topic <i>teacher</i> in the metaphor <i>The teacher is a shepherd</i> under the condition of the role play with the negative development than under the condition of no role play.	Confirmed
Hypothesis C: The estimation of the aptness of a metaphor can be altered by the communicative context in which the metaphor is provided.		21: Under the condition of the role play with the positive development, the teacher metaphor provided to the subjects will be rated as much more suitable than under the condition of no role play.	Refuted
		22 Under the condition of the role play with the negative development, the teacher metaphor provided to the subjects will be rated as less suitable than under the condition of no role play.	Confirmed

According to the assessment of the conventionality and the aptness of the three teacher metaphors made in pilot study I (see section 4.2.2.2), the metaphor *The teacher is a candle* was a conventional and apt metaphor to the Chinese subjects but a novel and inapt metaphor to the German subjects. The metaphor *The teacher is a shepherd* was a conventional and apt metaphor to the German subjects but a less conventional and less apt metaphor to the Chinese. The metaphor *The teacher is a captain* was a less conventional but apt metaphor to both the Chinese and the German subjects.

Hypothesis A-1 suggests that the more conventional and apt that addressees find a metaphor to be, the stronger the consensuses of metaphor understanding that they will share. Otherwise, more disagreement among the metaphor addressees is foreseen. From the hypothesis, six concretised assumptions (1-6) can be easily inferred:

The first three assumptions concern the affective impression ratings. As described

in section 4.3.1.1, there was an interaction of the factor “cultural group” and the factor “metaphor” on rating each dimension of the SAM. Especially, Figure 6 in particular shows clearly that the Chinese impression profile of *teacher* in the metaphor *The teacher is a candle* differs significantly from that of the Germans on the dominance dimension. As indicated by the error bar, there is a stronger consensus among the Chinese subjects than among the Germans in their ratings of the affective impressions of the metaphor *The teacher is a candle*. Thus, the concrete assumption 1 was confirmed that stronger consensus is shared among the Chinese subjects than among the Germans in assessing their affective impressions of the topic concept *teacher* in the metaphor *The teacher is a candle*, as this metaphor is conventional and apt to the Chinese but novel and inapt to the German.

When the metaphor *The teacher is a shepherd* was provided, which was rated by the German as conventional and apt but by the Chinese as less conventional and less apt, the situation was reversed: Figure 6 not only shows that the German subjects enjoyed more consensus than the Chinese subjects in rating their affective impression of that teacher image than the Chinese, but also suggests that the German subjects had a more powerful and active impression of the concept *teacher* in the metaphor *The teacher is a shepherd* than the Chinese subjects did. Thus, assumption 2 was also confirmed.

In pilot study I, the metaphor *The teacher is a captain* was estimated by both the Chinese and the German as a less conventional but apt metaphor. Their affective impressions of the metaphor *The teacher is a captain* were quite similar, except that the Chinese showed a slightly more active impression of the *captain-teacher image* than did the Germans. So concrete assumption 3 was well confirmed.

Concrete assumptions 4 - 6 concern the feature ratings. As a matter of fact, the Chinese network constructed for the metaphor *The teacher is a candle* under the condition of no role play is both more compact and more dense than the German network of the features constructed for the same metaphor. This indicates that the Chinese subjects agreed with each other in their ratings more than the German subjects did and that the Chinese rated a number of features higher than the Germans did. In contrast, the German network of the features according to the metaphor *The teacher is a shepherd* is more compact and more dense than the Chinese when no role play was involved, which indicates that the German subjects seemed to agree with each other more than those of the Chinese in their ratings and

that the German assigned generally more higher ratings than the Chinese. Compared with the two metaphors mentioned above, the metaphor *The teacher is a captain* did not exert such obvious differences between the Chinese and the German. Under each role play condition in which the metaphor *The teacher is a captain* was provided, both the network degree centralization and the density of the networks constructed according to the Chinese ratings were slightly higher than for their German counterparts, which indicates that the Chinese subjects tended to agree with each other in feature ratings a little more than the German. The results are also visualised in the corresponding bipartite graphs. So the concrete assumptions 4-6 were also well supported.

Therefore, not only the affective impressions of the concept *teacher* in the three teacher metaphors as suggested by the SAM ratings but also its conceptual representation in the three different teacher metaphors as indicated by the feature ratings confirmed Hypothesis A-1.

Hypothesis A-2 is: the more conventional and apt a metaphor appears to the metaphor addressees, the greater likelihood of a close relation between the conceptual representations of the vehicle and that of the topic, and the greater a close relation between the affective assessment of the vehicle concept and that of the topic. It can be concretised into assumptions 7-10 (see Table 12).

As illustrated in section 4.3.1.1, the Chinese agreed more on the topic *teacher* in the metaphor *The teacher is a candle*, and the Germans agreed more on the topic *teacher* in the metaphor *The teacher is a shepherd*. The correlation test presented in section 4.3.1.3 shows that there was a positive correlation between the Chinese SAM ratings of the topic *teacher* and those of the vehicle *candle* in the metaphor *The teacher is a candle* under the condition of no role play at both the dominance dimension and at the pleasure dimension. In contrast, no significant correlation between the German subjects' SAM ratings of the topic *teacher* and those of the vehicle concept *candle* was ever found. This shows that the affective impressions of the vehicle concept *candle* by the Chinese largely influence their affective impressions of the topic *teacher* in the metaphor *The teacher is a candle*. In contrast, such an influence was not so obvious for the German subjects. This result supported concrete assumption 7 that there will be a positive correlation between the affective impression of the vehicle *candle* and that of the topic *teacher* in the metaphor *The teacher is a candle* by the Chinese subjects but not by the Germans, as this

metaphor was estimated by the Chinese as conventional and apt but by the Germans as novel and inapt,.

The German SAM ratings of the topic *teacher* and those of the vehicle concept *shepherd* in the metaphor *The teacher is a shepherd* under the condition of no role play suggest a positive correlation on both the dominance dimension and the pleasure dimension. That is, the German's affective impressions of the topic *teacher* was largely related to the vehicle concept *shepherd*. Astonishingly, the SAM ratings of the Chinese subjects showed a positive correlation between the topic *teacher* and those of the vehicle concept *shepherd* at the arousal dimension. In this sense, the concrete comparative assumption 8 was merely marginally supported.

As to the metaphor *The teacher is a captain*, both the Germans' and the Chinese SAM ratings suggests a strong correlation between the ratings at the dominance dimension of the vehicle *captain* and that of the topic *teacher*.

When most features listed in D2-1 and D2-2 in Appendix D are compared, a total of nine features, including *unselfishness*, *self-sacrifice*, *tolerance*, *friendliness*, *care*, *plainness*, *warmth*, *brightness*, and *patience*, were rated highly by the Chinese not only on the topic *teacher* but also on the vehicle *candle* of the metaphor *The teacher is a candle*. These features are also largely related to the metaphorical or figurative meaning of the vehicle *candle* as stemming from Chinese culture. In contrast, the German subjects only rated three features, *warmth*, *brightness* and *plainness*, as highly associated to both the topic *teacher* and the vehicle concept *candle*. Obviously, the features that were highly associated with the figurative meaning of the vehicle *candle* were also highly associated with the topic *teacher* by the Chinese but not by the German participants. So concrete assumption 9 was supported.

Likewise, altogether twelve features, including *orientation*, *influence*, *responsibility*, *watchfulness*, *courage*, *plainness*, *model*, *optimism*, *justice*, *calmness*, *experience* and *unselfishness*, were rated relatively highly by the Germans on both the topic *teacher* and its vehicle *shepherd* in the metaphor *The teacher is a shepherd*. Of course, those features are directly or indirectly associated with the metaphoric category of the *shepherd*. However, there were only three features, *patience*, *friendliness* and *tolerance*, were rated highly by the Chinese on both the topic *teacher* and the vehicle concept *shepherd* in the metaphor *the teacher is a shepherd*. Concrete assumption 10 was partially supported.

In contrast to hypothesis A-2, hypothesis A-3 is: The more unconventional and inapt a metaphor appears to the metaphor addressees, the more likely that emergent or new features will appear in the comprehending process of that metaphor. From this hypothesis, the concrete assumptions 11 and 12 can be well inferred from hypothesis A-3 (see Table 12).

The German subjects' feature ratings of the topic *teacher* in the *candle-teacher* metaphor varied from those of the vehicle concept *candle* in a significant way. Under the role play with the positive development, the German subjects tended to agree among each other more in interpreting the topic in the metaphor *The teacher is a candle*. Moreover, more features that were not originally associated with the vehicle concept *candle* started to appear as appropriate features to describe the topic *teacher*, such as *enthusiasm, diligence, helpfulness, justice, responsibility, patience, care, friendliness, trust, delight, love, tolerance, orientation, optimism, thoughtfulness, influence, experience* and *courage*. Thus, concrete assumption 11 was confirmed that more new features<sup>48</sup> appeared during the comprehension of the metaphor *The teacher is a candle* by the Germans.

When the central and peripheral features listed in Table D2-1 and D2-2 are compared, the Chinese subjects' feature ratings of the topic *teacher* in the metaphor *The teacher is a shepherd* differed greatly from those of the vehicle concept *shepherd*. Under the role play with the positive development, the German subjects agreed with each other more in interpreting the topic *teacher* in the metaphor *The teacher is a shepherd*. More features that were not originally associated with the vehicle concept *shepherd* were also rated high in describing the concept *teacher* in the metaphor *the teacher is a shepherd*, such as *orientation, light-heartedness, plainness, optimism* and *delight*. In this sense, concrete assumption 12 was marginally supported.

Since assumptions 7 and 9 were confirmed, but 8 and 10 were only marginally supported, hypothesis A-2 was only marginally supported. If a metaphor is estimated as a conventional and apt metaphor, there will be a close correlation between the understanding of the vehicle concept and that of the metaphor. In other words, the

---

<sup>48</sup> The new features refer to the features that were originally hardly associated with the two concepts if they do not appear as the topic and the vehicle in a metaphor. In a related study (Zhou & Heineken, 2007), the concepts, *teacher, candle, captain, shepherd* were correspondently investigated according to the SAM ratings and the feature ratings. For instance, they are the features that were highly rated on the topic *teacher* in the metaphor *The teacher is a candle* but were rarely associated with either the concept *teacher* or the concept *candle* if they were not appeared in a metaphor.

metaphor addressees are more likely to directly refer to the metaphoric meaning that pre-exists in the vehicle to comprehend the metaphor. Since concrete assumption 11 was confirmed but 12 was only marginally supported, hypothesis A-3 was also largely supported. If a metaphor appears to the metaphor addressee as unconventional and inapt, there is a tendency for more new features to be generated in comprehending that metaphor. This suggests that various cognitive processing mechanisms take place in comprehending conventional and apt metaphors and in comprehending unconventional and inapt metaphors.

Hypotheses B-1 and B-2 mainly concern how context may affect metaphor comprehension. According to hypothesis B-1, context can promote metaphor understanding. Even if a metaphor is originally viewed by the metaphor addressees as an inapt and unconventional metaphor, it is still possible that stronger consensus can be achieved in understanding the metaphor if an encouraging communication context is provided. From this hypothesis, it is easy to infer four concrete assumptions concerning the teacher metaphors explored in this work.

First of all, concrete assumption 13 was well supported. Under the condition of no role play, there were significant differences between Chinese and the Germans' SAM ratings of the topic *teacher* in the metaphor *The teacher is a candle*. There was stronger congruence among the Chinese subjects than among the German subjects in their ratings. Under the role play with the positive development, the differences between the German and the Chinese ratings were much reduced. There were fewer differences among the German subjects and far fewer differences between the German and the Chinese subjects in their SAM ratings of the topic *teacher* in the metaphor *The teacher is a candle* when the condition of the role play with the positive development was provided than under the condition of no role play. Thus, assumption 13 was confirmed, namely: Even though the teacher metaphor *The teacher is a candle* is a novel and inapt metaphor for the Germans, the German subjects will show a tendency to share greater consensus in rating their affective impressions of the topic *teacher* in the *candle-teacher* metaphor under the condition of the role play with the positive development than under the condition of no role play.

Similarly, assumption 14 was confirmed. Under the condition of no role play, there were significant differences between Chinese SAM ratings and the German ratings of the metaphor *The teacher is a shepherd*. Under the role play with positive

development, the differences between the German and the Chinese rating were much reduced as shown in Figure 6. According to the empirical results, even if the Chinese took the metaphor *The teacher is a shepherd* as a less conventional and less apt teacher metaphor, they did show a tendency to rate their affective impression more similarly to the Germans and more similarly among themselves under the condition of the role play with the positive development than under the condition of no role play.

According to the feature ratings of the Chinese and the Germans on the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of no role play (Figure 8), the white vertices representing the Chinese subjects were quite concentrated together whereas the black vertices indicating the German subjects were spread out. It indicates that there was stronger consensus among the Chinese than among the Germans in the conceptual representation of the topic *teacher* in the metaphor *The teacher is a candle*. Under the condition of the role play with the positive development, Figure 10 shows that a stronger consensus was reached among the German subjects, as the location of all the black vertices are less dispersed than that in the Figure 8. In addition, such visual evidence can also be further supported by the density and the network index as listed in Table 10. Thus, concrete assumption 15 was well confirmed. That is, even though the teacher metaphor *The teacher is a candle* was considered a novel and inapt metaphor by the Germans, the German subjects would still show a tendency to share a stronger consensus among themselves in their feature ratings on the topic *teacher* in the metaphor *The teacher is a candle* under the condition of the role play with the positive development than under the condition of no role play.

Likewise, a comparison of Figure 20 and Figure 22 shows clearly that the Chinese subjects tended to share stronger consensus in their feature rating of the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the positive development than under the condition of no role play, even if the Chinese subjects did not originally take the metaphor *The teacher is a shepherd* as an apt teacher metaphor. Thus, concrete assumption 16 was also well supported.

According to hypothesis B-2, a discouraging context can have a negative influence on metaphor understanding. That means, even if a metaphor is originally viewed by the metaphor addressees as conventional and apt, the consensus among those

people in understanding the metaphor can be reduced if the communicative context is discouraging.

Under the condition of the role play with the negative development, the Chinese SAM ratings of the topic *teacher* in the metaphor *The teacher is a candle* shows clearly less consensus on the dominance dimension and pleasure dimension; the standard deviation was much increased and the ratings on those two dimensions were also obviously reduced as compared to their corresponding ratings under the condition of no role play. Thus, concrete assumption 17 was supported to a large degree. That is, the Chinese subjects show a tendency to share less consensus among themselves in rating their affective impression of the metaphor *The teacher is a candle* under the condition of the role play with the negative development than under the condition of no role play.

A comparison between Germans' SAM ratings of the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of no role play and those under the condition of the role play with the negative development shows that the standard deviation of the ratings on the pleasure dimension and the arousal dimension increased when the role play with the negative development was provided. In addition, under the condition of the role play with the negative development, German subjects' affective impressions of the metaphor *The teacher is a shepherd* tended to be more active and less pleasant. Such a result supported concrete assumption 18 (see Table 12) to a large degree.

As to the evaluation of assumptions 19 and 20, a comparison of Figure 8 and Figure 12 and a comparison of Figure 20 and Figure 24 are necessary. Under the condition of the role play with negative development, the white vertices representing the Chinese subjects are not located so near to each other in Figure 12 as they are in Figure 8. It shows that the Chinese subjects did not share such a strong consensus among each other in rating the features on the topic *teacher* in the metaphor *The teacher is a candle* under the condition of the role play with the negative development as they did under the condition of no role play. Likewise, the comparison of Figure 20 and Figure 24 shows that the German subjects also shared slightly less consensus among each other in rating the features on the topic *teacher* in the metaphor *The teacher is a shepherd* under the condition of the role play with the negative development than they did under the condition of no role play. Thus, assumptions 19 and 20 were supported.

The status of assumptions 17-20 shows that metaphor understanding can be altered by various contexts (Hypothesis B-1 and B-2). When the teacher metaphor is provided in the role play context in which participants experience constant success in practising the metaphor (acting after the metaphor), the subjects showed a greater tendency to understand the metaphor more even if the metaphor is originally unknown to them. On the contrary, when the subjects' experience with that metaphor was negative in the role play context, it would be more difficult for them to understand the metaphor. Even if the metaphor was originally well known to them, the metaphor addressees may become uncertain about the typically known meaning of the metaphor and made effort to generate new meanings.

Hypothesis C largely concerns the acceptance or the aptness of a metaphor. According to hypothesis C, the aptness can be altered by the communicative context in which the metaphor is provided. Two concrete assumptions can be inferred from hypothesis C:

- Under the condition of the role play with the positive development, the metaphor provided to the subjects will be rated much more suitable than under the condition of no role play;
- Under the condition of the role play with the negative development, the metaphor provided to the subjects will be rated less suitable than under the condition of no role play.

As illustrated in section 4.3.3, there is a significant interaction effect between the factor "role play" and the factor "metaphor" on the suitability ratings of all three teacher metaphors. The empirical results show that the Chinese subjects under the condition when the metaphor *The teacher is a candle* was provided without a role play rated the topic *teacher* in the metaphor *The teacher is a candle* much higher than the Germans did under the same condition. When the role play with a positive development was provided, there was an increase in the suitability ratings of the metaphor *The teacher is a candle* by the German subjects but not necessarily by the Chinese subjects. Under the condition of the role play with the negative development, both the Chinese subjects and the German subjects tended to reduce their suitability ratings. Under the condition of no role play, the German subjects regarded the metaphor *The teacher is a shepherd* as more suitable than the Chinese did. Astonishingly, under the condition of the role play with either the positive development or the negative development, both the Chinese and the German

subjects' suitability ratings of the shepherd-teacher metaphor were reduced. So, concrete comparative assumption 22 was confirmed but assumption 21 was refuted, which suggests that a negative role play paralyzes the suitability ratings of a metaphor but the role play with the positive development does not necessarily increase the suitability ratings of a metaphor. Thus, hypothesis C, namely that metaphor suitability is influenced by the communicative context in which the metaphor is provided was only partially supported.

Four aspects from this empirical research of metaphor comprehension are highlighted:

First of all, the empirical results show that consensus among the subjects in an experimental group in their affective impression and conceptual representation of a metaphor were closely related to pre-existing conceptual knowledge as reflected in the conventionality and aptness that they addressed to it. According to Bowdle and Gentner (2005), the vehicle of a conventional metaphor is more likely to involve a metaphoric category. In other words, the more conventional and apt a metaphor is, the more likely that such a metaphoric category already exists in the conceptual system of the metaphor addressees. Since this pre-existing metaphoric category or figurative meaning shared by the metaphor addressees can be directly applied to metaphor comprehension, it is no wonder that consensus is easily attainable among them. In contrast, there are more controversial views among the metaphor addressees in understanding unconventional and inapt metaphors, because no such common metaphoric category or figurative meaning is directly available in their conceptual systems. They need to execute an ad hoc processing mechanism in order to draw out the figurative meaning of that metaphor. This process can certainly vary from individual to individual. This is why the Chinese participants shared stronger consensus in their SAM and feature ratings of the metaphor *The teacher is a candle*, which was conventional and apt to them, but not in those of the metaphor *The teacher is a shepherd*, which was assessed by them as novel and inapt.

Second, the more that metaphor addressees estimate a metaphor as conventional and apt, the more likely that their affective impressions of the vehicle concept and that of the topic in a metaphor will have a positive correlation; also, it is more likely that the highly rated features of the topic include those features that were associated with the figurative meaning of the vehicle. On the contrary, the more that the metaphor addressees estimated a metaphor to be unconventional and inapt, the

more likely that the new features not associated with the topic or with the vehicle would be highly rated by the metaphor addressees. Such results suggest that various cognitive mechanisms are involved in comprehending various metaphors that differ from each other in their conventionality and aptness as estimated by the metaphor addressees. According to the empirical results in this research, conventional and apt metaphors are likely to be processed through categorization (see e.g., Bowdle and Gentner, 2005; Glucksberg and Keysar, 1993), whereas the unconventional and inapt metaphors may demand more cognitive effort (see Wilson and Sperber, 2004) and involve more complicated cognitive processing mechanisms, such as interaction (see e.g., Tourangeau and Sternberg 1982) or blending (see e.g., Fauconnier and Turner 1998, 2002).

The reason that concrete assumptions 7 and 11 concerning the metaphor *The teacher is a candle* were well confirmed, but that the corresponding comparative assumptions 8 and 12 about the metaphor *The teacher is a shepherd* were only marginally supported is because that the metaphor *The teacher is a candle* was more unconventional and inapt to the Germans than the metaphor *The teacher is a shepherd* was to the Chinese. Therefore, the German subjects seemed to make effort to generate more new features in order to understand the metaphor *The teacher is a candle* because their conceptualization of *candle* did not suggest any congruent figurative meaning among themselves. In contrast, Chinese subjects did have a congruent understanding of *shepherd*, although such an understanding of *shepherd* was not identical to the originally figurative meaning of *shepherd* as known to the Westerners. In comprehending the metaphor *The teacher is a shepherd*, the German subjects just applied what they understood about the concept *shepherd* onto the concept *teacher*.

Third, the empirical results confirm that context can promote the metaphor understanding and also marginally support that certain contexts can also confuse metaphor understanding. This agrees with the idea once mentioned by Tourangeau and Sternberg (1982) that if the context is strong enough, it can determine the meaning of the metaphor rather than the pre-existing structure of the two domains (the topic and the vehicle) determining the meaning of the metaphor. Moreover, it also supports the idea expressed in the relevance theory (Wilson and Sperber, 2004) that context can help metaphor addressee to generate and test assumption in the

process of comprehending the figurative meaning. This point is going to be discussed in detail in the next chapter

Last but not least, the empirical results demonstrate that a negative role play reduced the suitability ratings of a metaphor, but a role play with the positive development did not necessarily increase the suitability ratings of a metaphor. This shows that the aptness of a metaphor does not merely rely on whether this metaphor is an appropriate metaphor in a certain context. The result that the Chinese generally rated the metaphor *The teacher is a candle* and the Germans generally rated the metaphor *The teacher is a shepherd* as the most apt teacher metaphor under all conditions shows that the conceptual knowledge of the metaphor addressees is prior to the context in deciding the aptness of a metaphor.

In summary, the experiment shows that the comprehension of metaphor is a flexible process, which can be altered by metaphor addressees' pre-existing conceptual knowledge and the context. The way that metaphor addressees view the metaphor according to their conceptual knowledge and the context in which the metaphor is provided affect the cognitive mechanisms to be taken in the metaphor comprehending process. No single cognitive mechanism is sufficient to explain metaphor comprehension. The more unconventional and inapt a metaphor is, the more likely that more complicated a cognitive processing mechanism is involved. In the next chapter, a dynamic view of metaphor comprehension is constructed. Its task is to explore how flexible the comprehension of a metaphor is and what causes this flexibility in metaphor comprehension.

## Chapter 5: A Dynamic View of Metaphor Comprehension

The empirical results show that the process of metaphor comprehension can be influenced by both the pre-existing conceptual knowledge of the metaphor addressees and the context in which it is provided. This chapter theoretically explores how these factors affect the metaphor comprehension and in which way they make the cognitive processing mechanism involved in metaphor comprehension flexible. Inspired by the relevance theory (Wilson & Sperber, 2004) and Cowan's working memory theory (2005), a dynamic view is constructed to integrate the current cognitive metaphor mapping theories into comprehension of various types of metaphors.

### 5.1 Flexibility of Metaphor Comprehension

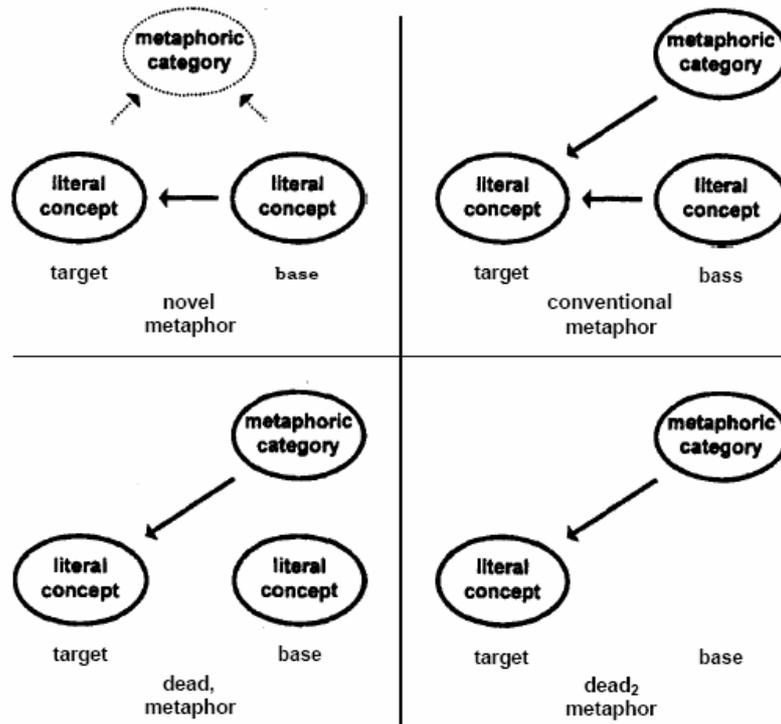
According to the empirical results, the comprehension of metaphor is not a static process that can be explained by a single cognitive mechanism in every situation. In fact, the conceptual knowledge that the metaphor addressees already have, affects their estimation of the conventionality and the aptness of a metaphor and decides which mapping mechanism is most suitable for comprehending a certain metaphor in a particular context. In other words, the meaning of a metaphor is not always obvious and constant and the cognitive mapping mechanism process to comprehend a metaphor is not necessarily identical in every situation, but can vary from person to person and context to context. This flexibility of metaphor comprehension is reflected in the following points:

First, no specific mapping mechanism is applicable for all metaphor comprehension. Instead, different types of metaphors may involve different mapping mechanisms. This finding is consistent with Bowdle and Gentner's (2005) CMT, which postulates a shift from comparison to categorization as metaphors are conventionalized. They classified metaphors into four categories according to the criterion "conventionality" (see Figure 45):

- a novel metaphor is interpreted as comparison, or horizontal alignment between the target (topic) and the base (vehicle) representations, as its base term can be considered a domain-specific concept;
- a conventional metaphor can be interpreted either as comparison, by horizontally aligning the target concept with the literal base concept, or as categorization, by vertically aligning the target concept with the metaphoric

category, since its base term can be referred to either as a literal concept or as an associated metaphoric category;

- a dead<sub>1</sub> metaphor is interpreted as categorization, as its base term refers to the metaphoric category that has lost any sense of connection with the original base concept;
- a dead<sub>2</sub> metaphor is also interpreted as categorization as its base term refers to a metaphoric category and the original base concept is no longer available.



**Figure 45: Career of metaphor.**

(Bowdle and Gentner, 2005: 219)

Taking the novel-to-dead metaphor evolution as a discrete process, Bowdle and Gentner (2005) graded conventional metaphors into three categories, namely conventional, dead<sub>1</sub> and dead<sub>2</sub> metaphors. For novel metaphors, they did not provide further sub-categories. In the author's opinion, metaphors along the end of novelty can be further divided into novel metaphors (unconventional but apt) and bizarre metaphors<sup>49</sup> (unconventional and inapt). In order to establish association between the topic and the vehicle, in contrast to conventional metaphors, the comprehension of unconventional but apt metaphors shall involve more complicated cognitive

<sup>49</sup> Unlike Bowdle and Gentner (2005) who used the criterion "conventionality" to classify metaphors, the author adopted two criteria "conventionality" and "aptness". In section 5.3, the different mapping mechanisms that could be involved in comprehending the five types of metaphors graded by the conventionality and aptness are to be discussed.

processing mechanisms than categorization, because the vehicle of novel metaphors do not have a pre-existing metaphoric category to refer to. As to the comprehension of bizarre metaphors, application of more complex mapping mechanism alone is not sufficient to establish a plausible association between the topic and the vehicle. In many cases, new information needs to be imported from the context to have bizarre metaphors (e.g., within-group metaphors and culture-specific metaphors) comprehended. In this experiment, it was impossible for the German participants to associate the Chinese metaphor *The teacher is a candle* to a teacher who is ready to sacrifice his or her time for pupils without referring it to a certain context, because the concept *candle* does not embody the features of *self-sacrifice* and *devotion* in the German culture as it does in the Chinese culture.

Second, the comprehension of the same metaphor can involve a combination of several types of processing. In comprehending certain metaphors, especially those that first sound bizarre and cannot be recognized as apt metaphors upon first hearing and those whose real-time meanings are distinguished from their original metaphoric meanings, several attempts might be taken before a suitable cognitive mapping mechanism is finally found. To explain this aspect, Fauconnier and Turner's conceptual blending theory (2002) provides a good reference. In the integration network, not only the two input spaces need to be compared to create generic space, but also a blend space demands three cognitive operations, namely composition, completion and elaboration to create new meanings in the real-time processing of a metaphor. Unlike the four-space network in the blending theory, the dynamic view to be presented consists of the topic space, the vehicle space, and the contextual space as activated in people's long-term memory system, as well as the mapping mechanism taken to achieve the metaphoric meaning and that combines the three spaces.

Third, various processing mechanism can be employed by different people in comprehending the same metaphor. A metaphor can be estimated as conventional and apt by some people, but at the same time it can be estimated as less conventional and less apt by others, depending on their existing conceptual knowledge system nurtured by their own culture, experiences, and education. Due to the different representations of the topic and the vehicle space, a metaphor is comprehended easily by some people through direct reference of the metaphoric category of the vehicle that already existed in their long-term memory, or by others

through comparison or even more complicated on-line integration of all the topic space, vehicle space, and contextual space. The results of the empirical study suggest that the metaphor *The teacher is a candle* can be comprehended by the Chinese participants through categorization. Since the features such as *self-sacrifice* and *unselfishness* were already available in the representation of the vehicle space of *candle*, a horizontal alignment between the target *teacher* and the representation of the vehicle *candle* is sufficient to comprehend the metaphor. However, such features are not available in the representation of the vehicle space by the German subjects. Thus, they can only comprehend this metaphor through integration with this information imported from the context.

Fourth, even to the same person, comprehension of a metaphor does not necessarily employ the same processing mechanism. In a certain context, an inapt metaphor can be well comprehended and accepted as an apt one. In this empirical study, the metaphor *The teacher is a candle* was difficult for the German participants to comprehend when no context was provided. As the bipartite graph suggests (see Figure 20), no consistent view of the metaphor was available among the German participants. By comparison, the German subjects seemed to understand the metaphor *The teacher is a candle* much better under the condition of the role play with a positive development. (see Figure 22) In contrast, a typically conventional and apt metaphor can appear as less conventional or less apt in certain contexts, for instance, when conventional metaphors are used for ironic purposes. In such cases, not the typical metaphorical meaning but the ad hoc new meaning can be intended in that situation.

Moreover, metaphors have a tendency to be learnt and conventionalized. Once a less conventional and less apt metaphor is well understood, it can be stored in people's long-term memory and ready for direct retrieval and activation the next time it is encountered. That means, its comprehension demands less cognitive effort and employs a simpler cognitive mechanism because the metaphor is conventionalized. All the first four aspects mentioned above have been tested by this empirical study, and the last aspect, although not tested, can be easily inferred.

## **5.2 Theoretical Inspiration of the Dynamic View**

In order to explain the above mentioned flexibility of metaphor comprehension, inspiring elements are to be imported respectively from the Wilson and Sperber's relevance theory, Cowan (2005)'s working memory theory, and relevant metaphor

theories on the mapping process. Wilson and Sperber's relevance theory is selected, because its cognitive principles of relevance can explain why more cognitive effort is due if the metaphor appears more unconventional and inapt to the metaphor addressee and because its perspective is helpful for generalizing the comprehension steps of metaphors. Cowan's working memory theory is inspiring because its notions of "activation of knowledge" and the "focus of attention" can help to address how different entities of knowledge and their association are activated and interact in the people's working memory. As to the various metaphor theories on the mapping process, a synthetic approach is taken to integrate them into a holistic explanation for various types of metaphor processing.

### 5.2.1 Relevance Theory

As metaphors are inseparable parts of communication (see section 3.5.2), their comprehension process shall be guided by general communicative principles. Concerning the question to what extent communication principles constrain the metaphor comprehension, there are two major views. According to Grice<sup>50</sup> (1989), the communication principle emphasizes that the expectation of cooperation between speakers and listeners shall guide every process of interpretation. The expectation involves a cooperative principle and maxims of *quality* (truthfulness), *quantity* (informativeness), *relation* (relevance), and *manner* (clarity) (Grice 1989: 368-372). The traditional belief is that these communication principles are more crucial to the understanding of non-literal language than to literal language. As listeners may first expect speakers to deliver clear, truthful, informative and relevant messages, the metaphorical interpretation is only sought after the literal interpretation fails to uncover the real meaning of the utterance. On the contrary, Keysar and Glucksberg (1992) argued from their experiment findings that the comprehension of metaphor depends on communicative principles in exactly the same way that literal comprehension depends on them. They suggested that "[t]he use of a metaphor serves the communicative function of indicating the strength of the implied attribution." (1992:656)

---

<sup>50</sup> Grice (1989) developed the so-called inferential model of communication in contrast to the code model. He argued that an essential feature of human communication is the expression and recognition of intention. According to the inferential model, speakers express their intention conveyed by certain meaning, which is later inferred by the addressees.

Wilson and Sperber (2004) developed Grice's idea (1989) that the expression and the recognition of intentions are essential for human communication and established the relevance theory. Two central claims are important for the relevance theory:

First, *the Cognitive Principle of Relevance* claims that "human cognition tends to be geared to the maximization of relevance." (Wilson and Sperber, 2004: 614) Wilson and Sperber regarded relevance as an important property of inputs to cognitive processes. According to them, inputs include both external stimuli, like utterances, and internal representations, like memories or inferences. An input is relevant to an individual when its processing in a context of available assumptions yields a "positive cognitive effect" (Sperber & Wilson 1995: §3.1-2). They described a positive cognitive effect as a worthwhile difference in the individual's representation of the world, such as, a true conclusion. False conclusions are cognitive effects but not positive ones and are not worth having. The relevance of an input (i.e., an utterance) is associated with both the cognitive effects and the cognitive effort<sup>51</sup> :

-other things being equal, the greater the positive cognitive effects achieved by processing an input [e.g., an utterance], the greater the relevance of the input to the individual at that time.

-other things being equal, the greater the processing effort expended, the lower the relevance of the input to the individual at that time. (Wilson and Sperber, 2004: 608)

Wilson and Sperber (2004) explained that the maximization of the relevance of the inputs is simply a matter of making the most efficient use of the available processing resources. Relevance theory claims that humans do have an automatic tendency to maximize relevance because the human cognitive system has developed in such a way that people's perceptual mechanisms tend automatically to pick out potentially relevant stimuli, their memory retrieval mechanisms tend automatically to activate potentially relevant assumptions, and their inferential mechanisms tend spontaneously to process them in the most productive way.

Second, *the Communicative Principle of Relevance* claims that "every ostensive stimulus conveys a presumption of its own optimal relevance" (Wilson and Sperber, 2004: 616). By producing an ostensive stimulus, such as an utterance, the communicator anticipates that the hearer is to find it relevant enough to be worth processing. In their opinion, an ostensive stimulus is optimally relevant if its relevance is sufficient to be worth the audience's processing efforts and at the same time compatible with communicator's ability and preference.

---

<sup>51</sup> "Effect" here refers to the cognitive gain or benefits. „A cognitive effect is a worthwhile difference to the individual's representation of the world- a true conclusion.“ (Wilson and Sperber, 2004: 609) Effort refers to "any expenditure of energy in the pursuit of a goal" (Van der Henst and Sperber , 2004: 230).

Wilson and Sperber claimed that “the search for relevance is a basic feature of human cognition, which communicators may exploit.” (Wilson and Sperber, 2004: 608) According to them, the expectations of relevance raised by an utterance can guide the hearer to grasp the meaning of the speaker. In communication, the hearer turns to find an utterance relevant when it is connected with background information and yields a *positive cognitive effect* which improves the hearer’s knowledge on a certain topic by attaining a true conclusion. In processing an utterance in communication, the hearer wants to attain as many cognitive effects as possible for the least effort. In Wilson and Sperber’s words,

The hearer should take the linguistically encoded sentence meaning; following a path of least effort, he should enrich it at the explicit level and complement it at the implicit level until the resulting interpretation meets his expectation of relevance. (Wilson and Sperber, 2004: 619)

According to them, the relevance-theoretic comprehension procedure involves following a path of least effort in computing cognitive effects or attaining the contextual implication (test interpretive hypotheses in order of accessibility) and stopping when the expectations of relevance are satisfied. This procedure involves a number of sub tasks: a) constructing an EXPLICATURE via decoding, disambiguation and etc; b) constructing IMPLICATED PREMISES; and c) constructing an IMPLICATED CONCLUSION.<sup>52</sup> It is very insightful for Wilson and Sperber (2004) to claim that the sub-tasks involved in the comprehension process are not sequentially ordered but an online process, with all the sub-tasks developed in parallel against a background of expectations:

These sub-tasks should not be thought of as sequentially ordered. The hearer does not FIRST decode the logical form of the sentence uttered, THEN construct an explicature and select an appropriate context and THEN derive a range of implicated conclusions. Comprehension is an on-line process, and hypotheses about explicatures, implicated premises and implicated conclusions are developed in parallel against a background of expectations (or anticipatory hypotheses) which may be revised or elaborated as the utterance unfolds.

(Wilson and Sperber, 2004: 624)

The framework of the relevance theory provides an inferential account of metaphor. Here, several recent studies concerning the application of relevance theory to the field of metaphor comprehension are to be reviewed.

In discussing metaphor and relevance, Amaral (1999) pointed out that two aspects from the relevance theory are important for metaphor comprehension. One aspect is

---

<sup>52</sup> In relevance theoretic terms, EXPLICATURE refers to the appropriate hypothesis about explicit content, IMPLICATED PREMISES to the appropriate hypothesis about the intended contextual assumption. IMPLICATED CONCLUSION to the appropriate hypothesis about the intended contextual implications. (see Wilson & Sperber, 2006)

that metaphor comprehension involves testing an interpretive hypothesis formed by the hearer in order to grasp the speaker's intended assumption. Amaral agreed with Holland et al. (1993) that such an inferential calculation responsible for metaphor interpretation manifests the reasoning strategies through which addressees validate their meaning assumption. The other aspect is that the context construction as advocated by the relevance theory is crucial for metaphor comprehension. It is important that the context used to process an assumption is not given to the interpretation process but rather constructed and modified by the metaphor addressees based on their knowledge and experiences stored in memory.<sup>53</sup> In order to comprehend a metaphor, the relevant commonplace of the vehicle is identified and the contextual assumptions are combined with new information in a productive way.

Moreover, Noveck et al. (2001) summarized two features of relevance theory that are crucial for discussing metaphor comprehension (Sperber and Wilson, 1986, 1991):

- A listener can draw implications effectively from unliteral utterances as well as literal utterances (metaphors are regarded as a form of loose talk);
- A metaphoric utterance is likely to carry more information than its literal equivalent.

As to the second aspect, Noveck and his colleagues claimed that metaphor comprehension is more costly than literal comprehension or demands more cognitive efforts, because it involves not only understanding what the metaphor is referring to but also the understanding of the speaker's intention in using it. In this way, they used the relevance theory to explain why metaphor comprehension demands extra costs (cognitive efforts) and point out that the extra costs in understanding a metaphor also bring extra benefits (cognitive effects).

Our primary claim is that it should not be surprising to find evidence supporting the notion that -- all other things being equal -- metaphors are costly when compared to literal controls. Our auxiliary claim is that the extra costs that come with an apt metaphor ought to be commensurate with extra benefits.

(Noveck et al., 2001: 111)

Through analyzing a number of metaphors from the perspective of the relevance theory, Wilson and Carston (2006) demonstrated how metaphor addressees are able to recover emergent features from metaphoric utterances merely from an inferential account. Based on the relevance theory, they advocated two important views of

---

<sup>53</sup> According to Amaral (1999), the construction of the context from the perspective of the relevance theory is somewhat corresponding to Black's system of associated commonplaces.

metaphor: One is the continuity view of metaphor, which indicates that the comprehension of metaphors, similar to the comprehension of literal utterances, involves processes of concept modulation or adjustment, including both narrowing and several varieties of broadening. The other is the so-called fully inferential view of metaphor, a relevance-based account of the cognitive processes, which guide the move from the encoded concept to the ad hoc concept via constructing sound hypotheses about explicit content, the intended contextual assumption, and the intended contextual implications.

According to them, *contextual implication* is the most important type of cognitive effect in comprehending a metaphor. The contextual implication is derived from neither a metaphoric utterance nor context alone but is a deducible conclusion from both the metaphoric utterance and the context. Through the search of relevance, communicators can attain true contextual implication and carry out cognitive processes to strengthen or revise the existing assumptions concerning the meaning of that metaphor. Although the associative links among the domains involved in a metaphor may affect the outcome of the mutual adjustment process by altering the accessibility of contextual implications, the resulting overall interpretation will only be accepted as the speaker's intended meaning if it satisfies the hearer's expectation of relevance. (see Wilson and Carston, 2006)

Although Wilson and Sperber (2004) themselves asserted that the relevance theory is a cognitive psychological one, it is actually more pragmatic theory, because its assertions fail to have experimental verification and its analysis of utterances in context follows the typical pragmatic tradition. This makes it difficult to use the terminologies of the relevance theory directly in this cognitive psychological study of metaphor comprehension. Nevertheless, several ideas from the relevance theory are still helpful in explaining the dynamic processing of metaphor comprehension: First, its cognitive principle of relevance claim is plausible in explaining why more cognitive effort seems to be involved if the metaphor appears to be more unconventional and inapt. Second, the steps of comprehension in communication advocated by the relevance theory provide a general view of the steps of comprehending a metaphor. According to the relevance theory, context construction, in which the contextual implication is derived and tested, is crucial for comprehension. It involves testing an interpretative hypothesis formed by the hearer in order to grasp the speaker's intended assumption. The results of this experiment show that interpretive

hypotheses of a metaphor can be greatly altered by the communicative context in which the metaphor is provided.

### **5.2.2 Cowan's Working Memory Theory**

It is hard to talk about the comprehension of metaphor without associating it with people's working memory. In fact, more and more cognitive scientists started to realize the importance of people's working memory in metaphor comprehension. Recently, a number of empirical studies show that metaphor processing is greatly related to people's working memory. For instance, Monetta and Pell's research (2007) reveals that metaphor interpretation is highly dependent on intact fronto-striatal systems, in which area the working memory mainly operates. Other empirical studies (e.g., Almor, et al., 2007; Chiappe, D. and Chiappe, P., 2007; Kintsch, 2001) show that working memory capacity or performance is an important factor in metaphor interpretation and production.

Despite the rising awareness of the role of people's working memory in metaphor processing, there has hardly been any attempt to apply the theoretical achievements of working memory to exploring metaphor comprehension. To fill up this gap, the dynamic view of metaphor comprehension presented here imports the inspiration from Cowan's attentional working memory theory to explain how information entities of the topic and the vehicle were activated and processed attentively to attain the meaning of a metaphor.

The term working memory has been first used by Baddley and Hitch (1974) in the sense similar to the so-called primary memory (James, 1890), which refers to the very limited information that can reside in the conscious mind at one time in contrast to the second memory which people can hold for a whole lifetime. Another associated term is short-term memory, which has been applied by both Broadbent (1958) and Atkinson and Schiffrin (1968) in their information processing models. The term working memory here adopts Cowan's definition as "the retention of information in a temporarily accessible form, through all available mental processing mechanisms" (Cowan, 2005: 155).

There are several different views about people's working memory: From the perspective of the psychometric or modal view, the measurement of the digital span that a person can remember is important, because it reflects the storage of needed data in temporary form necessary for conducting intellectual tasks. From the perspective of Baddley's multi-component view, there are several devices that store

information in people's brain, including a phonological buffer, a visual-spatial buffer, and an episodic buffer. They interact with long-term memory. The so-called central executive process is taken to transform information and to help information to be stored (see Baddley, 1986, 2000). From the perspective of Daneman and Carpenter's (1980) storage-plus-processing view, people's ability both to store information and to carry out a processing task are important in measuring the capacity of their working memory.

The dynamic view of metaphor comprehension greatly benefits from Cowan's working memory theory. According to Cowan, people's working memory is conceived as "an activated portion of long-term memory and, within that activated portion, the focus of attention and the control process that direct it" (Cowan, 2000: 117). Compared with other views of working memory, this theory holds attention as critical for the working memory, but it also distinguishes itself from the classic Broadbent's attentional information-processing model (1958), which proposes that human information processing contains a filter that excludes the irrelevant information and processes only the relevant information. In contrast, Cowan claimed, "all information is processed to some extent and it activates at least some features in memory, but only certain information recruits attention and ends up getting the more complete processing." (Cowan, 2005:125)

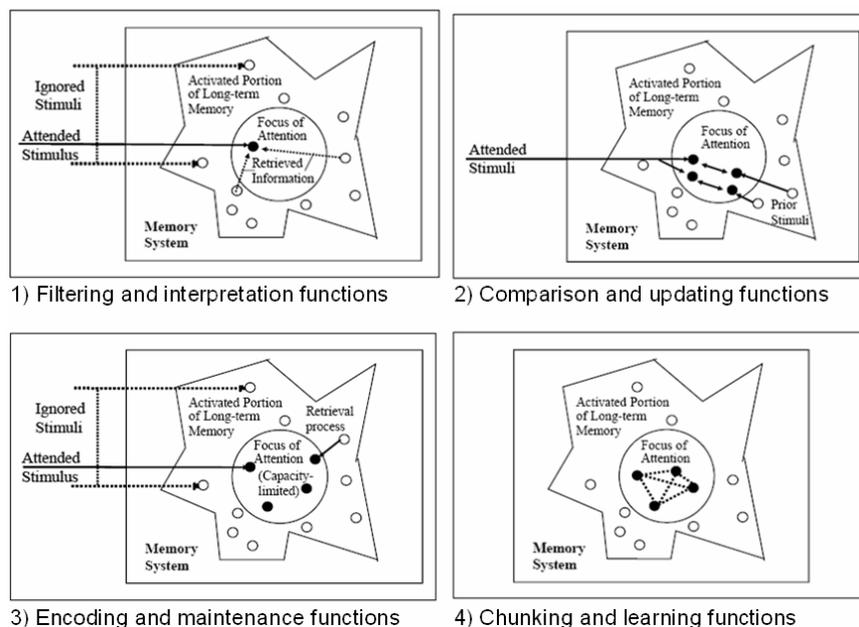
Cowan used the term *attention* to refer to selective attention, in which some information is selected from processing at the expense of less-than-optimal processing of other information. Two dimensions are important about the attention in Cowan's theory, namely *the control of attention* and *the scope of attention*.

The control of attention was an important element of early theories of information processing (e.g., Atkinson and Shiffrin, 1968) and is embodied in the central executive component of theoretical conceptions of working memory (e.g., Baddeley, 1986; Cowan, 1988, 1995). Recent research has revealed the importance of the control of attention in carrying out the standard type of working memory task involving separate storage-and-processing components (see e.g., Conway et al., 2002; Conway, Cowan and Bunting, 2001; Daneman and Merikle, 1996; Hambrick and Engle, 2001; Kane et al., 2004). For instance, Conway, Cowan and Bunting's (2001) experiment has showed that subjects could concentrate attention on a message presented to one ear so effectively that they did not even notice their own names in a different message presented to the other ear. Other experiments (see

e.g., Kane, et al., 2001; Unsworth, Schrock and Engle, 2004) also suggested a correlation between the control of attention and working –memory tasks.

Due to the limited storage in the working memory (see e.g., Miller, 1956), it is impossible to process intensively at the same degree all the representations activated by stimuli or incoming information in people’s working memory intensively at the same degree. Cowan (2005) suggested that attention ought to focus on one stream of stimulation concerning the ongoing task goals that he termed attended stimuli. The representations activated by the attended stimuli become the focus of attention and receive the most complete processing. The rest of information from the ignored stimuli will only be held by a passive storage device. Ignored stimuli do activate representations in the memory system, but they do not receive much attention and a complete processing. In this way, the attention is well controlled to ensure a focused and effective working at the task goal.

Cowan (2001) proposed that the storage limit of the working memory may be counted as the scope of attention. In contrast to Miller (1956), who argued that the capacity limit for processing information is about seven separate items (plus or minus two), Cowan (2001) claimed a limited capacity of four separate units or chunks of information in normal adults and proposed that the special form of storage limit may be the capacity of the scope of attention, i.e. the focus of attention.



**Figure 46: Functions of attention in the working memory.**

(see Cowan, 2005)

Figure 46 illustrates a wide variety of functions that the focus of attention can carry out: The focus of attention has filtering and interpretation functions. (see the graph at

the top left of Figure 46) Stimuli or incoming sensory information automatically activates representations in the memory system, which results in the activated portion of long-term memory within the jagged line. However, only some of the activated information is sufficiently active to be the focus of attention, which is represented by the circle. On one hand, the attention is able to focus on one stream of stimulation (horizontal solid line) and the information activated by it receives more complete processing. On the other hand, the attention is also able to filter out other streams of stimulation (horizontal dotted line) as the capacity of attention is limited. In addition, the relevant items in the activated memory are engaged automatically to help interpret the information in the focus of attention.

The focus of attention can exert comparison and updating functions. (see the graph at the top right of Figure 46) Through comparing incoming stimulation with the representations already in memory, new updating of the information is enabled.

The focus of attention helps to encode and maintain useful information. (see the graph at the bottom left of Figure 46) Since there is a limit to how much independent information can be held at one time, the focus of attention executes the retention function for the most important information.

The focus of attention also has the chunking (Miller, 1956) and learning functions. (see the graph at the bottom right of Figure 46) Information that resides in the focus of attention usually tends to be linked together or associated to form a large chunk. Through chunking, new information can be learnt more effectively. In this sense, the capacity of the focus of attention is also enlarged as more information items are involved through the chunking.

Two aspects of Cowan's attentional memory theory are relevant to explain the metaphor comprehension. First, Cowan's theory is unique in regarding the working memory as an activated portion of long-term memory, rather than as a separate memory unit distinguished from the long-term memory. In comprehending a metaphor, different representations of the topic and the vehicle may be activated by different people according to the conceptual knowledge that they already have in their memory system. Moreover, different focuses of attention could come into being in comprehending the same metaphor if the metaphor is provided in different context. Second, the functions executed by the focus of attention, filtering and interpretation functions, the comparison and updating functions and the functions to encode and maintain useful information can all be employed in combination to explore the

processing of a metaphor. In comprehending a metaphor, both the conceptual representations of the topic and the vehicle are activated. If an association between the topic and the vehicle of a metaphor is available in the representations activated, it will be retrieved and directly applied to understanding that metaphor. For instance, the vehicle concept of a conventional metaphor typically involves a pre-existing metaphoric category, which can usually be adopted as the meaning of that metaphor. (See e.g., Bowdle and Gentner, 2005) Otherwise, more complicated cognitive mechanisms, such as comparison and interaction of the representations activated by the topic and the vehicle are to be taken to create a new association between the two in pursuit of the meaning of the metaphor. So far as the metaphor is comprehended, its meaning is encoded and maintained in people's memory.

### **5.2.3 Various Views of the Mapping Process**

There are various important theories concerning the mapping process involved in the comprehension of metaphors, including the comparison theory (e.g., Gentner and Clements, 1988; Ortony, 1979), the categorization theory (e.g., Glucksberg and Keysar, 1990), the interaction theory (e.g., Tourangeau and Sternberg, 1982), and the integration theory (e.g., Coulson and Matlock, 2001). Recently, Bowdle and Gentner (2005) argued that whether metaphors are processed as comparison or categorization largely depends on the conventionality of the vehicle concept and the grammatical form of the statement. Other empirical studies (e.g., Bortfeld and McGlone, 2001; Nueckles and Janetzko, 1997; Wolf and Gentner, 1992) also suggest that various theories on the mapping process of a metaphor can actually be complementary rather than contradictory to each other. Since those theories and the relevant empirical studies have been introduced in Chapter 2 and 3, they are not to be repeated again. Here a synthetic approach is advocated to bring the relevant parts of those theories together to show how various mapping theories can be combined together to explain the comprehension of certain types of metaphors, graded after *conventionality* and *aptness*.

### **5.3 The Framework of the Dynamic View**

As described above, the dynamic view of metaphor comprehension involves three aspects inspired respectively by Wilson and Sperber's (2004) relevance theory, Cowan's (2005) working memory theory and the cognitive theories concerning the

mapping process involved in metaphor comprehension. According to the relevance theory, metaphor comprehension comprises deriving, testing and confirming a suitable interpretive hypothesis, which is named here as the contextual metaphoric assumption. The more conventional and the more apt a metaphor is, the more easily people can draw and test that contextual metaphoric assumption. According to Cowan's working memory theory, metaphor comprehension involves the activation of representations from the topic, the vehicle and the context in people's memory and their interactions. Moreover, the comprehension of different types of metaphor could involve different mapping mechanisms, depending on the context and the conceptual knowledge that people have. The major idea of this dynamic view of metaphor comprehension can be expressed as follows: Depending on people's conceptual knowledge preexisting in their long-term memory and the communicative context in which a metaphor is provided, the comprehension of the metaphor involves testing the contextual metaphoric assumptions that are formulated through the ad-hoc interplay of the topic space, the vehicle space, and the contextual space generated in people's working memory.

### **5.3.1 Steps of Metaphor Comprehension**

According to the relevance theory (Wilson and Sperber, 2004), the steps of comprehending any utterance involves: 1) using the least cognitive effort to achieve the greatest cognitive effect in deriving and testing interpretive hypotheses; and 2) stopping if the expectations of relevance are satisfied or abandoned.

In case of metaphor comprehension, the cognitive effect to achieve is the metaphoric interpretive hypothesis confirmed by the context. The interpretive hypotheses are named here as the contextual metaphoric assumptions, which is similar to what Wilson and Carson's (2006) contextual implication.<sup>54</sup> The contextual metaphoric assumption is a central concept for the dynamic view. It is the assumed association between the topic and the vehicle in a certain context.

In order to attain the meaning of a metaphor, a contextual metaphoric assumption

---

<sup>54</sup> Wilson and Carson (2006) held the contextual implication as the most important type of cognitive effect in comprehending a metaphor, as it is a deducible conclusion derived from a metaphorical utterance and the context in which it appears. According to Wilson and Carson (2006), communicators can attain true contextual implication and carry out cognitive process to strengthen or revise the existing assumptions concerning the meaning of that metaphor through the search of relevance. Although the associative links among the domains involved in a metaphor may affect the outcome of the mutual adjustment process by altering the accessibility of contextual implications, the resulting overall interpretation will not be accepted as the speakers' intended meaning unless it satisfies the hearer's expectation of relevance.

is formed, tested, revised or strengthened. In other words, the comprehension of a metaphor involves the following steps: 1) derive a contextual metaphoric assumption; 2) test the contextual metaphoric assumption; and 3) accept it as the meaning of the metaphor if it suits the context in which the metaphor is provided. Otherwise, it is rejected and a new attempt is made to create and test another contextual metaphoric assumption. This searching process does not end until a well-confirmed contextual metaphoric assumption is finally attained.

The whole process of formulating and testing such a contextual metaphoric assumption allows much flexibility, because people's representations of the topic and the vehicle in a metaphor are not the same and their perception of the context differs. A metaphor can appear as conventional and apt to some people, but novel and inapt to others. In comprehending a conventional and apt metaphor, a pre-existing metaphoric category is available in people's memory system and can be directly inferred. If a metaphor appears as unconventional and inapt to the metaphor addressees, there is nearly no pre-existing associations between the representations activated by the topic and the vehicle in their mind. Thus, they need to take more cognitive effort to attain the meaning of the metaphor.

There are two basic claims concerning the contextual metaphoric assumption:

- As long as the contextual metaphoric assumption is not derived, the search for a suitable mapping mechanism to associate the topic and the vehicle in a certain context will not end.
- As long as the established contextual metaphorical assumption is rejected in the testing process, new activations of the representations of the topic and the vehicle shall take place and more complicated mapping mechanisms are initiated to form a new plausible assumption.

### **5.3.2 Acquisition of the Contextual Metaphoric Assumption**

It is very important to notice that the contextual metaphoric assumption derives from not only the metaphoric utterance and the context in which it appears, but also the pre-existing knowledge of the metaphor addressees. As a matter of fact, the processing of a metaphor, including the formation, testing and confirmation of a contextual metaphoric assumption, operates on the interplay between knowledge of the language system and knowledge of the context (the situation), and of the

background schematic knowledge, including factual and socio-cultural knowledge.<sup>55</sup> Since these three types of knowledge may differ from person to person, the cognitive process to attain such a contextual metaphoric assumption varies in different situations.

As shown in Figure 47, a metaphor *x is y* is composed of the topic concept *x* and the vehicle concept *y*, both of which activate correspondent conceptual representations in people's memory system in comprehending a metaphor. According to the abstractionist model of representation of knowledge (see e.g., Estes, 1991; Hinzmann, 1990), a representation is the result of the activation of a concept defined by some properties (features) and its relationship with the other concept and activation of other concepts close to the first activated concept. The small dots, standing for the activated representations, make up the topic space *X* and the vehicle space *Y*. They are created online in people's working memory and may differ from person to person due to their pre-existing conceptual knowledge that results from their unique socio-cultural heritage.

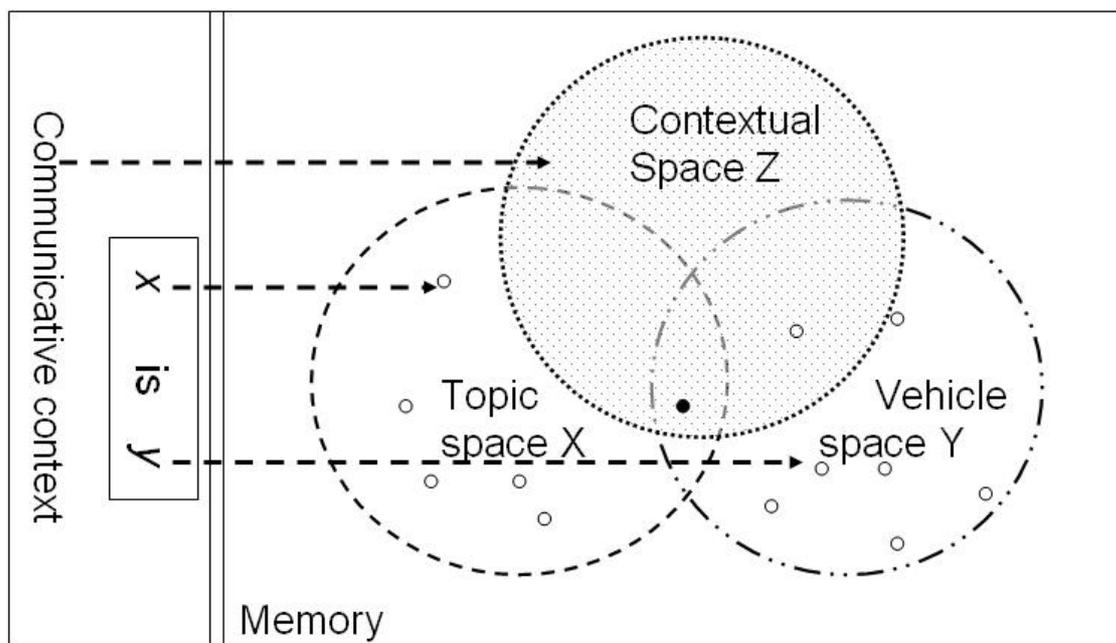
Sometimes metaphor addressees' knowledge of the topic and the vehicle is not sufficient in comprehending a metaphor. Especially in comprehending novel metaphors, new information needs to be imported from metaphor addressees' perception of the context to derive the contextual metaphoric assumption. Therefore, not only the topic space *X* and the vehicle space *Y* but also the contextual space *Z* is necessary for the creation of a plausible contextual metaphoric assumption.

Since the generation of all three spaces is totally online and spontaneous, jagged lines rather than solid lines are used to sketch the three spaces. As a result, their relative positions are not fixed. This indicates that the overlapped area among the three as shown in Figure 47 may not always be available. When there is such an overlapped area among the three or an overlapped area between the contextual space *Z* and one of the other spaces, it is the focus of attention and receive the most processing, because it indicates that there are representations activated in the topic or the vehicle space that are compatible with the context. It is these representations that are crucial for generating conceptual metaphoric assumptions represented by the black dot. In comprehending conventional and apt metaphors, the contextual metaphoric assumption can be derived easily from the pre-existing association between the topic and the vehicle spaces, as represented by the overlapped area

---

<sup>55</sup> The three types of knowledge are clarified by Goatly (1997: 137).

between the X and Y. If the target space X and the vehicle space Y vary too much from each other to achieve any overlapped space, the contextual space Z shall play a crucial role in establishing a new association between the topic space and the vehicle space. In this way, the new meaning emerges.



**Figure 47: Acquisition of the contextual metaphoric assumption.**

**x is y: metaphor; x: topic concept; y: vehicle concept; white dots: representations (activated concepts and features); black dot: contextual metaphoric assumption.**

In Figure 47, it is clear that a number of representations (relevant concepts and properties) are activated in the topic space X and vehicle space Y. However, not all of them are relevant and shall receive full attention. In fact, the concepts and properties that are less relevant to the expectation of understanding the metaphor in the perceived context are filtered out and neglected without further processing. In contrast, the representations in the focus of attention, that is, the area which is more relevant to a plausible association of the topic and the vehicle in a certain context, will receive much more complete processing to generate the contextual metaphoric assumption. The contextual metaphoric assumption attained will be reexamined to test whether the interpretation fits the metaphor in that context. If so, the interpretation process is successfully closed. If the meaning is new information, it will be stored in the conceptual system in people's memory. If the meaning attained in the focus of attention does not suit the metaphor in that context, the interpretation procedure will restart and continue until a plausible meaningful interpretation is finally

achieved.

The term context used here does not simply refer to the text or the passage that surrounds a statement or the circumstance in which an utterance is spoken. Here, context involves not only the *discourse context*, the situation in which a metaphor appears, but also the *conceptual context*, the assumed relevance to the metaphoric statement according to the addressee's own conceptual knowledge. This is similar to Sperber and Wilson's definition, namely "a psychological construct, a subset of the bearer's assumption. It is these assumptions, of course, rather than the actual state of the world, that affect the interpretation of an utterance." (1986: 15) In comprehending a metaphor, the context not only exerts influence on the accessibility of different contextual assumptions through altering the accessibility of the entries of its constituent concepts but also establishes goals or expectations in the hearer (Wilson and Carson, 2006).

In the dynamic view of metaphor comprehension, the contextual space  $Z$  generated from the context executes mainly the following two functions:

First, the contextual space  $Z$  helps to direct the focus of attention. Both the topic and the vehicle may activate a large number of representations in people's conceptual system. According to the relevance theory (see section 4.1.3), the least cognitive effort shall be taken to achieve the greatest cognitive effect. The context helps to derive contextual knowledge, which is helpful to select representations activated in the topic space  $X$  and the vehicle space  $Y$  to form contextual metaphoric assumption. In the dynamic view of metaphor comprehension, only the representations activated in the two spaces that are compatible with the contextual space  $Z$  will receive the most attention.

Second, the contextual space  $Z$  helps to check whether the contextual metaphoric assumption attained through cognitive processing satisfies the expectations or goals suggested by the context. In Wilson and Sperber's work (2004), the comprehension procedure starts by taking the least effort in computing cognitive effects, including testing interpretive hypotheses (disambiguation, reference resolution, implicature, and etc.), and ends with satisfying the expectation of relevance. In line with this logic, the contextual space serves in this dynamic view the function of a hypothesis-testing device to confirm, deny or modify the meaning attained. No matter what kind of cognitive processing is engaged in the focus of attention, the comprehension processing will not stop unless the meaning attained meets the expectations

suggested by the context. Otherwise, more complicated cognitive processing is to be involved to generate more appropriate and plausible meanings. To ensure the least cognitive effort to make in attaining the meaning of the metaphor, the comprehension process stops once the contextual metaphoric assumption is confirmed in the context.

It can also be inferred that the less conventional and the less apt a metaphor appears, the more necessary it is for people to refer to the context for plausible metaphor comprehension. As shown in the empirical studies, a conventional and apt metaphor in one culture (e.g., *The teacher is a candle*, in Chinese culture) may be regarded as completely novel and inapt in another (e.g., *The teacher is a candle* in German culture). By encountering such a metaphor (*The teacher is a candle*), the Chinese and the German subjects generated various contextual assumptions due to their different conceptualizations of the topic and the vehicle in the two cultures.

All in all, the contextual metaphoric assumption can be formed through the interplay of three spaces, namely the topic space X, the vehicle space Y, and the contextual space Z. The overlapping area of the contextual space and the other two spaces is the special focus of attention and will receive the most processing. In this case, it is where the intensive mapping process is involved. Depending on the pre-existing conceptual knowledge and the context, the topic space, the vehicle space and the contextual space come into being and interact with each other to achieve the contextual metaphoric assumption, which is to be confirmed or rejected as the meaning of the metaphor after testing.

### **5.3.3 Mappings in the Dynamic View**

According to the relevance theory (see Wilson and Sperber, 2004), the greater the positive effects that are achieved by processing an input with the same amount of effort, the greater the relevance of the input to the individual at that time. By contrast, the lower the relevance is, the greater the processing effort is to be involved. In comprehending a metaphor, the more conventional and the more apt a metaphor appears, the less cognitive effort and the less complicated the cognitive mapping mechanism involved in pursuing its relevance.

By processing a dead metaphor, the metaphoric meaning is so conventionalized that not a second thought is needed to retrieve that meaning. On the contrary, the less conventional and the less apt a metaphor is estimated to be, the more flexible

and complicated cognitive processing is to be involved and the more important is the bridging role of contextual space Z in achieving a plausible association between the topic space X and the vehicle space Y. Especially for comprehending bizarre or extremely novel and inapt metaphors, hardly any plausible association can be directly found between the representations activated in the topic space and vehicle space. When necessary, socio-cultural information shall be imported to enable the activation of new items in the topic space x or vehicle space Y, in order to derive a plausible contextual metaphoric assumption.

As stated in Chapter 2 and Chapter 3, there are various cognitive theories concerning metaphor mapping, namely the comparison theory, the categorization theory, the interaction theory and the blending or the integration theory. Those different mapping theories are not mutually exclusive. In fact, the results of this cognitive online experiment (see Chapter 4) not only confirm Bowdle and Gentner's career of metaphor hypothesis that metaphor can be understood through both categorization and comparison, depending on the conventionality of that metaphor, but also suggest that other metaphor mapping theories, such as interaction and integration theories can also be employed to "describe different points on a continuum of metaphor processing" (Bortfeld and McGlone, 2001: 75) and explain phenomena occurring in metaphor comprehension, such as the emergence of the new features. Based on the empirical results, a synthetic approach is taken to integrate the important aspects of the current metaphor mapping theories in the dynamic view of metaphor comprehension.

This extensive integration of various metaphor mapping theories is enabled by classifying metaphors according to two criteria, namely *conventionality* and *aptness*. Bowdle and Gentner (2005) took conventionality as a criterion to classify metaphors to achieve a reconciliation of the comparison and categorization models of metaphor comprehension. In their opinion, "conventional metaphors can be distinguished not only in terms of whether the base term evokes an abstract metaphoric category but also in terms of how this abstraction is related to the literal base concept." (Bowdle and Gentner, 2005: 208). In contrast, several other studies have suggested that aptness influences metaphorical processing. (see e.g., Chiappe et al., 2003:97)

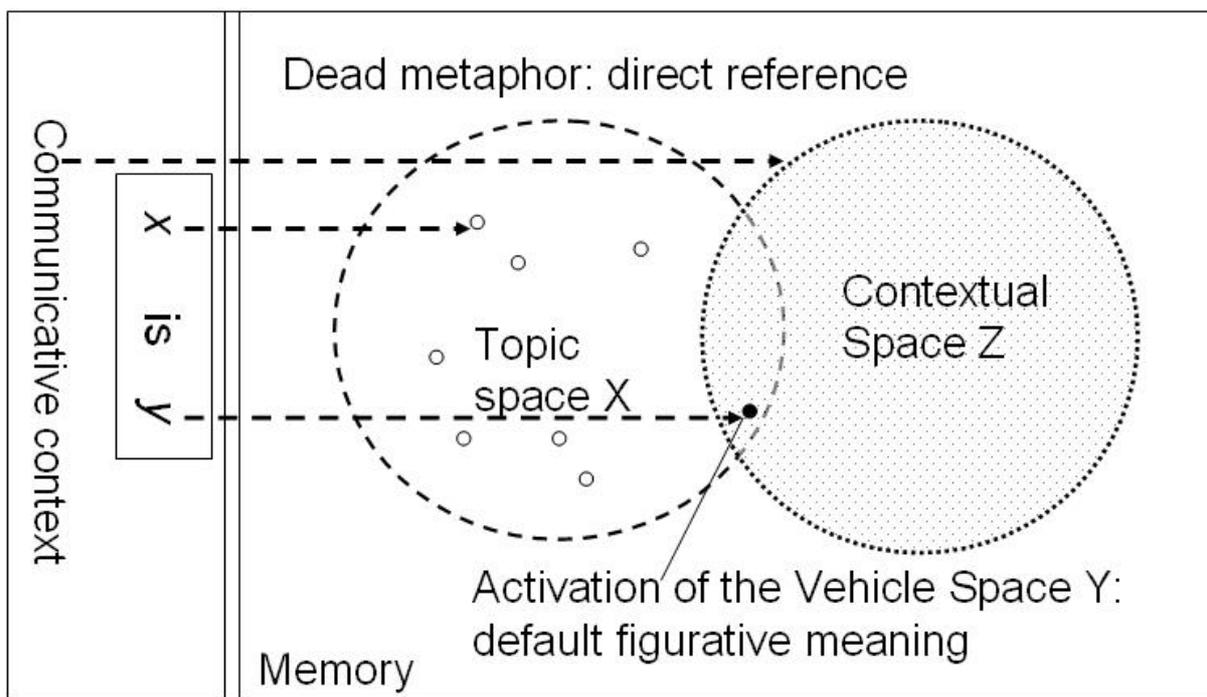
In this study, *conventionality* refers to how familiar the metaphor seems to appear to the metaphor addressee. Such a definition appears at first sight different from, but is actually very much related to Bowdle and Gentner's (2005) definition according to

the availability of an abstract metaphoric category and Jones and Estes's definition "the extent to which the concept is associated with a figurative meaning" (2006: 23). The other criteria of aptness is derived according to the metaphor addressee's estimation of its suitability in describing the crucial property of the topic. Such a definition is similar to the definition given by Chiappe et al. They define aptness as "the extent to which the statement captures important features of the topic" (Chiappe et al., 2003:97).

A unique feature of classifying metaphors according to those two criteria is its emphasis on metaphor addressee's estimation, rather than on metaphors themselves. This is reasonable because metaphors are not conventional or novel in their own right. Metaphors accepted by some people as well-known and apt may at the same time be regarded by other people as extremely new and confusing, depending on what kind of relevant knowledge of the topic and vehicle is available in the metaphor addressees' minds and whether a direct association can be found between the topic space and the vehicle space. Conversely, a conventional metaphor may bear a new meaning in an unusual context and cause more difficulty for addressees to comprehend.

Since both the dimension of conventionality and that of aptness are continuous rather than discreet, it is almost impossible to make a scientific classification of metaphors into segmented categories according to the two criteria. Only for the convenience of presentation, five types of metaphors are given to illustrate how differently cognitive processing could be involved in comprehending metaphors according to people's estimation of their conventionality and aptness:

The first category is dead metaphors, which are estimated by people as extremely conventional and apt. The figurative meanings of their vehicle concepts are so well accepted that their original meanings are either regarded as irrelevant in correspondence to Bowdle and Gentner's (2005) dead<sub>1</sub> metaphors (e.g., *A university is a culture of knowledge*) or considered as being no longer available like Bowdle and Gentner's dead<sub>2</sub> metaphors (e.g., *The movie Star Wars is a block buster*). Bowdle and Gentner (2005) have suggested that dead metaphors should be processed as categorization.



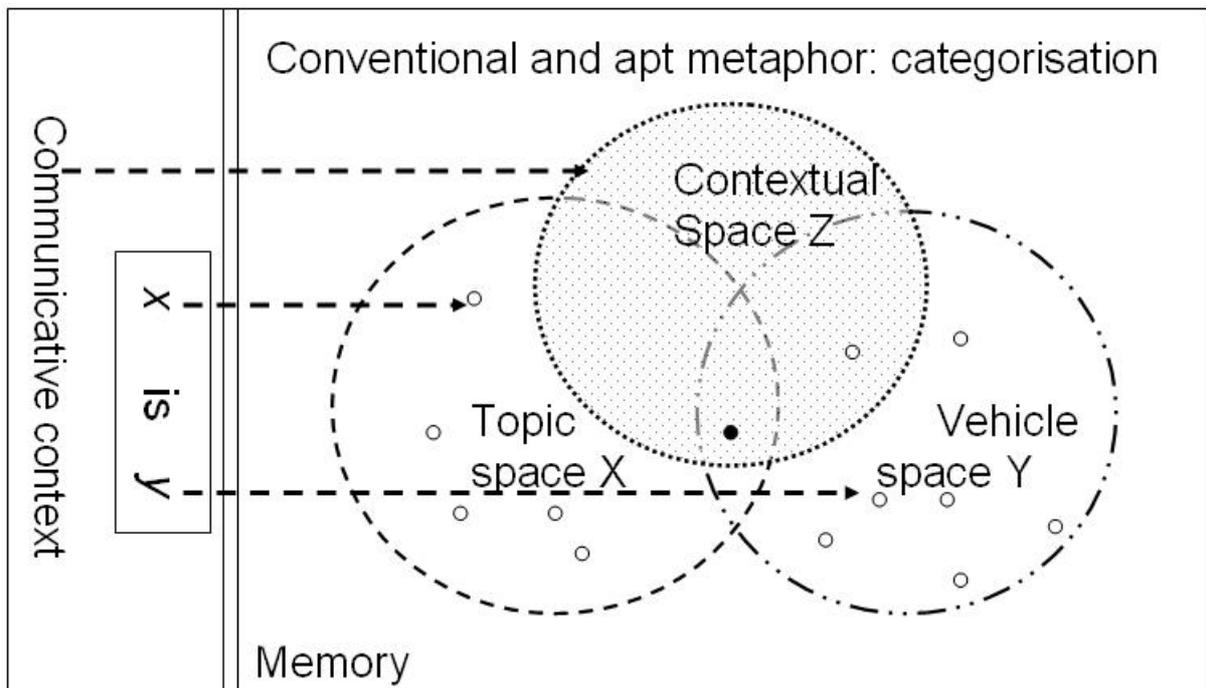
**Figure 48: Direct reference in processing dead metaphors.**

**x is y: metaphor; x: topic concept; y: vehicle concept; white dots: representations (activated concepts and features); black dot: contextual metaphoric assumption.**

As to dead metaphors, the figurative meaning or the metaphoric category of the vehicle concept already exists in people's conceptual system. Actually, this figurative meaning of the vehicle concept is so frequently used for communication that the original literal meaning of the vehicle concept is almost lost. In most cases, as illustrated in Figure 48, a single specific figurative meaning is activated by the vehicle concept. There are almost no other alternatives. Thus, this activated figurative meaning will be directly adopted to form the contextual metaphoric assumption.

Similar to dead metaphors, conventional and apt metaphors could activate in the vehicle space figurative meaning or the so-called metaphoric category which pre-exists in people's conceptual system. In contrast to dead metaphors, the original literal meanings of the vehicles of conventional and apt metaphors have not died out. Thus, other representations (other relevant concepts and properties) of the pre-existing metaphoric category or the figurative meaning are also activated in the vehicle space. The contextual space helps to direct the focus of attention (see the overlapped space in Figure 49) and highlight the metaphoric category. The conventional and apt metaphor can be understood through categorization, by aligning the topic concept with the metaphoric category represented by the vehicle

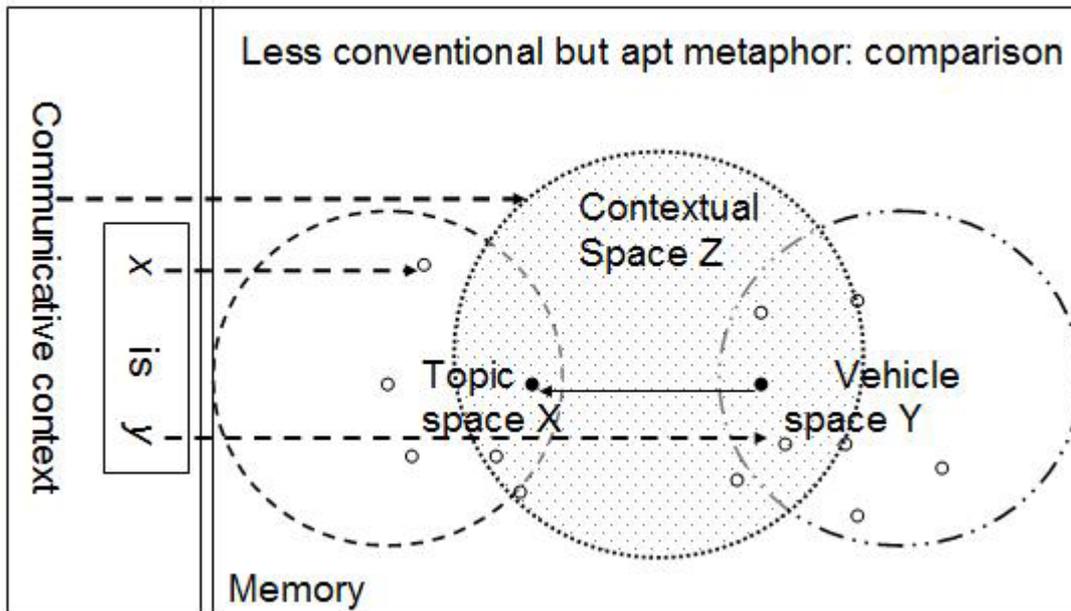
concept or, in other words, by associating the topic to the figurative meaning suggested by the vehicle concept.



**Figure 49: Categorization in processing conventional and apt metaphors.**

**x is y: metaphor; x: topic concept; y: vehicle concept; white dots: representations (activated concepts and features); black dot: contextual metaphoric assumption.**

There are metaphors which appear to people as less familiar but at the same time reasonable. They are less conventional but apt metaphors. They are estimated as less conventional because usually no preexistent figurative meaning or the so-called metaphoric category of the vehicle concept is available in people's conceptual system. Even if there is a metaphoric category hinted by the vehicle concept, the association of such a metaphoric category and the topic is an innovative one. In Figure 50, there is no direct overlapping area between the topic space X and the vehicle space Y. However, people's preexisting knowledge and the contextual knowledge involved in the contextual space can help to direct the focus of attention, so that a specific structure or specific features of the vehicle are highlighted as the figurative meaning, which will then be mapped onto that of the topic through comparison. This figurative meaning is again controlled in the contextual space to check whether the mapping is a plausible one. Only if it is, the processing procedure is arrested and the newly-attained metaphorical meaning is confirmed and stored in people's memory.

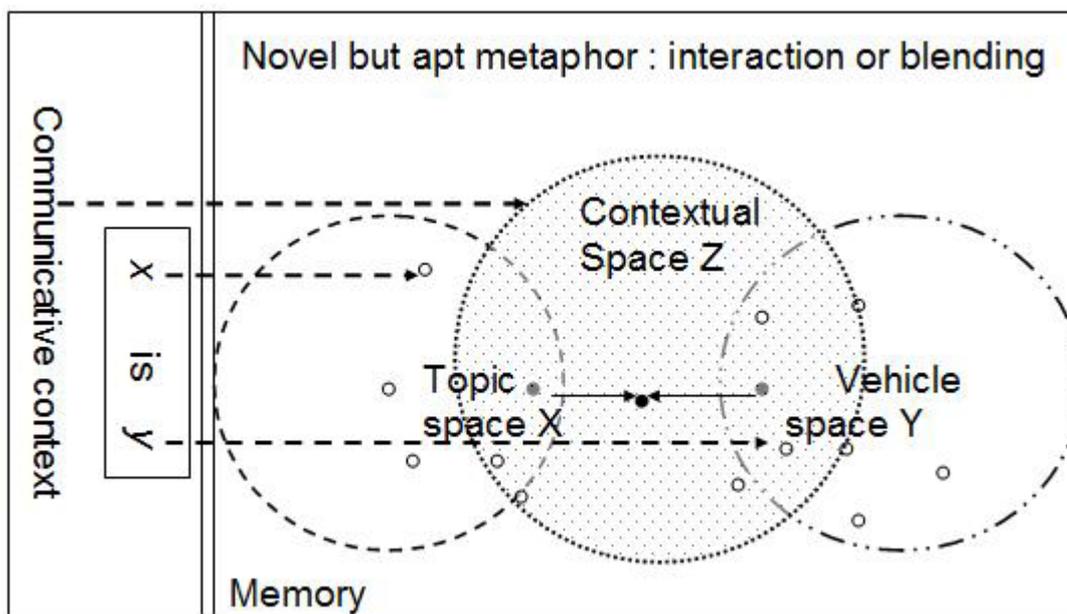


**Figure 50: Comparison in processing less conventional but apt metaphors.**

**x is y: metaphor; x: topic concept; y: vehicle concept; white dots: representations (activated concepts and features); black dots: crucial representations involved in generating contextual metaphoric assumption.**

Novel metaphors refer to the metaphors that are unfamiliar to people. However, most novel metaphors are still comprehensible and apt in a certain context, for instance, various innovative metaphors that people encounter in poetry. The classic example of a novel and apt metaphor is *The surgeon is a butcher* (e.g., Fauconnier and Turner, 2002). The difficulty of comprehending novel and apt metaphors is that there are no direct similarities or associations directly attainable between the representations of the topic and the vehicle; even if there are, they do not seem to be very helpful in deriving the meaning of the metaphor. In this case, an interaction or blending of both the topic space and the vehicle space is needed to achieve new meaning, which is otherwise unavailable in either the topic space or the vehicle space. As shown in Figure 51, the topic concept and the vehicle concept activate a number of representations that construct the topic space and the vehicle space. There is no direct similarity that can be observed between the topic space and the vehicle space as no overlapped area is available and no representations in the vehicle space can be directly associated to their counterparts in the topic space. In this case, the topic and the vehicle need to interact or blend with each other to form the conceptual metaphoric assumption or generate new meaning directed by the contextual space if there is a context. The new meaning is again tested to ensure that this interpretation really suits the metaphor in that context. If not, more

information will be retrieved and matched from the topic and the vehicle space until a plausible meaning is attained.



**Figure 51: Interaction or blending in processing novel and apt metaphors.**

**x is y: metaphor; x: topic concept; y: vehicle concept; white dots: representations (activated concepts and features); black dot: contextual metaphoric assumption.**

Of course, some novel metaphors may appear completely inapt. They are named as bizarre metaphors. No matter how much cognitive effort is invested, there is no trace of the possibility that the vehicle can be in any way associated with the topic, even if some contextual information is available. Usually, this is because that the metaphor addressee is deprived of some crucial socio-cultural knowledge concerning the topic or the vehicle. To comprehend the novel and inapt metaphors, the relevant background information needs to be imported in the sufficient context, so as to enable the activation of new representations in the vehicle or topic space. Only in this way, the metaphor addressee is able to initiate plausible generation of new meaning, which can echo or match the addresser's communicative intention.

There are two different kinds of novel and inapt metaphors. In the first case, the figurative meaning of the vehicle concept is easy to access once the background information is given. The metaphor is then comprehended through mapping the figurative meaning of the vehicle onto the topic. For instance, if westerners hear someone say, "Don't try to brandish an axe at Ban's gate", they may feel completely lost, since they know nothing about Lu Ban. Once they are informed that Lu Ban was the greatest master of carpentry in Chinese legend and an axe is the basic tool for a

carpenter, they will have no difficulty to master its intended meaning, “to show off before an expert”. In this sense, a new representation is activated in the vehicle space with the hints of the background information and this representation is directly projected onto the topic. In the second case, metaphors are not directly comprehensible, because the activation of some elements in the topic (sometimes also the vehicle) is disabled due to the failed background information. Take the metaphor *Argument is a dance* (see Lakoff and Johnson, 1980) as an example. In this metaphor, the participants of an argument are seen as dancers who perform in a balanced and an aesthetically pleasing way. This metaphor will be a novel and inapt metaphor to someone who merely perceives the aggressive side of an argument, namely attack, defence, demolishing, winning and losing. Thus, they have to change their conceptualization of the topic concept “argument” and import new elements in the topic space, so as to fully understand and appreciate this metaphor.

So far, cognitive comprehension processes of dead, conventional and apt, less conventional and apt, novel and apt, and bizarre metaphors have been illustrated. It is clear that the more unconventional the metaphor is, the more complicated the cognitive processes involved and the more important it is to rely on contextual knowledge in order to comprehend the metaphor. Since very conventional and apt metaphors only require retrieving the figurative meaning or the metaphoric category from the memory, they need not necessarily require more time or cognitive effort to comprehend than literal language does. In contrast, comprehending less conventional and less apt metaphors involves more complicated cognitive processing mechanism, so as to establish the association between the topic and the vehicle. Thus, such metaphors require more time and cognitive effort in their comprehension. This is helpful to resolve the debate of the cognitive effort in comprehending metaphors and literal language as discussed in the section 3.2.1. Metaphors do not necessarily take more time and cognitive effort to comprehend than literal utterances. In fact, conventional and apt metaphors may be comprehended as easily and quickly as the literal utterances. However, unconventional and inapt metaphors do take more cognitive effort and may take more time to comprehend than literal utterances do.

### **5.3 Analysis of the Teacher Metaphors with the Dynamic view**

In this section, the dynamic view is applied to analyse how the Chinese and the German subjects manage to understand teacher metaphors as suggested by the results of the empirical study. As a simplification, the following analyses do not cover

the comprehension of the three teacher metaphors by both Chinese and the Germans under all conditions, but focus only on how the Chinese and the German subjects finally manage to comprehend each of the three teacher metaphors under the condition of the role play with positive development.

### ***The teacher is a candle***

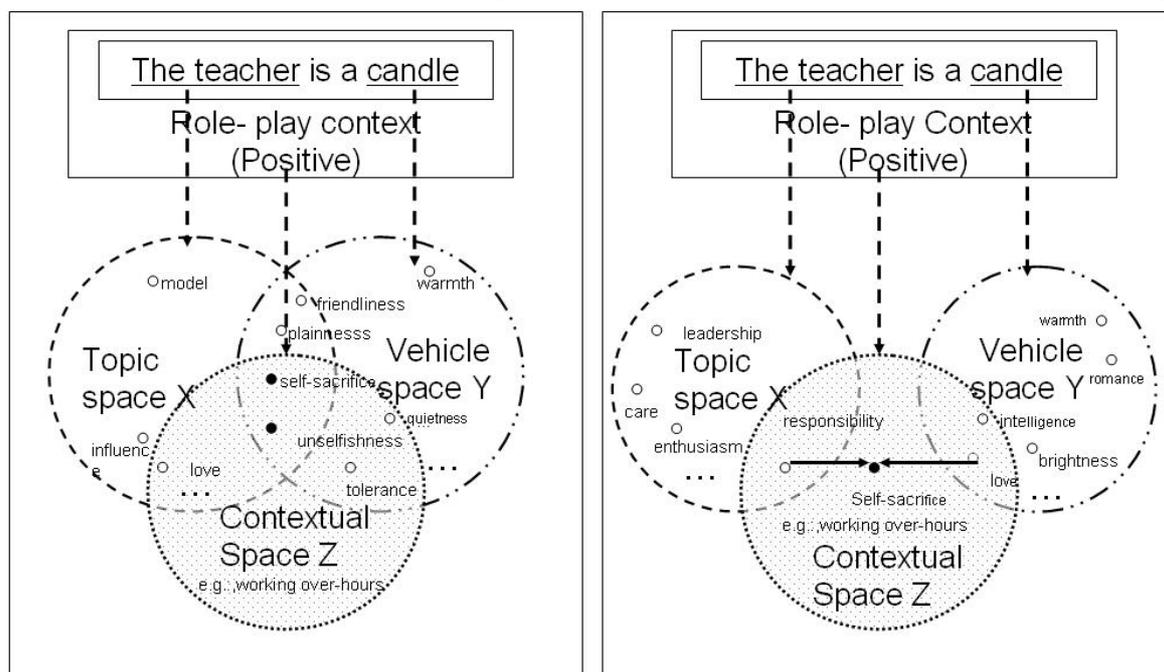
The metaphor *The teacher is a candle* was estimated by the Chinese subjects as a conventional and apt metaphor but by the German subjects as a novel and inapt metaphor. Under the condition of no context, the Chinese subjects shared significantly greater consensus in their SAM ratings and feature assessment among each other than the German subjects did, which shows that there exists a reliable and common interpretation of the metaphor *The teacher is a candle* by the Chinese but not by the Germans. However, the German subjects seemed to grasp the meaning of the metaphor to a degree when a positive communicative context is involved (this refers to the role-play context).

The vehicle concept *candle* embodies the representation of *self-sacrifice* (benefiting others by burning out oneself) in the conceptual system of the Chinese but not that of the Germans. Thus, the Chinese can easily perceive the meaning of the metaphor by mapping this pre-existing representation activated in the vehicle space onto the topic space. This pre-existing representation involves a metaphoric category, namely someone who is unselfish and ready to sacrifice himself or herself for others' benefits. This metaphoric category is highlighted in the topic space, which is at the same time composed of other features, such as *model, influence, friendliness, love, plainness*, and etc. Meanwhile, the assumption of the meaning is well confirmed by the unselfish and devoting image activated in the contextual space that the Chinese subjects draw from their own experiences by "living out" the teacher metaphor in playing the role of a class teacher who is willing to work extra hours for his or her pupils.

In contrast, the vehicle concept *candle* does not include a fixed figurative meaning by the German subjects. In the vehicle space, a number of features were activated, such as *love, brightness, warmth, intelligence*, and etc. In the topic space, a number of features were activated, such as *responsibility, leadership, enthusiasm, and care*. It seems that no similarity between the topic space and the vehicle space is directly attainable. However, the German subjects may notice from the scenario that the

teacher works extra hours for the class and is enthusiastic about passing all their knowledge to the students. This may help the German subjects to form the contextual metaphoric assumption that a teacher must be very loving, responsible, and unselfish. In this way, the meaning *self-sacrifice* could be deduced by integrating all those features activated in the ad hoc overlapped area, the focus of attention. Comparatively, the German subjects required more cognitive effort, involved more complicated cognitive processing mechanisms and depended more on the context for comprehending this teacher metaphor than the Chinese subjects did.

Chinese: a conventional & apt metaphor    German: an unconventional & inapt metaphor



**Figure 52: Comprehension of the metaphor *The teacher is a candle* by the Chinese and the German subjects.**

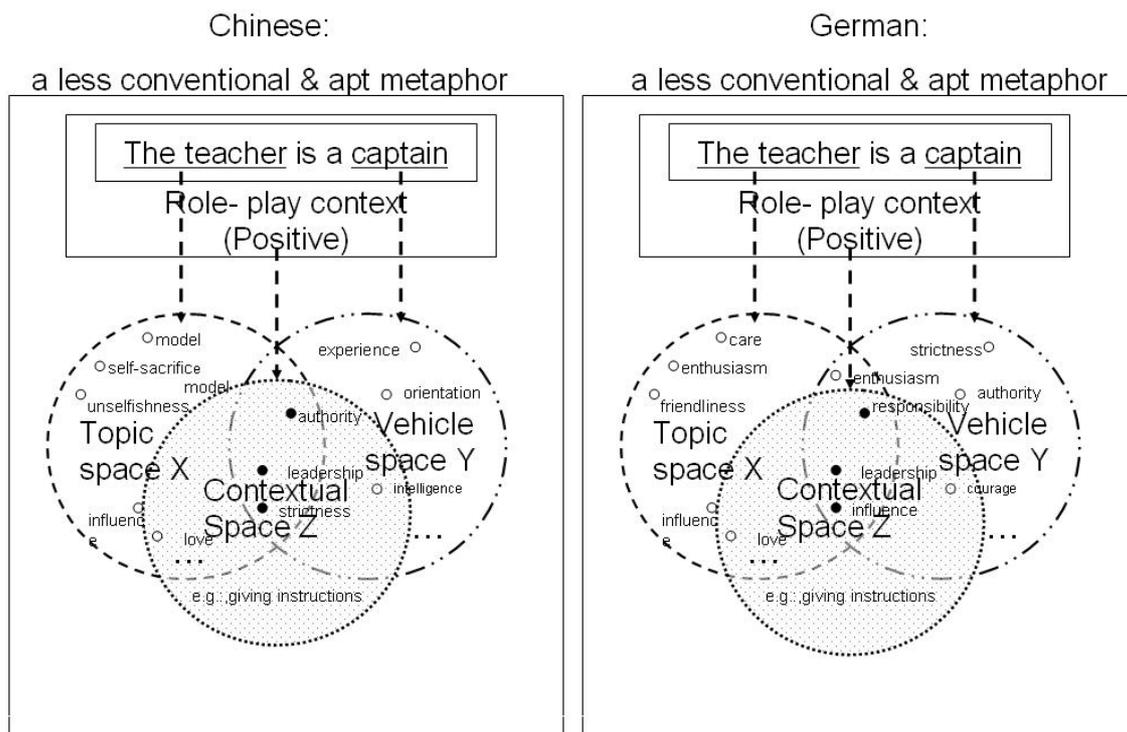
### ***The teacher is a captain***

The metaphor *The teacher is a captain* was estimated by both the German and the Chinese subjects as a less conventional and apt metaphor. In the empirical studies, the SAM ratings and feature assessment show that both the German and the Chinese subjects reached consensus<sup>56</sup> to a degree under all conditions when they were provided with the teacher metaphor *The teacher is a captain*. This indicates that the Chinese subjects had a relatively common understanding of this teacher

<sup>56</sup> Although there is significant within-group consensus among the German subjects as well as the Chinese subjects in their SAM ratings and the feature assessment by the teacher metaphor *The teacher is a captain*, this within-group consensus is obviously less than that achieved by the Chinese subjects when they were provided with the metaphor *The teacher is a candle* or that achieved by the German when they were provided with the metaphor *The teacher is a shepherd*.

metaphor and the German subjects also. However, the empirical results also show that the Chinese understanding of the metaphor *The teacher is a captain* is somewhat different from that of the German understanding of the metaphor.

When the metaphor *The teacher is a captain* was provided to the Chinese subjects, a number of features were activated in the topic space, such as *model, influence, friendliness, self-sacrifice, unselfishness, love, warmth, leadership, strictness, authority*, etc. and features like *authority, strictness, leadership, experience, orientation, authority*, and *intelligence* are activated in the vehicle space. (see the left side of Figure 53) When the topic space is compared to the vehicle space, it is not difficult to perceive that the topic space and the vehicle space share three features, like *authority, strictness* and *leadership*. In accordance, a similar assumption is also generated in the contextual space: pupils should always follow the instruction of the teacher. In this case, the meaning achieved was well supported and confirmed by the contextual space. Thus, the Chinese interpreted the teacher metaphor as someone who possesses high authority as a strict leader.



**Figure 53: Comprehension of the metaphor *The teacher is a captain* by the Chinese and the German subjects.**

The right side of Figure 53 shows how German subjects comprehended the metaphor *The teacher is a captain*. In the topic space, a number of features are activated, such as *friendliness, enthusiasm, care, love, leadership, influence* and *responsibility* and in the vehicle space, features like *strictness, authority, leadership,*

*influence, responsibility, courage and enthusiasm*. Common features between the topic space and the vehicle space are *leadership, influence, and responsibility*. This certainly fits the role of the class teacher who defined the goal of the class and took authoritative decision as the context suggests. In this sense, the German subjects understood this teacher metaphor as someone who is an influential and responsible leader.

All in all, the German and the Chinese subjects had slightly different emphasis on the metaphor *The teacher is a captain*, although both the German and the Chinese regarded the *captain-teacher* as a leader. The Chinese subjects shared a similar idea that a *captain-teacher* must be a leader who is strict and very authoritative, whereas the German subjects seemed to agree with each other that a *captain-teacher* must be a leader who is responsible and influential.

### ***The teacher is a shepherd***

The metaphor *The teacher is a shepherd* was estimated by the German subjects as conventional and apt metaphor but by the Chinese subjects as less conventional and less apt metaphor. As suggested by the empirical studies, the German subjects had greater consensus at the SAM ratings and feature assessments than the Chinese subjects did when no context was provided. This indicates that the German subjects shared more intra-group common understanding of the metaphor *The teacher is a shepherd* than that did the Chinese subjects. However, the inter-group differences between the Chinese and the Germans were reduced when the metaphor was provided in a role-play context. This indicates that the context assisted the Chinese subjects or gave them more hints in deriving the meaning of the metaphor *The teacher is a shepherd*.

In Christianity, Jesus Christ is regarded as a shepherd who loves all His lambs, takes care of them and shows them the way to the meadow and water. Therefore, the German subjects who were nurtured in a culture with a tradition of Christianity, can easily associate the vehicle concept *shepherd* with a pre-existing metaphoric category or figurative meaning as “someone who is loving, caring and alert” in the conceptual system of the German subjects. This figurative meaning is congruent with the assumptions aroused in the contextual space because the class teacher in the role play was very cautious about what happened to his students and took efforts to avoid the outside negative influences on his pupils. In the overlapping area, the

German subjects share a number of common features, such as *care*, *love*, *responsibility* and *watchfulness*, in the topic space and the vehicle space in understanding the *teacher-shepherd* metaphor.

Deprived of the influence of the Christianity, the Chinese subjects, unlike the German subjects, perceived *shepherd* as more *romantic*, *plain*, and *light-hearted* than someone who is loving, caring and alert under the condition of no context.

In the left side of Figure 54, the topic *teacher* generates in the topic space a number of features, like *model*, *love*, *self-sacrifice*, *unselfishness*, *friendliness*, *responsibility* and *watchfulness*, whereas the vehicle *shepherd* activates in the vehicle space features, like *watchfulness*, *romance*, *patience*, *experience*, *light-heartedness*, and *quietness*. According to the role-play context with the positive development, the subjects might have the impression that the teacher not only cared about the pupils' study but cared also about their living status and wanted to prevent them from experiencing negative influence from the society. This contextual space helped to direct the focus of attention that crosses over the topic and the vehicle space. In the overlapping area or the focus of attention, not only is the common feature *watchfulness* shared by both the topic and the vehicle concept but also the new feature *care* results from blending the feature *love*, as contributed by the topic space, and the feature *watchfulness* as contributed by the vehicle space, under the guidance of the contextual space. Here, both the cognitive mechanisms of comparison and blending (composition, completion and elaboration) are involved in understanding the metaphor *The teacher is a shepherd* by the Chinese subjects.



metaphor was provided in the negative communicative role-play context, the participants who tried to orient their behaviours after the metaphor *The teacher is a candle* encountered continuous dissatisfaction and depressive class reports. Their depressive experience led them to distrust that the metaphoric meaning of the vehicle, which they already know can be projected directly onto the topic in comprehending that metaphor. That was why the Chinese subjects showed less consensus in the SAM ratings and the feature ratings in their assessment of the metaphor *The teacher is a candle* under the condition of negative development than they did under the condition of the role-play context with the positive development or under the condition of no context.

## Chapter 6: Conclusions and Outlook

This work explores experimentally how metaphors are understood in a virtual communicative context by subjects whose conceptual knowledge varies significantly from each other. Effort has been taken to measure the understanding of the metaphor at not only the conceptual level but also the affective level. Moreover, the cluster analysis and the network analysis have been applied to analyzing subjects' feature ratings of the metaphors. More impact is added to this work through the visualization of abundant bipartite graphs and dendrograms drawn from subjects' feature ratings of the metaphors under various conditions.

The empirical findings of the current research project neither defend any of the cognitive metaphor theories, including comparison (see e.g., Gentner and Gentner 1983), categorization (see e.g., Glucksberg and Keysar 1993), interaction (see e.g., Tourangeau and Sternberg 1982), or blending theory (see e.g., Fauconnier and Turner 1998, 2002), to be the ultimate optimal theories for explaining metaphor comprehension nor reject any of them as irrelevant or groundless. On the contrary, the research data show that most of them are referential to the comprehending process of certain metaphors, depending on the pre-existing conceptual knowledge system of the metaphor addressee. In this research, the conventionality and the aptness serve as two good indicators for demonstrating how the metaphors appear to the metaphor addressees according to their pre-existing conceptual knowledge. The more conventional and apt a metaphor was estimated by the subjects, the more likely that the features associated with the figurative meaning of the vehicle were estimated highly by the subjects in their feature ratings of the metaphor. On the contrary, the more unconventional and inapt that a metaphor appears to the subjects, the more likely for new features to emerge in understanding that metaphor. For the emergence of the new features, the interaction theory and blending theory can provide a good explanation.

The empirical results also suggest that context plays a definite role in metaphor comprehension. In the role play with positive development, subjects were more likely to accept the guiding metaphor provided and a consensus was much easier to achieve among them. In the role play with negative development, there was more incongruence among the subjects in understanding the metaphors.

In all, the online empirical studies on metaphor comprehension have verified the main hypothesis: The cognitive processing mechanism involved in comprehending a

metaphor depends, on one hand, on the pre-existing conceptual knowledge of the addressees as reflected by the aptness and the conventionality that they assign to the metaphor and, on the other hand, on the context, in which the metaphor appears. The more unconventional or inapt a metaphor appears, the more complicated the cognitive mechanism that is involved in comprehending the metaphor. With sufficient information provided in a certain context, even the unconventional and inapt metaphor can be comprehended and accepted well. Once the meaning from a less conventional and less apt metaphor is attained, it will be stored in long-term memory and ready for direct retrieval and activation the next time it is encountered. Conversely, a conventional and apt metaphor can be rendered as a less conventional or less apt metaphor in certain contexts, for instance, when metaphors are used for ironic purposes. All in all, the metaphor comprehension is a dynamic process, in which the comprehension of different kinds of metaphor involves different cognitive mechanisms.

Inspired by the empirical results, a dynamic view of metaphor comprehension is constructed through a creative integration of Cowan's working memory theory (2005), Wilson and Sperber's relevance theory (2004), and various metaphor mapping theories. The major idea of the dynamic view of comprehension is summarized as: Depending on the conceptual knowledge pre-existing in addressees' long-term memory and the knowledge activated by the communicative context in which a metaphor is provided, the comprehension of the metaphor involves testing contextual metaphoric assumptions that are formulated through the ad-hoc interplay of the topic space, the vehicle space, and the contextual space, generated in people's working memory.

According to the dynamic view, the formulation and testing of a plausible contextual metaphoric assumption is central to the comprehension of metaphors. The contextual metaphoric assumption is derived from the interplay of the topic space, the vehicle space and the contextual space. In deriving a plausible contextual metaphoric assumption, concepts and properties related to the topic and the vehicle in people's long-term memory are activated to formulate topic space and vehicle space in people's working memory. The contextual space is also generated to include all the contextual knowledge as perceived from the context. Not all the representations included in the topic space and the vehicle space are processed actively. In fact, only the information elements that are also compatible with the

contextual space will receive the most complete processing. The less conventional and the less apt a metaphor appears to the addressees, the more decisive is the role of the contextual space in establishing the association between the topic space and the vehicle space, and the more complicated the processing mechanisms involved in comprehending the metaphor. The derived contextual metaphoric assumption is tested and confirmed in the context to be accepted as the interpretation of that metaphor. Otherwise, new attempts based on the interplay of the three spaces are made to formulate more applicable contextual metaphoric assumption.

This dynamic view may provide new insight in theorizing metaphor comprehension from the cognitive perspective for three reasons: First, it synthesizes the current metaphor mapping theories in exploring metaphor comprehension, including the categorization theory, the comparison theories, and the interaction theory and the blending theory. Second, the dynamic view of metaphor comprehension fills the gap where few attempts had been made to apply the cognitive theoretical achievements in working memory to metaphor comprehension. Motivated by a number of neuropsychological studies, which confirm the association between people's working memory and their ability to process metaphors, this view innovatively uses Cowan's attentional working memory model to explain the dynamic processing of metaphor comprehension. Third, based on the relevance theory, it can clearly explain why the more conventional and apt a metaphor appears to its addressees, the less cognitive effort and less complicated cognitive mechanism is utilized in comprehending a metaphor. Moreover, it also points out that the conventionality and the aptness of a metaphor do not only depend on the metaphor addressee's pre-existed conceptual knowledge but also on the context in which the metaphor arises. Novel metaphors become conventionalized and conventional metaphors, in a certain contexts, may trigger the emergence of new meanings.

Admittedly, this empirical research of the metaphor comprehension also has its minor limitations. For instance, although the author is fully aware of the necessity to study metaphor comprehension in a real communicative context, a compromise had to be made to employ an online communicative role-play context for economical and experiment methodology reasons. Even so, the empirical research is an innovative one in the following four aspects: First, the experimenter has made the best use of two different cultural heritages to obtain correspondent experimental groups who are distinguished from each other in their conceptual knowledge system as suggested by

their different estimations of the conventionality and the aptness of the same metaphor; Second, the online role play employed in the empirical research helps to study metaphor comprehension in communicative context rather than isolated linguistic expressions. Third, the understanding of metaphors is studied not only through feature ratings at the semantic dimension but also through Self-Assessment Manikin on the affective dimensions, which is useful because one essential function or advantage of metaphor lies in its convenience and effectiveness in expressing affections. Last, the author applied the network analysis, a sociological researching method, to the cognitive exploration of the metaphor research and plotted multiple graphs to visualize the conceptual representation of metaphors, as suggested by the feature ratings under different conditions.

The results attained from the experiment can be taken as the empirical evidence to resolve the debate over the direct or indirect processing of the metaphor. The data show that different cognitive mechanisms are involved in understanding different metaphors. This rejects both the sequential view that metaphorical comprehension does not occur unless the literary interpretation fails (see e.g., Grice, 1975) and the direct view that metaphors can be comprehended as easily as the literal language (see e.g., Glucksberg, Gilda and Bookin, 1982). In fact, the results rather support Giora's idea (1997) that metaphor comprehension, in comparison to the literary understanding, may involve different processes (direct/ parallel/ sequential) depending on the type of metaphors uttered. Conventional and apt metaphors are as easy and as quick to understand as literal expressions are, whereas unconventional and less apt metaphors may demand more cognitive effort and involve more complicated cognitive mechanisms to process.

In conclusion, the experimental data show that metaphor comprehension is a complex dynamic process. Depending on the pre-existing knowledge of the metaphor addressee as nurtured in their socio-cultural experiences, representations from their long-term memory are activated to formulate ad hoc topic space, vehicle space and contextual space in their working memory. Based on the representations of the three spaces, a specific cognitive mechanism (direct reference, categorization, comparison, interaction or blending) is taken to formulate contextual metaphoric assumptions. The process of generating representation and establishing a plausible association between the topic and the vehicle only ends when the contextual metaphoric assumption is confirmed and accepted as the meaning of the metaphor.

The dynamic view presented in this work theoretically explains the empirical results from this online experiment of metaphor comprehension. The more I explore this topic, the more I am convinced that the dynamic view can provide plausible solutions to many problems concerning metaphor comprehension and it may lead to the formulation of a more applicable dynamic model. To consolidate and explore further applications of the dynamic view of proposed in this thesis, not only more cognitive psychological experimental researches but also more interdisciplinary collaboration among researchers from diversified fields needs to be made to test many of its assertions. Just as Veale (1995: 263,) points out,

As a subject of inquiry, metaphor comprehension is a nexus, which brings together the fields of linguistics, philosophy, artificial intelligence, and a cognitive science. A thorough treatment of the phenomenon will thus possess each of these flavours. (see Veale, 1995: 263)

First of all, to consolidate this dynamic view, the follow-up cognitive psychological verification research can be optimized in the following aspects :

As to the aspect of experiment material, it is better to involve more metaphors (in contrast to the three adopted in this research), more metaphorical formulations (rather than the simplification form of *X is Y*), and more metaphor types (along an ascending or descending order according to conventionality and aptness); In this research, only three metaphors were used for two reasons. One of the reasons is that it is not easy to find metaphors which are conventional and apt for one group of participants and at the same time unconventional and inapt to another. Moreover, for the feature analysis of the three metaphors, 33 features were selected from a pilot study. If more metaphors were involved, more features would have needed to be collected to use the same research method. This would make the analysis and presence of the data much more complicated. Especially when there are too many features, it would cause problems in the presence of the bipartite network graphs and dendrograms. In this case, a much simpler method shall first be found if more metaphors should be involved in the future research.

As to the aspect of subjects, experimental groups with different pre-existing conceptual knowledge system can be directly formed according to subjects' conventionality and aptness estimation of metaphors instead of making use of the distinction between various cultural groups in their estimation of conventionality and aptness. This could easily be done by having the participants rate the conventionality and aptness of metaphors first in the experiment.

As to the aspect of the context in which the metaphor appears, it is a big challenge to study metaphor comprehension in interactive communicative contexts. Virtual role plays or other forms of contexts, in which metaphors are provided need to be optimized in a way as similar as possible to the real communication context.

Second, the collaboration with neuropsychologists would be valuable to test the important assertions involved in the dynamic view of metaphor comprehension. After a review of all metaphor-related studies, it is hard not to notice that the studies of metaphor are no longer merely philosophical inspirations but research involving strict experimental design and technological back-ups. A number of neuropsychological studies (Beeman et al.1993; Brownell et al., 1990; Winner & Gardner, 1997) show that people's right-hemisphere makes a positive contribution to metaphor processing, which may be considered neuropsychological evidence that challenges the parallel processing model for figurative and literal language. Very recently, fMRI technology, ERPs neuro-images, and other techniques have been applied to do cognitive studies on metaphor comprehension (see e.g., Rapp, et al. 2004, 2007). It could be insightful to combine the neuropsychological research methods and the cognitive experimental designs in studying metaphor comprehension. For instance, neuropsychological research methods can be applied to test the following hypothesis from the dynamic view: The more unconventional and inapt a metaphor is, the greater cognitive effort is to be taken in comprehending the metaphor.

Third, this dynamic view of metaphor comprehension is in line with recent linguistic discoveries, for instance, Sollon's mediated discourse analysis (2001) and Cameron's discourse dynamic framework for metaphor (2006).<sup>57</sup> There are two possibilities for collaboration with those linguists: First, experimental research can be designed to test their views, especially Cameron's view of metaphor in the dynamic system of language, culture and thought. Since most empirical evidence of metaphor comprehension in their field relies largely on the corpus-based research and field interviews, the cognitive psychological experimental method may help them to base

---

<sup>57</sup> Cameron (2006) argued that all dimensions of metaphor are dynamic:

"Metaphor... has multiple interconnected dimensions: linguistic, cognitive, affective, physical and cultural...All dimensions of metaphor are dynamic, i.e. they unfold continuously in real time... Metaphor, in all its manifestations, can then be seen as a part of the continuously changing and interconnected systems of language, thinking, affect, physicality and culture."(Cameron, 2006, para. 1) Of course, with the interconnected complex dynamic systems of language, thinking, affect, physicality and culture as its framework, metaphor is a brilliant cut diamond, which has many attractive facets that manifest the best play of light: some metaphors are only used within a group to sustain intimacy for affective purpose. Some reflect the universal bodily experiences on our language and thinking and the other are culturally specific, so on and so forth.

their work on strong empirical evidence. Second, integrative work can be attempted to fuse the dynamic view of comprehension in this work into the discourse dynamic framework for metaphor. In this way, the comprehension of metaphors on the micro genetic timescale, the discourse event timescale and all those in-between can be approached by the dynamic view as proposed here, whereas the factors that involve the discussion of the metaphor on the socio-cultural level can be discussed in a more elaborate way as suggested by Cameron's discourse framework.

Last, effort can be taken to collaborate with computer scientists in order to work out an algorithm for the synthesis of various mapping mechanisms in exploring the dynamics of metaphor comprehension. As philosophers, linguists, and cognitive psychologists are enthusiastic about contemplating and researching the mechanisms underlying metaphor comprehension, artificial intelligence (AI) researchers devote themselves to emulating those mechanisms on computers. For instance, Max Black's interaction theory (1979) motivates both Way's dynamic type hierarchy model (1991) and Indurkya's interaction model (1991). Falkenhainer, Forbus and Gentner (1989) successfully developed the structure-mapping engine (SME) program to explore Gentner and Gentner's (1983) structure-mapping theory. Holyoak and Thagard (1989) proposed the Analog Mapping by Constraint Satisfaction (ACMS), which employs a connectionist network to determine the most valid inter-domain mappings of a metaphor in a robust and flexible manner. Metaphor interpretation, Denotation, and Acquisition system (MIDAS) is an approach that advocates the explicit representation of culturally-central core metaphors (Martin, 1990). In addition, Way (1991) took a hierarchically-based approach to establish her dynamic type hierarchy (DTH) model. Very influential are also Veale's Sapper model (1997) based on a network approach to metaphor and the interaction model<sup>58</sup>(Indurkya, 1991). The many AI achievements in studying metaphors show that computation provides another fundamental cognitive concern of metaphor comprehension. With its abundant vocabulary and tools, it is hoped that artificial intelligence will add more results to the dynamic views by constructing more extensive representations, graph algorithms, and so on. In other words, if the present dynamic view could be further developed into a dynamic model of metaphor comprehension, it would be very

---

<sup>58</sup> Indurkya's interaction model (Indurkya, 1991) is a insightful model, as he proposed a representational division between the SMD level (sensory motor data sets) and the CN level (conceptual network description). In his opinion, processing creative metaphors involves a change of high-level conceptual representation caused by a transition between these two levels of processing.)

interesting to collaborate with the computer scientists to work out its algorithm and emulate it on computers to analyse different types of metaphor.

All in all, it seems that many treasures and traps are still hidden along this long journey of studying metaphor and metaphor comprehension. It would be rewarding if metaphor theoreticians and practitioners from diverse disciplines could donate their own puzzle pieces and collaborate at exploring how people comprehend various kinds of metaphors in different contexts from a more integrative perspective.

## References

- Ahrens, K., et al. (2007). Functional MRI of conventional and anomalous metaphors in Mandarin Chinese. *Brain and Language*, 100, 163-171.
- Aisenmann, R. A. (1999). Structure-mapping and the simile-metaphor reference. *Metaphor and Symbol*, 14, 45-51.
- Aitchison, J. (1987). *Words in the Mind: An Introduction to the Mental Lexicon*. London: Blackwell.
- Almor, A., Arunachalam, S. and Strickland, B. (2007). When the creampuff beat the boxer: working memory, cost, and function in reading metaphoric reference. *Metaphor and Symbol*, 22(2), 169–193.
- Alverson, H. (1991). Metaphor and experience: looking over the notion of image schema. In J. Fernandez (Ed.), *Beyond Metaphor: The Theory of tropes in anthropology* (pp.94-119). Palo Alto:Stanford University Press.
- Alverson, H. (1994). *Semantics and Experience: Universal Metaphors of Time in English, Mandarin, Hindi, and Sesotho*. Baltimore: Johns Hopkins University Press.
- Amaral, P. (1999). *Do paradigma ao modelo: a relevância da metáfora para a compreensão do processo interpretativo*. unpublished M.A. thesis, Faculdade de Letras da Universidade de Coimbra.
- Anaki, D. et al. (1998). Cerebral hemisphere asymmetries in processing lexical metaphors. *Neuropsychologia* 36(7), 691-700.
- Atkinson, R. and Shiffrin, R. (1968). Human memory : A proposed system and its control processes. In K. W. Spence and J. T. Spence (Eds.), *The Psychology of Learning and Motivation: Advances in Research and Theory* (Vol. 2, pp. 89-195). New York: Academic Press.
- Aristotle (1973). *The Poetics*. In R. McKeon (Ed. and Trans). *Introduction to Aristotle*. (2nd ed.). Chicago:University of Chicago Press.
- Baddeley, A.(1986). *Working Memory*. Oxford Psychology Series 11. Oxford: Clarendon Press.
- Baddeley, A. (2000). The episodic buffer: A new component of working memory? *Trends in Cognitive Science*, 4, 417-423.
- Baddeley, A. and Hitch, G. (1974). Working memory. In G. Bower (Ed.), *The Psychology of Learning and Motivation*, (pp. 47-89). New York: Academic Press.
- Bargh, J. and Chartrand, T. (2001). The mind in the middle: A practical guide to priming and automaticity research. In H. Reis and C. Judd (Eds.), *Handbook of Research Methods in Social Psychology* (pp. 253-285). Cambridge: Cambridge University Press.
- Barnes, J. (1954). Class and committees in a Norwegian island parish. *Human Relations*, 7, 39-58.
- Bartlett, F. C. (1932). *Remembering - A Study in Experimental and Social Psychology*. Cambridge: Cambridge University Press.
- Batagelj, V., Mrvar, A. (1998). Pajek - A program for large network analysis. *Connections*, 21 (2), 47-57.
- Batagelj, V. and Mrvar, A. (2007). *Pajek Program for Analysis and Visualisation of Large Network – Reference Manual*. Retrieved June 30, 2007, from <http://vlado.fmf.uni-lj.si/pub/networks/pajek/doc/PajekMan.pdf>.
- Batinic, B. (2004). Online Research. In Mangold, R., Vorderer, P. and Bente, G. (Eds.), *Lehrbuch der Medienpsychologie* (pp. 251-270). Göttingen: Hogrefe.
- Beardsley, M. (1958). *Theories of Metaphor in Aesthetics*. New York: Harcourt.

- Becker, A. (1997). Emergent and common features influence metaphor interpretation. *Metaphor and Symbol*, 12(4), 243-259.
- Birnbaum, M. (2001). *Introduction to Behavioral Research on the Internet*. Upper Saddle River, NJ: Prentice Hall
- Black, M. (1962). *Models and Metaphors*. Ithaca, NY: Cornell University Press.
- Black, M.(1979). More about metaphor. In A. Ortony (Ed.) *Metaphor and Thought* (pp. 19-43). Cambridge: Cambridge University Press.
- Blank, G. D. (1988). Metaphors in the lexicon. *Metaphor and Symbolic Activity*, 3, 21-36.
- Blasko, D. and Connie, C. (1993). Effects of familiarity and aptness on metaphor processing. *Journal of Experimental Psychology, Learning, Memory and Cognition*, 19(2), 295-308.
- Borgatti, S., Everett, M. and Freeman, L. (2002). *Ucinet for Windows: Software for social network analysis*. Harvard, MA: Analytic Technologies.
- Bortfeld, H. and McGlone, M. (2001) The Continuum of metaphor processing. *Metaphor and Symbol*, 16(1/2), 75-86.
- Bottini, G., Corcoran, R., Sterzi, R., Paulesu, E., Schenone, P., Scarpa, P., et al. (1994). The role of the right hemisphere in the interpretation of figurative aspects of language: a positron emission tomography activation study. *Brain*, 117, 1241-1253.
- Bowdle, B. and Gentner, D. (1997). Informativity and asymmetry in comparisons. *Cognitive Psychology*, 34(3), 244-286.
- Bowdle, B. and Gentner, D. (1999). Metaphor comprehension: From comparison to categorization. In *Proceedings of the 21<sup>st</sup> Annual Conference of the Cognitive Science Society*. 90-95.
- Bowdle, B. and Gentner, D. (2005). The career of metaphor. *Psychological Review*, 112(1), 193- 216.
- Bradley, M., Greenwald, M. and Hamm, A.(1994). Affective Picture Processing In the Structure of Emotion: N. Birbaumer and A. Ohman (Eds.), *Psycho physiological, Cognitive, and Clinical Aspects*, Toronto : Hugute Huber.
- Broadbent, D. (1958). *Perception and Communication*. London: Pergamon Press.
- Brownell, Hiram H. et. al. (1990). Appreciation of metaphoric alternative word meanings by left and right brain-damaged patients. *Neuropsychologia*, 28, 375-383.
- Burgess, C. and Chiarello, C. (1996). Neurocognitive mechanisms underlying metaphor comprehension and other figurative language. *Metaphor and Symbol*, 11(1), 67-84.
- Cacciari, C. and Glucksberg, S. (1994). Understanding figurative language. In Gernsbacher (Ed.) *Handbook of Psycholinguistics* ( pp.447-477). San Diego, CA: Academic Press.
- Cameron, L. (2006). A discourse dynamics framework for metaphor. Retrieved December 10th, 2007, from Metaphor Analysis Project Web site: <http://creet.open.ac.uk/projects/metaphor-analysis/theories.cfm?paper=ddfm>.
- Cameron, L. and Deignan, A. (2006). The emergence of metaphor in discourse. *Applied Linguistics*, 27(4), 671-690.
- Cameron, L, and et al. (2008). Metaphor in the perception and communication of the risk of terrorism: A study across socio-cultural groups. The 7<sup>th</sup> International Conference on Researching and Applying Metaphor (RaAM 7). May 29-31, 2008. University of Extremadura. Cáceres, Spain. <Http://www.unex.es/eweb/raam7>.

- Carlson, T. (2001). Using metaphors to enhance reflectiveness among preservice teachers. *The Journal of Physical Education, Recreation and Dance*, 72 (1), 49-53.
- Carroll, J. and Mack, R. (1985). Metaphor, computing system, active learning. *International Journal of Man-machine Studies*, 22(1), 39-57.
- Chandler, D. (1994). The transmission model of communication. Retrieved January 15, 2008, from <http://www.aber.ac.uk/media/Documents/short/trans.html>. 2007-09-24.
- Chiappe, D. L. and Chiappe, P. (2007). The Role of working memory in metaphor production and comprehension. *Journal of Memory and Language*, 56(2), 172-188.
- Chiappe, D. and Kennedy, J. (1999). Aptness predicts preference for metaphors or similes, as well as recall bias. *Psychonomic Bulletin and Review*, 6, 668-676.
- Chiappe, D. and Kennedy, J. (2001). Literal bases for metaphor and similes. *Metaphor and Symbol*, 16(3/4), 249-276.
- Chiappe, D. L., Kennedy, J. M., and Chiappe, P. (2003). Aptness is more important than comprehensibility in preference for metaphors and similes. *Poetics*, 31, 51-68.
- Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.
- Clark, H., and Lucy, P. (1975). Understanding what is meant from what is said: A study in conversationally conveyed requests. *Journal of Verbal Learning and Verbal Behaviour*, 14, 56-72.
- Clement, C. A., and Gentner, D. (1991). Systematicity as a selection constraint in analogical mapping. *Cognitive Science*, 15, 89-132.
- Cohen, T. (1979). Metaphor and the cultivation of intimacy, In S. Sacks (Ed.) *On Metaphor* (pp.1-10). Chicago: University of Chicago Press.
- Collins, A. and Gentner, D. (1987). How people construct mental models In D. Holland and N. Quinn (Eds.), *Cultural Models in Language and Thought* (pp.243-265). England: Cambridge University Press.
- Coney, J. and Lange, A. (2006). Automatic and Attentional Processes in the comprehension of unfamiliar metaphors. *Current Psychology*. 25 (2), 94-119.
- Conway, R., Cowan, N. and Bunting, M. (2001). The cocktail party phenomenon revisited: The importance of working memory capacity. *Psychonomic Bulletin & Review*, 8, 331-335.
- Conway, A., Cowan, N., Bunting, M., Theriault, D. J. and Minkoff, S. R. B. (2002). A latent variable analysis of working memory capacity, short-term memory capacity, processing speed, and general fluid intelligence. *Intelligence*, 30, 163-183.
- Cooper, D. (1986). *Metaphor*. London: Blackwell.
- Coulson, S. (2007). A special role for the right hemisphere in metaphor comprehension? ERP evidence from hemifield presentation. *Brain Research*, 1146, 128-145.
- Coulson, S. and Matlock, T. (2001). Metaphor and the space structuring model. *Metaphor and Symbol*, 16(3), 295-316.
- Coulson, S. and Oakley, T. (2000). Blending basics. *Cognitive Linguistics*, 11, 175-96.
- Coulson, S. and Van Petten, C. (2002). Conceptual integration and metaphor: An event-related potential study. *Memory and Cognition*, 30 (6), 958-968.
- Cowan, N. (1988). Evolving conceptions of memory storage, selective attention, and their mutual constraints within the human information processing system. *Psychological Bulletin*, 104, 163-191.
- Cowan, N. (1995). *Attention and Memory: An Integrated Framework*. Oxford Psychology Series, No. 26. New York: Oxford University Press.

- Cowan, N. (2002). The magic number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavioral and Brain Sciences*, 24, 87-185.
- Cowan, N. (2005). Working-memory capacity limits in a theoretical context. In C. Izawa and N. Ohta (Eds.), *Human Learning and Memory: Advances in Theory and Application: The 4th Tsukuba International Conference on Memory* (pp.155–175). Mahwah, NJ: Erlbaum.
- Daneman, M. and Merikle, P. (1996). Working memory and language comprehension: A Meta- Analysis. *Psychonomic Bulletin and Review*, 3, 422-433.
- Davis, A., Gardner, B. and Gardner, M. R. (1941). *Deep South*. Chicago: Chicago University Press.
- Doreian, P, Batagelj, V. and Ferligoj, A. (2004). Generalized block modeling of two-mode network data. *Social networks*, 26, 29-53.
- Emanatian, M. (1995). Metaphor and the expression of emotion: The value of cross-cultural perspectives. *Metaphor and Symbolic Activity* 10 (3), 163-182.
- Engle, R. (2002). Working memory capacity as executive attention. *Current Directions In Psychological Science*, 11, 19 - 23.
- Estes, W. (1991). Cognitive architecture from the standing point of an experimental psychologist. *Annual Review of Psychology*, 42, 1-28.
- Evans, V. and Greens, M. (2006). *Cognitive Linguistics: An Introduction*. Edinburgh: Edinburgh University Press.
- Eviatar, Z. and Just, M. (2006). Brain correlates of discourse processing: An fMRI investigation of irony and conventional metaphor comprehension. *Neuropsychologia*, 44(12), 2348-2359.
- Fainsilber, L. and Ortony, A. (1987). Metaphor production in the description of emotional states. *Metaphor and Symbolic Activity*, 2, 239-250.
- Falkenhainer, B., Forbus, K. and Gentner, D. (1986). The structure-mapping engine. *Proceedings of the Meeting of the American Association for Artificial Intelligence*, 272-277.
- Falkenhainer, B., Forbus, K. and Gentner, D. (1989). The structure-mapping engine: Algorithm and examples. *Artificial Intelligence*, 41, 1-63.
- Fauconnier, G. (1997). *Mappings in Thought and Language*. New York: Cambridge University Press.
- Fauconnier, G. (1999). Methods and generalizations. In T. Janssen and G. Redeker (Eds.), *Scope and Foundations of Cognitive Linguistics* (pp.95-128). The Hague: Mouton De Gruyter. [Cognitive Linguistics Research Series]
- Fauconnier, G. (2005). Compression and emergent structure. In S. Huang (Ed.) *Language and Linguistics*, 6(4), 523-538.
- Fauconnier, G. and Turner, M. (1994). Conceptual Projection and Middle Spaces. Cognitive Science tech. rep. 9401, UCSD Department.
- Fauconnier, G. and Turner, M. (1998). Conceptual Integration Networks. *Cognitive Science*, 22(2), 133-187.
- Fauconnier, G. and Turner, M. (2000). Compression and global insight. *Cognitive Linguistics*, 11(3-4), 283-304.
- Fauconnier, G. and Turner, M. (2002). *The way we think: Conceptual blending and the mind's hidden complexities*. New York: Basic Books.
- Faust, M. and Mashal, N. (2007). The role of the right cerebral hemisphere in processing novel metaphoric expressions taken from poetry: A divided visual field study. *Neuropsychologia* 45(4), 860-870.
- Fiske, J. (1982). *Introduction to communication studies*. London: Routledge.

- Forbus, K., Ferguson, R. and Gentner, D. (1994). Incremental structure-mapping. *Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society*, 313-318.
- Forbus, K., Gentner, D. and Law, K. (1994). MAC/FAC: A model of similarity-based retrieval. *Cognitive Science*, 19(2), 141-205. (Abridged version to be reprinted in T. Polk and C. M. Seifert, (Eds.), *Cognitive Modelling*. Boston: MIT Press.
- Forceville, C. (1996). *Pictorial Metaphor in Advertising*. London: Routledge.
- Forceville, C. (2007). Multimodal metaphor in ten Dutch TV commercials. *The public Journal of Semiotics*, 1(1), 15-34.
- Freeman, L. (1977). A set of measures of centrality based on betweenness. *Sociometry*, 40(1), 35-40.
- Gagnon, L., et al. (2003). Processing of metaphoric and non-metaphoric alternative meanings of words after right- and left-hemispheric lesion. *Brain and Language* 87, 217-226.
- Garfield, E. (1986). The metaphor-science connection. *Essays of an Information Scientist*. 9 (42), 316-324.
- Gassner, G. (1999). Using metaphors for high-performance teaching and coaching. *The Journal of Physical Education, Recreation and Dance*, 70.30-35.
- Gavaert, C. (2001). Anger in old and Middle English: A 'hot' topic? *Belgian Essays on Language and Literature*, 89-101.
- Geeraerts, D. and Grondelaers, S. (1995). Looking back at anger: Cultural traditions and metaphorical patterns; in Taylor JR, MacLaury RE (Eds.), *Language and the Cognitive Construal of the World* (pp 153-179). Berlin: de Gruyter.
- Gentner, D. (1982). Are scientific analogies metaphors? In D. S. Miall (Ed.), *Metaphor: Problems and perspectives* (pp.106-132). Brighton, England: Harvester Press Ltd.
- Gentner, D. (1988). Metaphor as structure mapping: The relational shift. *Child Development*, 59, 47-59.
- Gentner, D. (2003). Analogical reasoning, psychology of. In *Encyclopaedia of Cognitive Science* (Vol 1, pp. 106-112). London: Nature Publishing Group.
- Gentner, D. and Boronat, C. (1992). Metaphor as mappings. Paper presented at International Workshop on Metaphor, Tel Aviv University, Israel.
- Gentner, D. and Bowdle, B. (2001). Convention, form, and figurative language processing. *Metaphor and Symbol*, 16(3and4), 223-247.
- Gentner, D. and Clement, C. (1988). Evidence for relational selectivity in the interpretation of analogy and metaphor. In G. H. Bower (Ed.), *The Psychology of Learning and Motivation: Advances in Research and Theory* (Vol. 22, pp. 307-358). New York: Academic Press.
- Gentner, D. and Gentner, D. R. (1983). Flowing waters or teeming crowds: Mental models of electricity. In D. Gentner and A. L. Stevens (Eds.), *Mental Models* (pp. 99-129). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gentner, D. and Grudin, J. (1985). The evolution of mental metaphors in psychology: A 90-year retrospective. *American Psychologist*, 40, 181-192.
- Gentner, D. and Markman, A. B. (1997). Structure mapping in analogy and similarity. *American Psychologist*, 52, 45-56.
- Gentner, D. Bowdle, B., Wolff, P. and Boronat, C. (2001). Metaphor is like analogy. In D. Gentner, K. J. Holyoak, and B. N. Kokinov (Eds.), *The Analogical Mind: Perspectives from Cognitive Science* (pp.199-253). Cambridge, MA: MIT Press.
- Gentner, D., Falkenhainer, B. and Skorstad, J. (1987). Metaphor: The good, the bad and the ugly. *Proceedings of the Third Conference on Theoretical Issues in Natural Language Processing*, 155-159.

- Gentner, D., Falkenhainer, B. and Skorstad, J. (1988). Viewing metaphor as analogy. In D. H. Helman (Ed.), *Analogical Reasoning: Perspectives of Artificial Intelligence, Cognitive Science and Philosophy* (pp. 171-177). Dordrecht, The Netherlands: Kluwer.
- Gentner, D. and Stevens, A. (1983). *Mental Model*. Hillsdale, NJ: Erlbaum.
- Gerrig R. and Gibbs, R. (1988). Beyond the lexicon: Creativity in language production. *Metaphor and Symbolic Activity*, 3, 1-19.
- Gerrig R. and Healy, A. (1983). Dual processes in metaphor understanding: Comprehension and appreciation. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 9(4), 667-675.
- Gevaert, C. (2005). The ANGER IS HEAT question: Detecting cultural influence on the conceptualization of anger through diachronic corpus analysis. In Delbecque, N. J. and Geeraerts, D. (Eds.), *Perspectives on Variation: Sociolinguistic, Historical, Comparative* (pp.195-208). Berlin and New York: Mouton de Gruyter.
- Gibbs, H. and Wales, R.(1990). Metaphor or simile: Psychological determinants of the differential use of each sentence form. *Metaphor and Symbolic Activity*, 5, 199-213.
- Gibbs, R. (1980). Spilling the beans on understanding and memory for idioms in conversation. *Memory and Cognition*, 8, 449-456.
- Gibbs, R. (1986). Skating on thin ice: literal meaning and understanding idioms in conversation. *Discourse Processes*, 9, 17-30.
- Gibbs, R. (1990). Psycholinguistics studies on the conceptual basis of idiomaticity. *Cognitive Linguistics*, 1-4, 417-462.
- Gibbs, R. (1992a) What do idioms really mean? *Journal of Memory and Language*, 31: 485-506.
- Gibbs, R. (1992b). When Is Metaphor? The Idea of Understanding in Theories of Metaphor. *Poetics Today*, 13(4): 575-606.
- Gibbs, R. (1992c). Categorization and metaphor comprehension. *Psychological Review*, 99(3), 572-577.
- Gibbs, R. (1993). Why idioms are not dead metaphors. In Cacciari, C. and Tabossi, P. (Eds.), *Idioms: Processing, Structure, and Interpretation* (pp. 57-77). Hillsdale, NJ: Erlbaum.
- Gibbs, R. (1994). *The Poetics of Mind*. Cambridge: Cambridge University Press.
- Gibbs, R. (2000). Making good psychology out of blending theory. *Cognitive linguistics* 11, 347-358.
- Gibbs, R. (2001). Evaluating contemporary models of figurative language understanding. *Metaphor and Symbol* 16 (3and4): 317-333.
- Gibbs, R. (2003). Prototypes in dynamic meaning construal. Gavins, J. and Steen, G. (Eds.) *Cognitive Poetics in Practice* (pp. 27-40). London: Routledge.
- Gibbs, R. (2006). *Embodiment and cognitive science*, Cambridge: Cambridge University Press.
- Gibbs, R., Bogdanovich, J. Sykes and J. Barr, D.(1997). Metaphor in idiom comprehension. *Journal of Memory and Language*, 37, 141-154.
- Gibbs, R. and Gerrig, R. (1989). How context makes metaphor comprehension seem "special". *Metaphor and Symbolic Activity*, 4, 147-158.
- Gibbs, R. and Nagaoka, N. (1985). Getting the hang of American slang: Studies on understanding and remembering slang metaphors. *Language and Speech*, 28, 177-194.
- Gibbs, R. and Najak, N. (1991). Why idioms Mean what they do. *Journal of Experimental Psychology*, 120, 93-95.

- Gibbs, R. and Nascimento, S. (1996). How we talk when we talk about love: Metaphorical concepts and understanding love poetry. In R. Kreuz and M. Macnearly (Eds.), *Empirical and Aesthetic Approaches to Literature* (pp. 291-307). Norwood, NJ: Ablex.
- Gibbs, R. and O'Brian J. (1990). Idioms and mental imagery: The metaphorical motivation for idiomatic meaning. *Cognition*, 36, 35-38.
- Gigerenzer, G. and Goldstein, D. (1996). Mind as a computer: birth of a metaphor. *Creativity Research Journal*, 9, 131-145.
- Gildea, P. and Glucksberg, S. (1983). On understanding metaphor: The role of context. *Journal of Verbal learning and Verbal behaviour*, 22, 57-590.
- Ginest, Indurkha and Scart (2000). Emergence of features in Metaphor comprehension. *Metaphor and Symbol*, 15(3). 117-135.
- Giora, R. (1997). Understanding figurative and literal language: The graded salience hypothesis. *Cognitive Linguistics* 7(1), 183-206.
- Giora, R. and O. Fein (1999) On understanding familiar and less-familiar language *Journal of Pragmatics* 31, 1601-1618.
- Glucksberg, S. (1998). Understanding metaphors. *Current Directions in Psychological Science* 7, 39-43.
- Glucksberg, S. and Keysar, B. (1990). Understanding metaphoric comparisons: Beyond similarity. *Psychological Review*, 97, 3-18.
- Glucksberg S. and Keysar B. (1993) How metaphors work. In A. Ortony (Ed.): *Metaphor and Thought* (pp. 401-424). (2nd ed.). Cambridge University Press, Cambridge.
- Glucksberg, S. Gildea, P. and Bookin, H.B.(1982). On Understanding Nonliteral Speech: Can People Ignore Metaphors? *Journal of Verbal Learning and Verbal Behavior*, 21, 85-98.
- Glucksberg, S., McGlone, M. and Manfredi, D. (1997). Property attribution in metaphor comprehension. *Journal of Memory and Language*, 36, 50-67.
- Goatly, A.(1997). *The Language of Metaphors*. London: Routledge.
- Goschler, J. (2005). Embodiment and body metaphors. In: *Metaphorik.de*, 9. <http://www.metaphorik.de/09/goschler.htm>
- Grady, J. (1997). *Foundations of Meaning: Primary Metaphors and Primary Scenes*, Unpublished doctoral dissertation, the University of California, Berkeley, California.
- Grady, J. (2000). Cognitive mechanisms of conceptual integration. *Cognitive linguistics* 11, 335-345.
- Grady, J., Oakley, T. and Coulson, S. (1999). Conceptual blending and metaphor. In R. Gibbs (Ed.) *Metaphor in Cognitive Linguistics*. Amsterdam and Philadelphia: John Benjamins.
- Gregory, M. and Mergler, N. (1990). Metaphor comprehension: In search of literal truth, possible sense, and metaphoricity. *Metaphor and Symbolic Activity*, 5(3), 151-173.
- Grice, H. (1975). Logic and conversation. In Cole, P., and Morgan, J.(Eds.), *Syntax and Semantics : Speech Acts* (pp. 41-58). New York: Academic Press.
- Grice, H. (1989). *Studies in the Way of Words*. Cambridge MA: Harvard university press.
- Hall, E. (1973). *The Silent Language*. NY: A Doubleday Anchor Book.
- Hall, E. (1982). *The Hidden Dimension*. NY: An Anchor Book, A Division of Bantam Dell Doubleday Publishing.
- Hambrick, D. and Engle, R. (2001). Effects of domain knowledge, working memory capacity, and age on cognitive performance: An investigation of the knowledge-is-power hypothesis. *Cognitive Psychology*, 44, 339-387.

- Hao, Y. and Veale, T. (2006). A fluid category structure for metaphor processing. at the ECAT 2006 workshop on computational creativity. Trento. Italy.
- Heine, B., Claudi, U. and Hünnenmeyer, F. (1991). *Grammaticalization: A conceptual Framework*. Chicago: University of Chicago Press.
- Heineken, E., Ollesch, H., and Schulte, F. (2003). Experimentalpsychologische Ausbildung im virtuellen Labor: Das Laboratorium für Online-Research (Lab.OR). [Experimental psychological education in the virtual lab: The Laboratory for Online Research (Lab.OR).] In G. Krampen and H. Zayer (Ed.), *Psychologiedidaktik und Evaluation IV*. Bonn: Deutscher Psychologen Verlag.
- Heineken, E., Schulte, F. and Ollesch, H. (2002). A virtual laboratory as an economic solution for teaching experimental methodology. *Plat 2002 - Psychology Learning and Teaching Conference*. University of York, 2002.
- Hinzman, D. L. (1990). Human Learning and memory: Connections and dissociations. *Annual Review of Psychology*, 41, 109-139.
- Hoffman, R. R. (1980). Metaphor in science. In R. P. Honeck and R. R. Hoffman (Eds.), *Cognition and Figurative Language* (pp. 393-423). Hillsdale, NJ: Erlbaum.
- Holland, D. and Quinn, N. (1987). *Cultural models in language and thought*. Cambridge: Cambridge University Press.
- Holland, D. and Valsiner, J. (1988). Cognition, symbols and Vygotsky's developmental psychology. *Ethos* 16 (3), 247-272.
- Holland, J. , et al. (1993). *Induction. Process of Inference, Learning and Discovering*. Cambridge, Mass: The MIT Press.
- Holyoak, K. and Thagard, P. (1989). Analogical mapping by constraint satisfaction. *Cognitive Science*, 13, 295-355.
- Horton, W. (2004, August). Metaphor and the Attribution of Intimacy. Poster presented at the 14<sup>th</sup> annual conference for the Society for Text and Discourse Chicago, IL.
- Huber, A. (2005). Metaphorik und Handeln. Metaphorisches Priming am Beispiel der Vorgesetzten- Mitarbeiter-Kommunikation-eine experimentelle Untersuchung in virtuellem Setting. doctoral disseration. Universität Duisburg-Essen, Germany. Retrieved October 21, 2006 from <http://www.ub.uni-duisburg.de/ETD-db/theses/available/duett-12272005-224239/unrestricted/index.html>
- Huber, A. and Heineken, E. (2006): Leitbilder und Handeln- eine experimentelle Untersuchung zum metaphorischen Priming der Vorgesetzten- Mitarbeiter-Kommunikation. In: Crijns, R. and Thalheim, J.(Hrsg.): *Kooperation und Effizienz in der Unternehmens-kommunikation* (pp. 277-290) .Wiesbaden.
- Indurkha, B. (1991). Modes of metaphor. *Metaphor and Symbolic Activity*, 6(1), 1-27.
- Indurkha, B. (1992). *Metaphor and Cognition*. Boston: Kluwer Academic Companies.
- Inhoff, A., Lima, S. and Carroll, P. (1984). Contextual effects on metaphor comprehension. *Memory and Cognition*, 12, 558-567.
- James, W. (1890). *The Principle of Psychology*. New York: Henry Holt.
- Janus, R. and Bever, T. (1985). Processing metaphoric language: An investigation of the three stage model of metaphor comprehension. *Journal of Psycholinguistic Research*, 14, 473-487.
- Johnson, M. (1987). *The body in the mind: The bodily basis of meaning, imagination, and reason*. Chicago: University of Chicago Press.
- Jones, L., and Estes, Z. (2005). Metaphor comprehension as attributive categorization. *Journal of Memory and Language*, 53, 110-12.

- Jones, L. and Estes, Z. (2006). Roosters, robins, and alarm clocks: Aptness and conventionality in metaphor comprehension. *Journal of Memory and Language*, 55, 18-32.
- Kacinik, N. and Chiarello, C. (2007). Understanding metaphors: Is the right hemisphere uniquely involved? *Brain and Language*, 100(2): 188-207.
- Kane, M., Bleckley, M., Conway, A. and Engle, R. (2001). A controlled-attention view of working-memory capacity. *Journal of Experimental Psychology: General*, 130, 169–183.
- Kane, M., Hambrick, D., Tuholski, S., Wilhelm, O., Payne, T. and Engle, R. W. (2004). The generality of working-memory capacity: A latent-variable approach to verbal and visuo-spatial memory span and reasoning. *Journal of Experimental Psychology: General*, 133, 189–217.
- Kemper, S. (1989). Priming the comprehension of metaphors. *Metaphor and Symbolic Activity* 4(1), 1-17.
- Kennedy, K. and Chiappe, D. L. (1999). What makes a metaphor stronger than a simile? *Metaphor and Symbol* 14 (1), 63-69.
- Keysar, B. (1989). On the functional equivalence of literal and metaphorical interpretations. *Journal of Memory and Language*, 28, 375-385.
- Keysar, B. and Glucksberg, S. (1992). Metaphor and communication. *Poetics Today*, 13 (4), 633-658.
- Kimmel, M. (2002). *Metaphor, Imagery, and Culture, Spatialized Ontology, Mental Tools and Multimedia in the making*. Unpublished doctoral dissertation, Department of Philosophy, University of Vienna, Vienna.
- Kimmel, M. (2004). Metaphor variation in cultural context: Perspectives from anthropology. *European Journal of English Studies*, 8(3), 275-294.
- Kintsch, W. (1988). The use of knowledge in discourse processing: A construction-integration model. *Psychological Review*, 95, 163-182.
- Kintsch, W. (1998). *Comprehension: A Paradigm for Cognition*. New York: Cambridge University Press.
- Kintsch, W. (2000). Metaphor comprehension: A computational theory. *Psychonomic Bulletin and Review*, 7(2), 257-266.
- Kircher, T., et al. (2007). Neural correlates of metaphor processing in schizophrenia. *NeuroImage* 34, 281-289.
- Kövesces, Z.(1999). Metaphor. Does it constitute or reflect cultural models? In R. Gibbs and G. Steen (Eds.), *Metaphor in Cognitive Linguistics* (pp. 167-188). Philadelphia and Amsterdam: John Benjamins.
- Kövesces, Z. (2000). *Metaphor and Emotion. Language, Culture, Body in Human Feeling*. Cambridge: Cambridge University Press.
- Kövesces, Z. (2002). *Metaphor : A practical Introduction*. Oxford: Oxford University Press.
- Kövesces, Z. (2005). *Metaphor in Culture: Universality and Variation*. Cambridge: Cambridge University Press.
- Kövesces; Z. (2006). Embodiment, experiential focus, and diachronic change in metaphor. In McConchie, R.W. et al (Eds.) *Selected Proceedings of the 2005 Symposium on New Approach in English Historical Lexis (HEL-LEX)*, (pp.1-7). Somerville, MA: Cascadilla Proceedings Project.
- Kreuz, R. and Graesser, A. (1991). Aspects of idiom Interpretation: Comment on Najak und Gibbs. *Journal of Experimental Psychology: General*, 120, 90-92.
- Krippendorff, K. (1993). Major metaphors of communication and some constructivist reflections on their use. *Cybernetics and Human Knowing*, 2(1),3-25.

- Kuhn, T. (1979). Metaphor in science. In A. Ortony (Ed.), *Metaphor and Thought* (pp. 409-419). Cambridge, England: Cambridge University Press.
- Lakoff, G. (1987a) *Women, Fire and Dangerous Things: What Categories Reveal about the Mind*. Chicago: University of Chicago Press.
- Lakoff, G. (1987b). Position paper on metaphor [Electronic version]. *Theoretical Issues in Natural Language Processing*, 191-197. <http://www.aclweb.org/anthology-new/T/T87/T87-1039.pdf>
- Lakoff, G. (1990) The Invariance Hypothesis: Is Abstract Reason Based on Image Schemas?, *Cognitive Linguistics*, 1, 9-74.
- Lakoff, G. (1993). The contemporary theory of metaphor. In A. Ortony (Ed.) *Metaphor and Thought* (pp. 202-251). Cambridge: Cambridge University Press 2<sup>nd</sup> Edition.
- Lakoff, G. and Johnson, M. (1980a). *Metaphors We Live By*. Chicago: University of Chicago press.
- Lakoff, G. and Johnson, M. (1980b). The metaphorical structure of the human conceptual system. *Cognitive Science* 4, 195-208.
- Lakoff, G. and Johnson, M. (1999). *Philosophy in the flesh. The embodied mind and its challenge to western thought*. New York: Basic Books.
- Lakoff, G. and Johnson, M. (2003). *Metaphors We Live By* (2<sup>nd</sup> Ed.). Chicago: University of Chicago Press.
- Lakoff, G. and Kövesce, Z. (1987). The cognitive model of anger inherent in American English, In D. Holland and N. Quinn (Eds.): *Cultural Models in Language and Thought* (pp. 195-221). Cambridge: Cambridge University Press.
- Lakoff, G. and Turner, M. (1989). *More than Cool Reason: A Field Guide to Poetic Metaphor*. Chicago: University of Chicago Press.
- Landauer, T. and Dumais, S. (1997). A solution to Plato's problem: The latent semantic analysis theory of the acquisition, induction, and representation of knowledge. *Psychological Review*, 104, 211-240.
- Landauer, T., Foltz, P. and Laham, D. (1998). An Introduction to latent semantic analysis. *Discourse Processes*, 25, 259-284.
- Lang, P. (1985). *The Cognitive Psychophysiology of Emotion: Anxiety and the Anxiety Disorders*. Hillsdale, NJ: Lawrence Erlbaum.
- Lawley, J. and Tompkins, P. (2000). *Metaphors in Mind: Transformation through Symbolic Modelling*. London, England: The Developing Company Press.
- Lee S. and Dapretto, M. (2006). Metaphorical vs. literal word meanings: fMRI evidence against a selective role of the right hemisphere, *NeuroImage* 29(2), 536-544.
- Lemaire, B. and Bianco, M. (2003). Contextual Effects on Metaphor Comprehension: Experiment and Simulation. In Detje, F, Dörner, D. and Schaub, H. (Eds.) *Proceedings 5th International Conference on Cognitive Modelling (ICCM)* (pp. 153-158). Bamberg, Germany: Universitätsverlag Bamberg.
- Levinson, S. (1983). *Pragmatics*, Cambridge University Press.
- Liebert, W. (1992). *Metaphernbereiche der deutschen Alltagssprache. Kognitive Linguistik und die Perspektiven einer kognitiven Lexikographie*. Frankfurt: Lang.
- Lu, D. (2002). *Processing of Conceptual Metaphors in Mandarin Chinese: A Conceptual-Mapping Model Based Study*. Unpublished master's thesis. Graduate Institute of Linguistics, National Taiwan University, Taiwan.
- MacCormac, E. (1985). *A Cognitive Theory of Metaphor*, unpublished master's thesis, Cambridge University, Cambridge.
- Martin, J. (1990). *A Computational Model of Metaphor Interpretation*. San Diego, CA: Academic Press Professional.

- Martin, J. (1994). A Corpus-based analysis of context effects on metaphor comprehension. *Technical report, University of Colorado*. CU-CS- 738-794.
- McGlone, M. and Manfredi, D. (2001). Topic-vehicle interaction in metaphor comprehension. *Memory and Cognition*, 29(8), 1209-1219.
- Miall, D. (1979). Metaphor as a thought- process. *The Journal of Aesthetics and Art Criticisms*, 38 (1): 21-28.
- Miller, G. (1956). The magic number seven, plus or minus two: some limits on our capacity for processing information. *Psychological Review*, 63, 81-97.
- Miller, G. (1979). Images and models, similes and metaphors. In Ortony, A. (Ed.) *Metaphor and Thought* (pp. 202-250). Cambridge: Cambridge University Press.
- Mio, J. (1996). Metaphor, politics and persuasion. In J.S. Mio and A. A. Katz (Eds.) *Metaphor: Implications and Applications*, Mahwah, NJ: Erlbaum.
- Mio, J. (1997): Metaphor and politics. *Metaphor and Symbolic Activity*, 12(2), 113-133.
- Mio, J., Riggio, R., Levin, S. and Reese, R. (2005). Presidential leadership and charisma: The effects of metaphor. *The Leadership Quarterly* 16(2), 287-294.
- Monetta, L and Pell, M.(2007). Effects of verbal working memory deficits on metaphor comprehension in patients with Parkinson's disease. *Brain and Language*, 101 (1), 80-89.
- Morgan, G. (1986). *Image of organization*. Thousand oaks: Sage.
- Morris, Jon D. and Bradley, M. (1994). Assessing affective reactions to emotion terms and television advertisements with (SAM) the Self-Assessment Manikin. Working Paper. University of Florida, College of Journalism and Communication.
- Müller, R. (2005). Creative Metaphors in Political Discourse, Theoretical considerations on the basis of Swiss Speeches. *metaphorik.de*. 9. Retrieved October 1, 2007 from <http://www.metaphorik.de/09/mueller.pdf>.
- Murphy, G. (1996). On metaphorical representation. *Cognition*, 60, 173-204.
- Murphy, G. (1997). Reasons to doubt the present evidence for metaphoric representation. *Cognition*, 62, 99-108.
- Nayak, N. and Gibbs, R. (1990). Conceptual knowledge in the interpretation of idioms. *Journal of Experimental Psychology: General*, 119, 315-330.
- Neisser, U. (1976). *Cognition and Reality*. San Francisco: Freeman.
- Neumann, C. (2001). Is metaphor universal? Cross-language evidence from German and Japanese. *Metaphor and Symbol*. 16(1/2): 123-142.
- Nietzsche, F. (1911). On Truth and Falsity in their ultramoral sense, translated by Maximillian A: Mugge, In Levy, O (ed.) *The Complete Works of Friedrich Neitzsche*, Vol. 16. London: T. N.Foulis.
- Nooy, W., Mrvar, A. and V. Batagelj (2005). *Exploratory Social Network Analysis with Pajek*. Cambridge: Cambridge University Press.
- Noveck, I., Bianco, M., and Castry, A. (2001). The costs and benefits of metaphor. *Metaphor and Symbol*, 16 (1and2), 109-121.
- Oberauer, K., Süß, H., Schulze, R., Wilhelm, O. and Wittmann, W. (2000). Working memory capacity – Facets of a cognitive ability construct. *Personality and Individual Differences*, 29, 1017-1045.
- Ollesch, H., Heineken, E., and Schulte, F. (2003). Das Labor im Rucksack – mobile computing in der psychologischen Grundlagenausbildung. [The lab in the backpack – mobile computing in the psychological basic education.] In M. Kerres and B. Voß (Eds.), *Digitaler Campus. Vom Medienprojekt zum nachhaltigen Medieneinsatz in der Hochschule*. Münster: Waxmann.
- Ollesch, H., Schulte, F. and Heineken, E. (2004). Experimentalpsychologische Grundlagenausbildung in einem hybriden Lernarrangement – das virtuelle Lab.OR

- als Cognitive Tool. [Experimental psychological education in a hybrid tutorial arrangement – the virtual Lab.OR as a cognitive tool.] In M. Kerres, M. Kalz, J. Stratmann, and C. de Witt (Eds.), *Didaktik der Notebook-Universität*. Münster: Waxmann.
- Ollesch, H., Schulte, F. and Heineken, E. (2006). Experimentalpsychologische Ausbildung im virtuellen Labor: Online-, WLAN- und Laborexperimente im Vergleich. In G. Krampen and H. Zayer (Eds.). *Didaktik und Evaluation in der Psychologie* (pp. 231-244). Göttingen: Hogrefe.
- Ortony, A. (1975). Why metaphors are necessary and not just nice. *Educational Theory*. 25, 45-53.
- Ortony, A. (1979a). Beyond literal similarity. *Psychological Review*, 86, 161-180.
- Ortony, A. (1979b). The role of similarity in similes and metaphors. In Ortony, A. (ed.) *Metaphor and Thought* (pp. 342-356). New York, Cambridge University Press.
- Ortony, A., Schallert, D., Reynolds, R. and Antos, S. (1978). Interpreting metaphors and idioms: Some effects of context on comprehension. *Journal of Verbal Learning and Verbal Behaviour*, 17, 465-477.
- Ortony, A., Vondruska, R. J., Foss, M.A., and Jones, I. E. (1985). Salience, similes, and the asymmetry of similarity. *Journal of Memory and Language*. 24, 569-594.
- Ots, T. (1994). The silenced Body- The Expressive Leib: On the dialectic of mind and life in Chinese cathartic healing, In Th, Csordas (Ed.), *Embodiments and Experience: The Existential Ground of Culture and Self* (pp.116-136). Cambridge: Cambridge University Press.
- Pudelko, B., Hamilton, E., Legros, D. and Tijus, C. (1999). How context contribute to metaphor understanding. *Lecture Notes in Computer Science. Proceedings of the Second International and Interdisciplinary Conference on Modeling and Using Context*, Vol. 1688. 511-514.
- Pynte, J., Bessen, M., Robinchon, F. and Antos, S. (1996). The time-course of metaphor comprehension: An event related potential study. *Brain and Language*, 55, 293-316.
- Quinn, N (1991). The culture basis of metaphor. In: J. Fernandez(Ed.) *Beyond Metaphor: The Theory of Tropes in Anthropology* (pp. 56-93). CA: Standard University Press.
- Rapp, A. et al. (2004). Neural correlates of metaphor processing. *Cognitive Brain Research*, 20, 395– 402.
- Rapp, A. et al. (2007). Laterality in metaphor processing: Lack of evidence from functional magnetic resonance imaging for the right hemisphere theory. *Brain and Language*, 100, 142-149.
- Reddy, M. (1979). The conduit metaphor r- A case of frame conflict in our language about language. In A. Ortony (Ed.) *Metaphor and Thought* (pp. 284-324). Cambridge: Cambridge University Press.
- Reips U. (2002). Standards for internet based experimenting. *Experimental Psychology*, 49 (4), 243-256.
- Reynolds, R. E. and Schwartz, R. M. (1983). Relation of metaphoric processing to comprehension and memory. *Journal of Educational Psychology*, 75(3), 450-459.
- Richard, I. (1936). *The Philosophy of Rhetoric*. New York: Oxford University Press.
- Ritchie, D. (2004a). Metaphors in conversational context: Toward a connectivity theory of metaphor interpretation. *Metaphor and Symbol*, 19(4), 265-287.
- Ritchie, D. (2004b). Lost in “conceptual spaces”: Metaphors of conceptual Integration. *Metaphor and Symbol*. 19(1), 31-50.

- Roediger, H.L. (1980). Memory metaphors in cognitive psychology. *Memory and Cognition*, 8, 231-246.
- Rohrer, T. (2001a). The Cognitive Science of Metaphor from Philosophy to Neuroscience. *Theoria et Historia Scientiarum*, 6(1), 27-42.
- Rohrer, T. (2001b). Understanding through the Body: fMRI and of ERP studies of metaphoric and literal language. Paper presented at the 7<sup>th</sup> International Cognitive Linguistics Association Conference, University of California at Santa Barbara, CA July 2001. Retrieved October 21, 2007, from <http://zakros.ucsd.edu/~trohrer/rohrelic2001atucsb.pdf>
- Rugg, M. and Coles, M. (1995). *Electrophysiology of Mind: Event-related Brain Potentials and Cognition*. Oxford: Oxford University Press.
- Rumelhart, D. (1979). Some problems with the notion of literal meanings, In Ortony, A.(Ed.), *Metaphor and Thought* (pp. 78–90). Cambridge: Cambridge University Press.
- Rumelhart, D., Smolensky, P., McClelland, J. and Hinton, G. (1986). Schemata and Sequential Thought Processes in PDP Models. In D. E. Rumelhart and J. L. McClelland (Eds.), *Parallel Distributed Processing: Explorations in the Microstructure of Cognition* (Vol. 2) (pp. 7-57). Cambridge, MA: MIT Press.
- Rupert, R. (2006). Embodiment and Cognitive Science, reviewed by Robert D. Rupert. Retrieved August 18, 2007. from <http://ndpr.nd.edu/review.cfm?id=7443>
- Russell, J., and Mehrabian, A. (1977). Evidence for a three-factor theory of emotions. *Journal of Research in Personality*, 11, 273-294.
- Schunn, C. and Dunbar, K. (1996). Priming, analogy, and awareness in complex reasoning. *Memory and Cognition*, 24, 271-284.
- Searle, J. (1979). Metaphor, in A. Ortony (Ed.) *Metaphor and Thought* (pp.92-123). Cambridge: Cambridge University Press.
- Shen, Y. (1989). Symmetric and Asymmetric Comparisons. *Poetics*, 18, 517-536.
- Shen, Y. (1992). Metaphors and categories. *Poetics Today*, 13, 771-794.
- Shinjo, M., and Myers, J. (1991). Interpreting and evaluating metaphors. *Journal of Memory and Language*, 30, 452-472.
- Smith, M.B. (1985). The metaphorical basis of selfhood. In G. DeVOS, A., Marsella, and F.K.L. Hsu (Eds.) *Culture and self. Asian and Western Perspective* (pp. 56-88). London: Tavistock.
- Sperber, D. and Wilson, D. (1986). *Relevance: Communication and Cognition*. Cambridge, MA: Harvard University Press.
- St. Claire (1998-9) Cultural wisdom, communication theory and the metaphor of the resonance. *Intercultural Communication Studies*, VIII(1), 79-102.
- Sternberg, R. (1977a). Component processes in analogical reasoning. *Psychological Review*, 84, 353-378.
- Sternberg, R. (1977b). *Intelligence, Information Processing, and Analogical Reasoning: The componential Analysis of Human Abilities*. Hillsdale, NJ, Lawrence Erlbaum Associates.
- Sternberg, R. (1995). *In Search of the Human Mind*. Fort Worth, TX: Harcourt.
- Sternberg, R. and Nigro, G. (1981). Interaction and Analogy in the Comprehension and Appreciation of metaphors. In NR 150-412 ONR Tech. Rep.t No. 26. New Haven, Department of Psychology, Yale University.
- Stewart, M. and Heredia, R. (2002). Comprehending spoken metaphoric reference: A real-time analysis. *Experimental Psychology* 49(1), 34-44.
- Stock, O. Slack, J. and Ortony, A. (1993). Building castles in the air. Some computational and theoretical issues in idiom comprehension. In C. Cacciari and

- P. Tabossi (Eds.), *Idioms: Processing, Structure, and Interpretation*. (pp. 229-247). Hillsdale, NJ: Erlbaum.
- Strauss, C. and Quinn, N. (1997). *A Cognitive Theory of Cultural Meaning*. Cambridge: Cambridge University Press.
- Su, I. (2002). What can metaphors tell us about culture. *Language and linguistics*, 3(3), 589-613.
- Tilley, C. (1999). *Metaphor and Material Culture*. Oxford: Blackwell .
- Tourangeau, R. and Sternberg, R.J. (1981) Aptness in metaphor. *Cognitive Psychology*, 13, 27-55.
- Tourangeau, R. and Sternberg, R.J. (1982) Understanding and appreciating metaphors. *Cognition*, 11, 203-244.
- Tryon, R.C. (1939). *Cluster Analysis*. Ann Arbor, MI: Edwards Brothers.
- Turner, M. and G. Fauconnier (1995). Conceptual integration and formal expression. *Journal of Metaphor and Symbolic Activity*, 10(3), 183–204.
- Turner, M. and G. Fauconnier. (2002). Metaphor, metonymy, and binding. In R. Dirven and R. Porings (Eds.), *Metaphor and Metonymy in Comparison and Contrast* (pp. 469-488). Berlin and New York: Mouton de Gruyter.
- Turner, M.(2006). Compression and representation. *Language and Literature*. 15:1, 17-27.
- Turner, N. E. and Katz, A. (1997). The availability of conventional and of literal meaning during the comprehension of proverbs. *Pragmatics and Cognition*, 5(2), 199.
- Tzung, O., Rumjahn, H. and Osgood,C.E. (1987). Cross-cultural componential analysis on affect attribution of emotion terms. *Journal of Psycholinguistic Research*, 16 (5), 443-465.
- Unsworth, N., Schrock, J. and Engle, R. (2004) Working memory capacity and the antisaccade task: Individual differences in voluntary saccade control. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 30, 1302-1321.
- Utsumi, A. (2003). An analysis of emergent features in metaphor comprehension: Toward a computational model of similarity-creating metaphor. *Joho Shori Gakkai Kennkyu Hokoku*, 6, 57-64.
- Utsumi, A.and Kuwabara, Y. (2005). Interpretive Diversity as a Source of Metaphor-Simile Distinction. *Proceedings of 27<sup>th</sup> Annual Meeting of the Cognitive Science Society (CogSci 2005)*,2230-2235.
- Utsumi, A. (2006). Computational exploration of metaphor comprehension processes, *Proceedings of the 28th Annual Meeting of the Cognitive Science Society (CogSci2006)*, 2281-2286.
- Van der Henst, J. and Sperber, D. (2004) Testing the cognitive and communicative principles of relevance. In Noveck, I. and Sperber, D. (Eds.), *Experimental Pragmatics*, Palgrave.
- Varela, F. J., Thompson, E. T. and Rosch, E. (1991). *The Embodied Mind*, Cambridge, MA: MIT Press.
- Veale, T. (1996). *Metaphor, Memory, Meaning: Symbolic and connectionist issues in metaphor interpretation*. Unpublished doctoral dissertation. School of computer applications, Dublin city university, Dublin, Ireland.
- Veale, T.(1997). Creativity as pastiche: A computational treatment of metaphoric blends, with special reference to cinematic ``borrowing". In *Proceedings of Mind 11:Computational Models of Creative Cognition*, Dublin, Ireland, September 1997. (available on-line at <http://www.compapp.dcu.ie/~tonyv/Pastiche/Pastiche.html>).
- Way, E. (1991). *Knowledge Representation and Metaphor*. Dordrecht: Kluwer Academic .

- Wee, L. (2006a). The cultural basis of metaphor revised. *Pragmatics and Cognition*, 14(1), 111-128.
- Wee, L. (2006b) Property names and the theory of metaphor. *Linguistics* 42, 355-371.
- Wilcox, H. (1995). *Saliency Imbalance and Metaphor*. Unpublished doctoral dissertation. University of Colorado at Boulder.
- Wilder, A. (1964). *The Language of the Gospel: Early Christian Rhetoric*. New York: Harper & Row.
- Wilson, D. and Carston, R. (2006). Metaphor, relevance and the 'emergent property' issue. *Mind and Language*, 21(3), 404-433.
- Wilson, D. and Sperber, D. (2004). Relevance Theory. In G. Ward and L. Horn (Eds.), *Handbook of Pragmatics* (pp. 607-632. ). Oxford: Blackwell.
- Winner, E. and Gardner, H. (1977). The comprehension of metaphor in brain-damaged patients. *Brain*, 100, 717-729.
- Wolff, P. and Gentner, D. (1992). The time course of metaphor comprehension. In: *Proceedings of the Fourteenth Annual conference of the Cognitive Science Society*. (pp. 504-509). Hillsdale, NJ: LEA.
- Yu, N. (1995). Metaphorical expression of anger and happiness in English and Chinese. *Metaphor and Symbolic Activity*, 10 (2):59-92.
- Yu, N. (1998). *The Contemporary Theory of Metaphor: A Perspective from Chinese*. Amsterdam/Philadelphia: John Benjamins.
- Yu, N. (2004). The eyes for sight and mind. *Journal of Pragmatics*, 36, 663-686.
- Zharikov, S. and Gentner, D. (2002). Why do metaphors seem deeper than similies?. *Proceeding of the 24th Annual Conference of the Cognitive Science Society*, 976-981.
- Zinken, J. (2003). Ideological imagination. Intertextual and correlational metaphors in political discourse. *Discourse and Society*, 14(4), 507-523.
- Zinken, J. (2004). Metaphors, stereotypes, and the linguistic picture of the world. *Metaphorik.de* 7, Retrieved February 12, 2008 from <http://www.metaphorik.de/07/zinken.pdf>.

## Appendices

### Appendix A: Pilot Study I

#### A1: Questionnaire for Selecting Teacher Metaphors (German Version)

Vielen Dank, dass Sie an unserer kleiner Untersuchung teilnehmen. Die Untersuchung gehört zur Pilotstudie einer online metaphorischen Forschung. Bitte tragen Sie in die folgenden Felder Ihre Daten ein und dann antworten Sie einige Fragen.

Geschlecht:

Alter:

Religion:

Fach:

Welche Leitbilder Ihrer Meinung nach sind die geeignete Leitbilder, um ein Lehrer zu beschreiben. Bitte listen möglich weise drei davon.

1. \_\_\_\_\_

In welchem Maße ist das Leitbild Ihnen bekannt?

ganz neuartig 1  2  3  4  5  sehr bekannt

In welchem Maße passt das Bild zu dem typischen Lehrer aus Ihrer Vorstellung?

passt überhaupt nicht 1  2  3  4  5  passt in vollem Maße

2. \_\_\_\_\_

In welchem Maße ist das Leitbild Ihnen bekannt?

ganz neuartig 1  2  3  4  5  sehr bekannt

In welchem Maße passt das Bild zu dem typischen Lehrer aus Ihrer Vorstellung?

passt überhaupt nicht 1  2  3  4  5  passt in vollem Maße

3. \_\_\_\_\_

In welchem Maße ist das Leitbild Ihnen bekannt?

ganz neuartig 1  2  3  4  5  sehr bekannt

In welchem Maße passt das Bild zu dem typischen Lehrer aus Ihrer Vorstellung?

passt überhaupt nicht 1  2  3  4  5  passt in vollem Maße

## A2: Questionnaire for Selecting Teacher Metaphors (Chinese Version)

非常感谢您能参加我们这个小小的调查。该调查的目的是为一个在线的隐喻研究做前期准备。请在空白处填写您的个人信息并回答以下问题：

性别：

年龄：

宗教信仰：

专业：

您认为什么形象可以用来形容教师？如果可能的话，请列举三项。

1. \_\_\_\_\_

这一教师形象对您而言有多熟悉？

非常新奇 1○ 2○ 3○ 4○ 5○ 非常熟悉

对您而言,用这一形象来描述教师有多合适？

一点也不合适 1○ 2○ 3○ 4○ 5○ 非常合适

2. \_\_\_\_\_

这一教师形象对您而言有多熟悉？

非常新奇 1○ 2○ 3○ 4○ 5○ 非常熟悉

对您而言,用这一形象来描述教师有多合适？

一点也不合适 1○ 2○ 3○ 4○ 5○ 非常合适

3. \_\_\_\_\_

这一教师形象对您而言有多熟悉？

非常新奇 1○ 2○ 3○ 4○ 5○ 非常熟悉

对您而言,用这一形象来描述教师有多合适？

一点也不合适 1○ 2○ 3○ 4○ 5○ 非常合适

## Appendix B: Pilot study II

### B1: Questionnaire for Selecting Features (German Version)

<Cover> Vielen Dank, dass Sie an unserer kleiner Untersuchung teilnehmen. Die Untersuchung gehört zur Pilotstudie einer online interkulturellen metaphorischen Forschung. Fünf bis zehn Minuten werden gebraucht, um den dreiseitigen Fragebogen auszufüllen. Bitte beginnen Sie mit der ersten Seite und enden mit der letzten Seite.

Geschlecht:

Alter:

Religion:

Fach:

<page 1> „Familie“ erinnert uns oft an die Eigenschaften, wie Sicherheit, Gemeinschaft, Vertrauen, Wohlfühl, Freude, Fürsorge, Geborgenheit, Chaos und so weiter. Solche Eigenschaften helfen uns, das Konzept „Familie“ zu beschreiben und zeigen, wie wir eine typische Familie in unserer Vorstellung wahrnehmen.

Stellen wir uns jetzt einen typischen Lehrer, einen typischen Kapitän, einen typischen Hirten und eine typische Kerze vor. Welche Eigenschaften oder Attribute werden wir dann benutzen, unsere Ansicht zu äußern?

- Zuerst was für ein Lehrer ist ein typischer Lehrer? Bitte listen Sie mindestens 5 Attribute aus, um einen typischen Lehrer zu beschreiben.
- Bitte nennen Sie fünf Attribute, um einen typischen Kapitän zu beschreiben.
- Bitte nennen Sie fünf Attribute, um einen typischen Hirten zu beschreiben.
- Bitte nennen Sie fünf Attribute, um eine typische Kerze zu beschreiben.

<page 2> Aber nicht jede „Familie“ ist so typisch. Zum Beispiel diese Familie ist ein Hafen, wo Sicherheit, Ruhe und Wohlfühl zugehören. Andere Familien gleichen eher einem Kampffeld, das „kalt, brutal und unruhig“ ist. Eben so gibt es unterschiedliche Lehrer.

- Stellen wir uns einen Lehrer vor. Er behauptet: „Der Lehrer ist ein Kapitän“. Er verhält sich in seiner Klasse wirklich wie ein Kapitän. Welche Eigenschaften werden genutzt, um einen kapitänischen Lehrer zu beschreiben? Versuchen Sie mindestens fünf solche Attribute zu nennen.
- Einige Lehrer folgen dem Modell „Der Lehrer ist ein Hirte“. Bitte listen Sie mindestens fünf Attribute auf, um einen solchen Lehrer zu beschreiben.
- Einige Lehrer glauben an den Satz „ein Lehrer ist eine Kerze“ und orientieren sich an dem Verhalten an dem Bild der Kerze. Bitte listen Sie mindestens fünf Attribute auf, um einen solchen Lehrer zu beschreiben.

<page 3> • In der Aussage „der Lehrer ist ein Kapitän“, wird „Kapitän“ genutzt, um „den Lehrer“ zu beschreiben. Bitte nennen Sie mindestens fünf Attribute von dem Kapitän, der durch diese Aussagen ganz spezifisch bestimmt wird.

• In der Aussage „der Lehrer ist ein Hirte“, wird „Hirte“ genutzt, um „den Lehrer“ zu beschreiben. Bitte nennen Sie mindestens fünf Attribute von dem Hirten, der durch dieser Aussagen ganz spezifisch bestimmt wird.

• In der Aussage „der Lehrer ist eine Kerze“, wird „Kerze“ genutzt, um „den Lehrer“ zu beschreiben. Bitte nennen Sie mindestens fünf Attribute von der Kerze, die durch diese Aussagen ganz spezifisch bestimmt wird.

## B2: Questionnaire for Selecting Features (Chinese Version)

<封面>非常感谢您愿意抽出您宝贵的时间参加我们这个小调查。该调查结果将会为一个网上跨文化隐喻研究项目提供必要的参考。完成整份问卷，需要大约 5-10 分钟。

整份问卷共三页纸。请依此从第一页做到最后一页，请中途不要跳页。

被试性别：

年龄：

宗教信仰：

专业：

<第一页>提起“家”，我们会很容易联想到关爱，温暖，安全，平凡，甜蜜，自由，琐碎等经常用来形容家的特征词。

这些特征词也大致勾勒出我们对“家”的基本看法。与此相似，如果让我们联想一位典型的老师，一位典型的船长，一位典型的牧羊人，一位典型的父亲，甚至于一段普通的蜡烛，我们又会用什么样的特征词来表达我们对这些事物的看法呢？

首先，怎样一位老师会被称为一位典型的老师呢？请列出所有可以用来描述一位典型老师的特征词（至少五个）。

请用至少五个特征词来形容一位典型的“船长”。

请用至少五个特征词来形容一位典型的“牧羊人”。

请用至少五个特征词来形容一段普通的“蜡烛”。

<第二页>但并非“家”家“如此。譬如，有的“家是港湾”，自然就“安全，平静，悠闲”。而有的“家是战场”，异常地“冷漠，无情，气氛紧张”。同样，世上也有不同风格的老师。

首先，让我们来想象这样一位老师。他认为“老师是船长”。而且他在他的班上的确表现得象一位船长。请问哪些特征词可以用来形容这样一位船长式的老师。请列出至少五个基本特征词。

还有的老师把自己全然当作一个“牧羊人”。请用至少五个基本特征词来形容这样一位牧羊人式的老师。

也有的老师坚信“老师是蜡烛”，并且在行为上这样要求自己。请用至少五个基本特征词来形容这样一位蜡烛式的老师。

<第三页>当我们说“老师是船长”的时候，船长被用来形容老师。在这种特殊的情况下，船长的涵义与一般情况下的船长涵义是否完全相同呢？

请用至少五个特征词来描述“老师是船长”中的船长。

当我们说“老师是牧羊人”的时候，牧羊人被用来形容老师。在这种特殊的情况下，牧羊人的涵义与一般情况下的牧羊人涵义是否完全相同呢？请用至少五个特征词来描述“老师是牧羊人”中的牧羊人。

当我们说“老师是蜡烛”的时候，蜡烛被用来形容老师。

在这种特殊的情况下，蜡烛的涵义与一般情况下的蜡烛涵义是否完全相同呢？请用至少五个特征词来描述“老师是蜡烛”中的蜡烛。

## Appendix C: The Screenshots of the Experiment

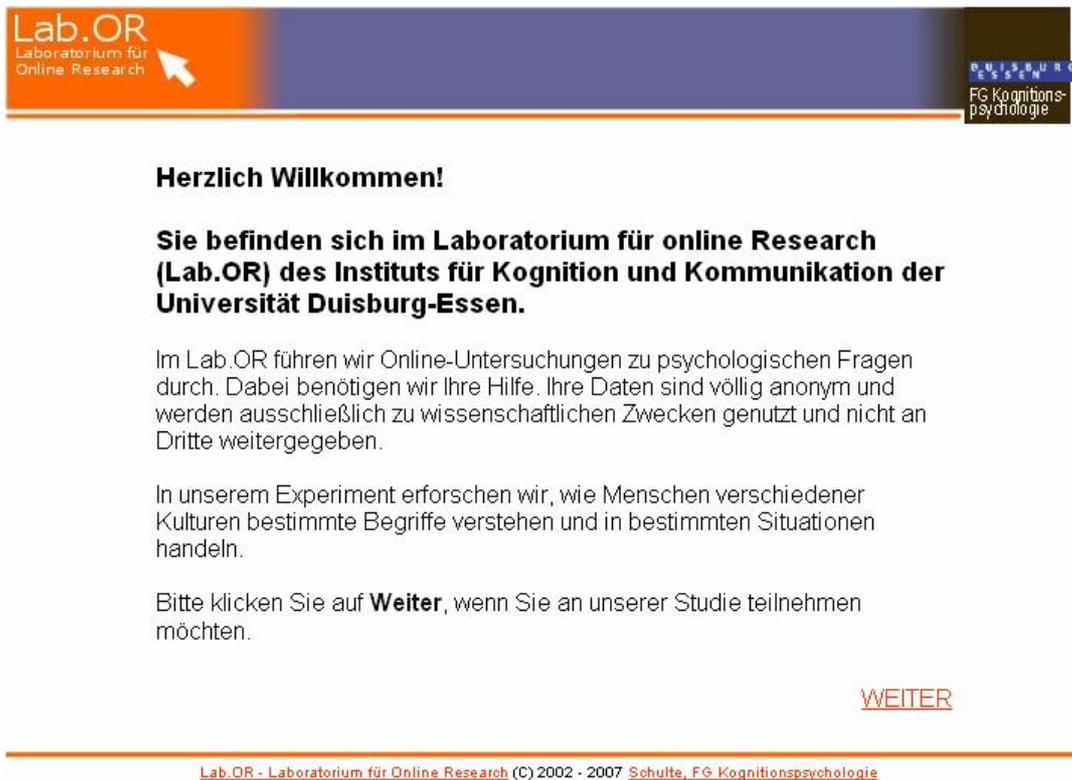
The screenshots of the experiment are presented as follows. The screenshots of the German versions are numbered after Figure C1-X, and those of the Chinese version are numbered as Figure C2-X:

### C1: German Version

The experiment was designed to evaluate three teacher metaphors under three various role-play conditions. They are documented under the following URL address: <http://heineken3.uni-duisburg.de/labor/versuche/huber1/admin/administrationsmenue.php4>.

The content, the structure and the order of the pages correspond exactly to the display of the experiment as implemented in Internet. Because all eighteen conditions of the experiment (nine conditions for males are exactly the copy of the other nine condition for the females except for the change of the address of the teacher in the role play ) are based on the same protocol, the screen shots of the web pages of one protocol condition are provided as an example. Under this condition, the subjects were females and they were provided with the metaphor *The teacher is a candle* under the role-play condition with the positive development.

The first five pages are identical in all conditions. The second page functioned as a filter page. Subjects were led randomly to one of the nine conditions according to their gender. Gender is not a factor in our experiment. Because a gender difference exists in addressing female and male teachers in German, a filter was necessary for subjects to receive appropriate address in the role play according to their correspondent gender identity.



**Herzlich Willkommen!**

**Sie befinden sich im Laboratorium für online Research (Lab.OR) des Instituts für Kognition und Kommunikation der Universität Duisburg-Essen.**

Im Lab.OR führen wir Online-Untersuchungen zu psychologischen Fragen durch. Dabei benötigen wir Ihre Hilfe. Ihre Daten sind völlig anonym und werden ausschließlich zu wissenschaftlichen Zwecken genutzt und nicht an Dritte weitergegeben.

In unserem Experiment erforschen wir, wie Menschen verschiedener Kulturen bestimmte Begriffe verstehen und in bestimmten Situationen handeln.

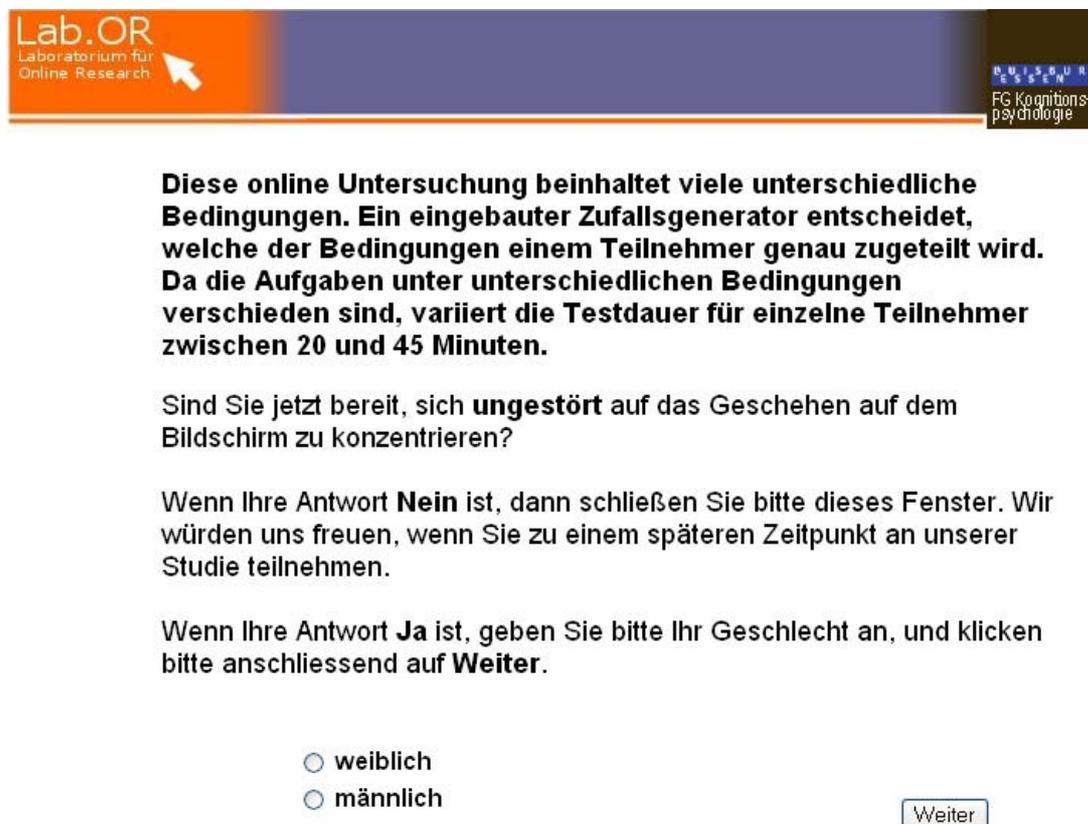
Bitte klicken Sie auf **Weiter**, wenn Sie an unserer Studie teilnehmen möchten.

[WEITER](#)

---

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-1: Start page with greetings and brief introduction of the Lab. OR. <page 1>



**Diese online Untersuchung beinhaltet viele unterschiedliche Bedingungen. Ein eingebauter Zufallsgenerator entscheidet, welche der Bedingungen einem Teilnehmer genau zugeteilt wird. Da die Aufgaben unter unterschiedlichen Bedingungen verschieden sind, variiert die Testdauer für einzelne Teilnehmer zwischen 20 und 45 Minuten.**

Sind Sie jetzt bereit, sich **ungestört** auf das Geschehen auf dem Bildschirm zu konzentrieren?

Wenn Ihre Antwort **Nein** ist, dann schließen Sie bitte dieses Fenster. Wir würden uns freuen, wenn Sie zu einem späteren Zeitpunkt an unserer Studie teilnehmen.

Wenn Ihre Antwort **Ja** ist, geben Sie bitte Ihr Geschlecht an, und klicken bitte anschliessend auf **Weiter**.

weiblich  
 männlich

Figure C1-2: Filter page. Subjects are led randomly to one of the nine conditions according to their gender identity. <page 2>

**Bitte beantworten Sie zunächst die folgenden Fragen.**  
**Wenn Sie von Beruf Lehrer sind - wieviel Jahre Berufserfahrung haben Sie?**

Weniger als ein Jahr  
 Ein Jahr bis 3 Jahre  
 Mehr als 3 Jahre bis 5 Jahre  
 Mehr als 5 Jahre

**Wenn Sie Lehramtsstudent sind – welche Fächer studieren Sie? Bitte schreiben Sie die Fächer in das folgende Feld.**

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-3: Acquisition of personal data-1<sup>st</sup> part. <page 3>

**Bevor Sie genaue Informationen zu Ihrer Aufgabe im Experiment erhalten, bitten wir Sie um einige Angaben:**  
**Wie haben Sie von diesem Versuch erfahren? (Mehrfachnennungen möglich)**

Einladung vom Versuchsleiter  
 Hinweis in einer Lehrveranstaltung an der Universität  
 Hinweis in der Schule  
 Hinweis auf der Homepage von Prof. Heineken  
 Hinweis von einer Person, die schon an diesem Versuch teilgenommen hat  
 zufällig beim Surfen im Internet entdeckt

Auf andere Weise, bitte geben Sie diese an:

**An welchem Ort befinden Sie sich momentan? Bitte geben Sie die Postleitzahl an:**

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-4: Acquisition of personal data-2<sup>nd</sup> part .<page 4>



**Bitte geben Sie noch die folgenden Daten an:**

**Ihr Alter**

**Ihre Muttersprache**

- Deutsch  
 eine andere Sprache

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-5: Acquisition of personal data - 3<sup>rd</sup> part. <page 5>



Wir alle haben bestimmte Vorstellungen von einem Lehrer. Sie werden nun an einem Planspiel teilnehmen, in dem Sie die Rolle einer Klassenlehrerin übernehmen, der sich nach dem folgenden Leitbild verhält:

**"Der Lehrer ist eine Kerze"**

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-6: Presence of the teacher metaphor *The teacher is a candle* (The teacher metaphors for the other corresponding subject groups under the same role-play condition are *The teacher is a captain* and *The teacher is a shepherd.*) <page 6>



### Ihre Rolle in diesem Planspiel:

In diesem Planspiel übernehmen Sie die Rolle **der neuen Klassenlehrerin** der Klasse 10a an einem Gymnasium.

Dieses Gymnasium ist von mittlerer Größe und liegt in einer Großstadt.

Dieses Gymnasium nimmt an dem Modellprojekt „Schulen ans Netz“ teil: Lehrer und Schüler nutzen daher regelmäßig das Internet und stehen mit dem Klassenlehrer über E-Mail in Kontakt.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-7: Description of the role to be taken by the subjects in the roleplay.



### Anweisung der Schulleitung:

Die Schulleitung bittet Sie, Ihren e-mail-Kontakt zu den Schülern so zu nutzen,

- **dass sich die Situation der Klasse verbessert**
- **dass auch die Eltern mit der Schule zufrieden sind.**

Die Schulleitung verlangt von allen Lehrern, sich in ihrem Umgang mit den Schülern an folgendem Leitbild zu orientieren:

## Der Lehrer ist eine Kerze

WEITER

Figure C1-8: Instruction of the school leader with the emphasis of the teacher metaphor *The teacher is a candle*. (The teacher metaphor for the other subject groups under the same role-play condition is either *The teacher is a captain* or *The teacher is a shepherd*.) <page 8>

### Ihre Aufgabe:

Sie werden nun das Geschehen in der Klasse 10a über ein Schuljahr verfolgen.

Vor jedem Quartal können Sie aktuelle Informationen

- . zur **Situation der Klasse**
- . zum **Verhalten der Schüler**
- . zu den **Meinungen der Eltern**

abrufen.

Nach jedem Quartal können Sie sich per e-Mail an Ihre Schüler wenden und versuchen so auf die Schüler einzuwirken, dass Sie die von der Schulleitung gestellte Aufgabe erfüllen .

Sie werden nun die Rolle der Klassenlehrerin **Julia Schmitt** übernehmen.

Sind Sie bereit? Dann klicken Sie bitte auf Weiter.

WEITER

Figure C1-9: Definition of the tasks of the subjects in the role play. <page 9>



Sie erhalten jetzt zu Anfang des Schuljahres die erforderliche Information über Klasse, Schüler, und Elternschaft. Bitte Lesen Sie die Informationen sehr sorgfältig durch.

**Achtung:** Die Information erscheint nur für **60 Sekunden** auf dem Bildschirm.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-10: Attention shield for the coming information page to the 1<sup>st</sup> quarter of the role play. <page 10>



**Situation der Klasse:**

- Die Noten der Klasse liegen über dem Durchschnitt.
- Die Lehrer bestimmen den Kurs.
- Die Klasse bedarf großer Fürsorge.
- Die Lehrer opfern viel Zeit für die Klasse.

**Verhalten der Schüler:**

- Die Schüler gehorchen den Lehrern nicht immer.
- Die Schüler sind auch an der Schule schädlichen Einflüssen ausgesetzt.
- Die Schüler nehmen alles gierig auf, was die Lehrer Ihnen geben.
- Die Schüler sind manchmal im Unterricht unkonzentriert.

**Meinungen der Eltern:**

- Die Lehrer sollen Ihre Aufgaben selbstverantwortlich erfüllen.
- Die Leistung der Schüler soll sich noch deutlich verbessern.
- Die Lehrer sollen Ihre Kenntnisse engagiert an die Schüler weitergeben.
- Die Lehrer sollen sich um die Schüler bemühen und diese stärker behüten.



Figure C1-11: Information for 1<sup>st</sup> quarter (presence only for 60 seconds) .<page 11>

**Remarks:** This page disappears automatically after the appearance of 60 seconds.

Lab.OR  
Laboratorium für  
Online Research

FG Kognitions-  
psychologie

Sie sind jetzt über die Situation der Klasse 10a am **Anfang des Schuljahres** informiert. Sicher werden Sie nicht alle Informationen behalten haben. Bitte beantworten Sie in **Stichworten** die folgenden Fragen.

Welche Fakten sind Ihnen in Erinnerung geblieben? Notieren Sie die fünf wichtigsten Fakten.

Welche Bedeutung haben diese Fakten für Sie als Klassenlehrerin?

Wie wird sich die Situation aus Ihrer Sicht weiterentwickeln?

WEITER

Figure C1-12: Acquisition of the situation awareness of the subjects from quarter 1 (three aspects: 1. Perception, 2. Comprehension, 3. Prospection). <page 12>

Lab.OR  
Laboratorium für  
Online Research

FG Kognitions-  
psychologie

Jetzt entschließen Sie sich, eine E-Mail an alle Schüler der Klasse zu schreiben und versuchen so auf die Schüler einzuwirken, um die von der Schulleitung gestellte Aufgabe zu erfüllen. Bitte berücksichtigen Sie dabei das vorgegebene Leitbild. Sie haben dafür nur 4 Minuten, denn gleich ist die Pause zu Ende und Sie müssen wieder in den Unterricht.

216

Figure C1-13: First action page, on which the subjects are asked to write their pupils an email. <page 13>

Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
ESSEN  
FG Kognitions-  
psychologie

Was wird Ihre E-Mail an die Schüler Ihrer Meinung nach bewirken?  
(in Stichworten)

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-14: Self estimation of the effect result from subjects' action. <page 14>

Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
ESSEN  
FG Kognitions-  
psychologie

Später bekommen Sie eine Antwort von Ihrem Schüler Peter. Er ist der  
Klassensprecher. Seine Email lautet:

von: peterbehrens@gymnasiuma.de  
An: juliaschmitt@gymnasiuma.de

*Liebe Frau Schmitt,  
vielen Dank für Ihre Email. Wir freuen uns, dass Sie unsere neue  
Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg  
und versprechen Ihnen fleißig zu arbeiten.*

*Herzliche Grüße  
Ihr Peter  
Klassensprecher*

WEITER

Figure C1-15: First E-Mail feedback from the class representative. <page 15>

### 3 Monate Später...

#### Ende des 1. Quartals des Schuljahres:

Von der Schulleitung erhalten Sie die aktuellen Einschätzungen.

Lesen Sie die Informationen bitte sehr sorgfältig durch.

Achtung: Die Information erscheint nur für **60** Sekunden auf dem Bildschirm.

WEITER

Lab. OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

FigureC1-16: Attention shield of the coming information page to Quarter 2 of the role play. <page 16>

**Remarks:** In the coming 17 pages, similar format of the role play quarter as shown in Figure C1-11 to C1-15 were repeated for three times with an attention shield as shown in Figure C1-16. However, the content of the class report (see Table C1-1 and Table C1-2) and the email feedback from the class representative (see Table C1-3 and Table C1-4) differed each time according to the different role-play quarter in the positive or negative role play condition.

Table C1-1: The Content of the class reports under the condition of the role play with positive development.

Quartal (Quarter)	Situation der Klasse (Situation of the class)	Verhalten der Schüler (Behaviours of the pupils)	Meinungen der Eltern (Opinions of the parents)
1.	Die Noten der Klasse liegen über dem Durchschnitt. Die Lehrer bestimmen den Kurs. Die Klasse bedarf großer Fürsorge. Die Lehrer opfern viel Zeit für die Klasse.	Die Schüler gehorchen den Lehrern nicht immer. Die Schüler sind auch an der Schule schädlichen Einflüssen ausgesetzt. Die Schüler nehmen alles gierig auf, was die Lehrer Ihnen geben. Die Schüler sind manchmal im Unterricht unkonzentriert.	Die Lehrer sollen Ihre Aufgaben selbstverantwortlich erfüllen. Die Leistung der Schüler soll sich noch deutlich verbessern. Die Lehrer sollen Ihre Kenntnisse engagiert an die Schüler weitergeben. Die Lehrer sollen sich um die Schüler bemühen und diese stärker behüten.
2.	Die Lehrer bemühen sich die Klasse zusammen zu halten. Die Lehrer bereiten ihren Unterricht bis tief in die Nacht vor. Die Noten haben sich in allen Fächern gebessert. Die Klasse folgt den Anordnungen der Lehrer.	Die Schüler sind zufrieden. Die Schüler schätzen den hingebungsvollen Unterricht der Lehrer. Die Schüler sind diszipliniert. Die Schüler merken, dass die Lehrer sich um sie sorgen.	Der beständige Einsatz der Lehrer ist zu loben. Die besonnene Fürsorge der Lehrer ist zu loben. Der Fortschritt der Klasse ist lobenswert. Die autoritäre Einstellung der Lehrer findet Anklang.
3.	Die Lehrer opfern ihre Freizeit für Nachhilfestunden. Die Klasse liegt voll auf Kurs und zieht an den Parallelklassen vorbei. Die Klasse vertraut den Lehrern und lässt sich von ihnen leiten. Die Noten der Klasse sind besser als die der Parallelklassen.	Außenseiter haben sich wieder in die Gemeinschaft integriert. Die Schüler erledigen alle gestellten Hausaufgaben. Die Schüler fühlen, dass sie vom Einsatz der Lehrer profitieren. Die Schüler beteiligen sich fleißig am Unterricht.	Die Führungsqualität der Lehrer ist hervorragend. Die Lehrer geben im Unterricht alles. Die Leistungen der Klasse haben sich konstant verbessert. Der Zusammenhalt in der Klasse ist hervorragend.
4.	Die Klasse hat die besten Noten des Jahrgangs. Die Lehrer wenden äußere Bedrohungen von der Klasse ab. Die Lehrer setzen sich bis zu Erschöpfung für die Klasse ein. Die Lehrer haben die Klasse offensichtlich auf Erfolgskurs gebracht.	Die Schüler belohnen die Anstrengungen der Lehrer mit guten Leistungen. Die Schüler nehmen aktiv am Unterricht teil. Die Schüler respektieren die Autorität der Lehrer. Die Schüler fühlen sich wohl in der Obhut der Lehrer.	Die Lehrer behüten die Schüler umsichtig. Die Eltern sind zufrieden mit den Lehrern. Die Lehrer haben auch in schwieriger Situation ihrer Ziele nicht aus den Augen verloren. Das selbstlose Engagement der Lehrer ist lobenswert.

Table C1-2: The content of the class reports under the condition of the role play with negative development.

Quartal (Quarter)	Situation der Klasse (Situation of the class)	Verhalten der Schüler (Behaviours of the pupils)	Meinungen der Eltern (Opinions of the parents)
1.	Die Noten der Klasse liegen über dem Durchschnitt. Die Lehrer bestimmen den Kurs. Die Klasse bedarf großer Fürsorge. Die Lehrer opfern viel Zeit für die Klasse.	Die Schüler gehorchen den Lehrern nicht immer. Die Schüler sind auch an der Schule schädlichen Einflüssen ausgesetzt. Die Schüler nehmen alles gierig auf, was die Lehrer Ihnen geben. Die Schüler sind manchmal im Unterricht unkonzentriert.	Die Lehrer sollen Ihre Aufgaben selbstverantwortlich erfüllen. Die Leistung der Schüler soll sich noch deutlich verbessern. Die Lehrer sollen Ihre Kenntnisse engagiert an die Schüler weitergeben. Die Lehrer sollen sich um die Schüler bemühen und diese stärker behüten.
2.	Den Lehrern ist es nicht gelungen, die Klasse zusammen zu halten. Die Lehrer investieren nicht genüge Zeit in der Vorbereitung der Unterricht. Die durchschnittlichen Noten der Klasse haben sich wieder verschlechtert. Die Klasse 10a folgt den Anordnungen der Lehrer nicht.	Die Schüler sind nicht zufrieden. Die Schüler schätzen den hingebungsvollen Unterricht der Lehrer nicht. Die Schüler sind nicht diszipliniert. Die Schüler merken nicht, dass die Lehrer sie liebevoll beschützen.	Die Lehrer zeigen nicht genügend Einsatz. Einige Lehrer missachten Ihre Fürsorgepflicht. Die schlechter gewordenen Leistungen der Schüler sind beklagenswert. Die autoritäre Einstellung der Lehrer findet keinen Anklang.
3.	Die Lehrer sind nicht bereit, ihre Freizeit für Nachhilfestunden zu opfern. Die Klasse kommt vom Kurs ab und agiert ziellos. Die Klasse lehnt die Fürsorge und Leitung ihrer Lehrer ab. Im Notenvergleich ist die Klasse 10a schlechter als die Parallelklasse.	Außenseiter lassen sich nicht in die Klasse integrieren. Die Schüler erledigen die gestellten Hausaufgaben nicht. Die Schüler fühlen nicht, dass Sie vom Einsatz der Lehrer profitieren. Die Schüler beteiligen sich nicht fleißig am Unterricht.	Die Führungsqualität der Lehrer ist unter dem Durchschnitt. Die Lehrer geben im Unterricht nicht alles. Die Leistungen der Klasse haben sich nicht verbessert. Der Zusammenhalt in der Klasse ist nicht gut.
4.	Die Klasse hat die schlechtesten Noten des Jahrgangs. Die Lehrer fällt es schwer, äußere Bedrohungen von der Klasse abzuhalten. Die Lehrer setzen sich nicht bis zu Erschöpfung für die Klasse ein. Die Lehrer haben die Klasse offensichtlich nicht auf Erfolgskurs gebracht.	Die Schüler belohnen die Anstrengungen der Lehrer nicht. Die Schüler nehmen nicht aktiv am Unterricht teil. Die Schüler respektieren die Autorität der Lehrer nicht. Die Schüler fühlen sich in der Obhut der Lehrer nicht wohl.	Die Lehrer behüten die Schüler nicht ausreichend. Die Eltern sind unzufrieden mit den Lehrern. Die Lehrer haben in schwierigen Situationen ihre Ziele aus den Augen verloren. Die Lehrer sollen sich im Unterricht noch mehr engagieren.

Table C1-3: The content of the email feedbacks from the class representative under the condition of the role play with the positive development.

Quartal (Quarter)	Text of the Email feedback for conditions of different teacher metaphors		
	Kerze (candle)	Kapitän (captain)	Hirte (shepherd)
1.	Vielen Dank für Ihre E-Mail. Wir freuen uns, dass Sie unser neuer Lehrer/unsere neue Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg und versprechen Ihnen fleißig zu arbeiten.	Vielen Dank für Ihre E-Mail. Wir freuen uns, dass Sie unser neuer Lehrer/unsere neue Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg und versprechen Ihnen fleißig zu arbeiten.	Vielen Dank für Ihre E-Mail. Wir freuen uns, dass Sie unser neuer Lehrer/unsere neue Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg und versprechen Ihnen fleißig zu arbeiten.
2.	Meine Mitschüler und ich freuen uns, dass Sie mit unseren Leistungen zufrieden sind und sich diese gebessert haben. Dank für die Zeit und die Mühe, die Sie für uns geopfert haben.	Meine Mitschüler und ich freuen uns, dass Sie mit unseren Leistungen zufrieden sind und sich diese gebessert haben. Dank für Ihre gute Führung, die uns Orientierung gegeben hat.	Meine Mitschüler und ich freuen uns, dass Sie mit unseren Leistungen zufrieden sind und sich diese gebessert haben. Dank für die Fürsorge mit der Sie uns begleitet haben.
3.	Wir freuen uns mit Ihnen, dass es wieder gelungen ist, den Klassendurchschnitt zu verbessern. Wir sind mit ganzem Herzen bei Ihrem hingebungsvollen Unterricht.	Wir freuen uns mit Ihnen, dass es wieder gelungen ist, den Klassendurchschnitt zu verbessern. Wir haben eingesehen, dass eine straffe Führung Garantie für gute Leistungen ist.	Wir freuen uns mit Ihnen, dass es wieder gelungen ist, den Klassendurchschnitt zu verbessern. Wir fühlen uns wohl in Ihrer Obhut zu sein. Danke!
4.	Wir freuen uns über Ihre E-Mail. Sie haben uns wirklich sehr viel geholfen. Vielen Dank für Ihr selbstloses Engagement.	Wir freuen uns über Ihre E-Mail. Sie haben uns wirklich sehr viel geholfen. Im kommenden Schuljahr, bitte führen Sie uns weiter so erfolgreich.	Wir freuen uns über Ihre E-Mail. Sie haben uns wirklich sehr viel geholfen. Im kommenden Schuljahr, bitte behüten Sie uns weiter.

Table C1-4: The content of the email feedbacks from the class representative under the condition of the role play with the negative development.

Quartal (Quarter)	Text of the Email feedback for conditions of different teacher metaphors		
	Kerze (candle)	Kapitän (captain)	Hirte (shepherd)
1.	Vielen Dank für Ihre E-Mail. Wir freuen uns, dass Sie unser neuer Lehrer/unsere neue Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg und versprechen Ihnen fleißig zu arbeiten.	Vielen Dank für Ihre E-Mail. Wir freuen uns, dass Sie unser neuer Lehrer/unsere neue Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg und versprechen Ihnen fleißig zu arbeiten.	Vielen Dank für Ihre E-Mail. Wir freuen uns, dass Sie unser neuer Lehrer/unsere neue Klassenlehrerin sind. Wir wünschen Ihnen und uns gemeinsam viel Erfolg und versprechen Ihnen fleißig zu arbeiten.
2.	Wir bedauern, dass Sie etwas enttäuscht sind. Das hängt damit zusammen, dass wir uns erst auf Sie einstellen müssen. Wir hoffen auf Besserung.	Wir bedauern, dass Sie etwas enttäuscht sind. Das hängt damit zusammen, dass wir uns erst auf Sie einstellen müssen. Wir hoffen auf Besserung.	Wir bedauern, dass Sie etwas enttäuscht sind. Das hängt damit zusammen, dass wir uns erst auf Sie einstellen müssen. Wir hoffen auf Besserung.
3.	Wir möchten mehr Freiheit haben und nicht so eingeeengt werden. Wir glauben, dass das Angebot der Nachhilfestunden für uns kein Leistungsanreiz ist. Die ständigen Enttäuschungen für Sie und für uns lähmen unsere Leistungsbereitschaft.	Ihr Führungsstil schreckt uns ab. Vielleicht sind Sie zu streng? Die ständigen Enttäuschungen für Sie und für uns lähmen unsere Leistungsbereitschaft.	Es gibt unterschiedliche Wege im Leben. Wieso sollen wir immer Ihnen folgen? Wir sind auch deprimiert. Die ständigen Enttäuschungen für Sie und für uns lähmen unsere Leistungsbereitschaft.
4.	Ihr Mitgefühl und Ihre Aufopferung helfen uns in dieser Situation leider nicht weiter. Nun ist schon ein Schuljahr vorbei. Wir haben ein ganzes Jahr verloren.	Wir fühlen uns von Ihnen unter Druck gesetzt. In dieser autoritären Atmosphäre können wir nicht arbeiten. Nun ist schon ein Schuljahr vorbei. Wir haben ein ganzes Jahr verloren.	Nun ist schon ein Schuljahr vorbei. Wir haben ein ganzes Jahr verloren. Ihre Fürsorge ist gut gemeint, aber wir fühlen uns zu stark beobachtet.

Lab.OR  
Laboratorium für  
Online Research

DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

**Erinnern Sie sich an das Leitbild des Gymnasiums? Das Leitbild lautet:**

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-34: Inquiry about the teacher metaphor provided at the beginning of the role play. <page 34>

Lab.OR  
Laboratorium für  
Online Research

DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

Das Leitbild der Lehrer am Gymnasium A lautet:

***"Der Lehrer ist eine Kerze"***

**Wie passend finden Sie dieses Leitbild ?**

passt überhaupt nicht      passt in vollem Maße

**Das Leitbild hat mir geholfen, meine Situation als Klassenlehrerin zu verstehen.**

lehne völlig ab      stimme völlig zu

**Das Leitbild hat mein Handeln bestimmt.**

lehne völlig ab      stimme völlig zu

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-35: Estimation of the metaphor provided. <page 35>

In diesem Planspiel haben Sie die Rolle als Klassenlehrerin der Klasse 10a übernommen. Sie sollten sich in Ihrem Handeln an folgendem Leitbild orientieren:

### Der Lehrer ist eine Kerze.

Verbunden mit diesem Leitbild gewiss auch bestimmte Gefühle. Wir möchten erfassen, welche Gefühle Sie mit dem Lehrer verbinden, den Sie sich jetzt vorstellen. Welches der folgenden Bilder passt am besten zu Ihrem Gefühl? Klicken Sie nur ein Bild an, das am besten passt.

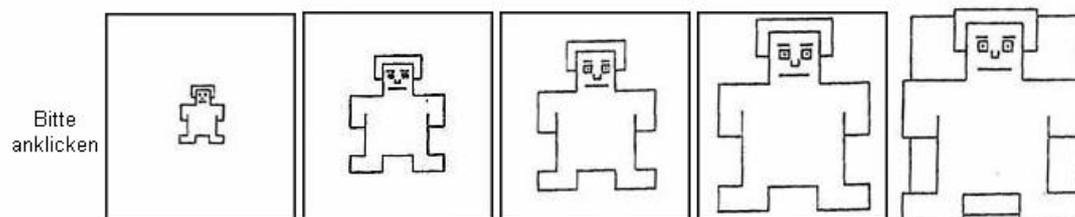


Figure C1-36: The SAM ratings of the metaphor *The teacher is a candle*, dominance dimension. (Under other conditions, the metaphor *The teacher is a candle* as provided here could be replaced correspondently by one of the following two metaphors, *The teacher is a captain* or *The teacher is a shepherd*). <page 36>

Jetzt erhalten Sie eine neue Reihe von Bildern.  
Klicken Sie bitte wiederum das Bild an, das am ehesten zu Ihrem Gefühl, das Sie mit dem Lehrer, der nach dem Leitbild

### "Der Lehrer ist eine Kerze"

verhält, verbinden.

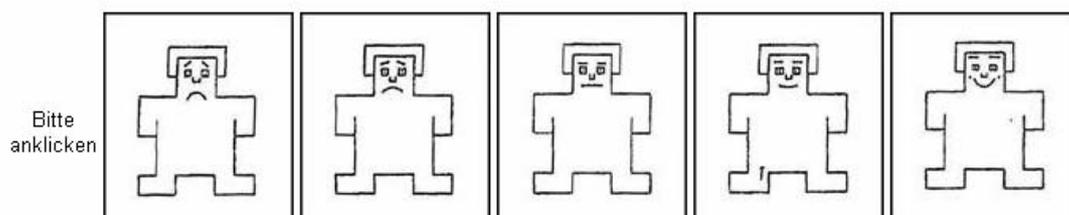
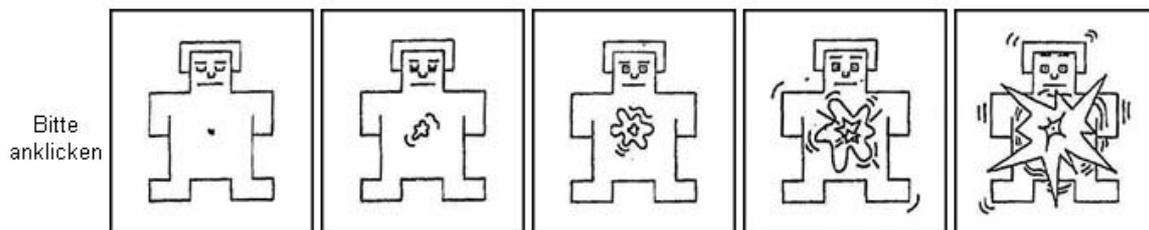


Figure C1-37: The SAM ratings of the metaphor *The teacher is a candle*, pleasure dimension (Under other conditions, the metaphor provided here could be replaced correspondently by one of the following two metaphors, *The teacher is a captain* or *The teacher is a shepherd*). <page 37>

Noch eine Bilderreihe: welches der Bilder passt am ehesten zu Ihrem Gefühl, das Sie mit dem Lehrer, der nach dem Leitbild

## "Der Lehrer ist eine Kerze"

verhält, verbinden.



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-38: The SAM ratings of the metaphor *The teacher is a candle*, arousal dimension. (Under other conditions, the metaphor provided here could be replaced correspondently by one of the following two metaphors, *The teacher is a captain* or *The teacher is a shepherd*). <page 38>

Im Planspiel haben Sie schon versucht, sich als eine Lehrerin nach dem Leitbild „**Der Lehrer ist eine Kerze**“ zu verhalten. Zu der Rolle, die Sie als eine Lehrerin im Planspiel gespielt haben, passen sicherlich bestimmte Begriffe sehr gut, andere dagegen sehr schlecht.

Sie erhalten nun eine Reihe von Begriffen. Bitte geben Sie für jeden Begriff an, in welchem Maße der jeweilige Begriff zu dem Lehrer passt, der nach diesem Leitbild „**Der Lehrer ist eine Kerze**“ verhält.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-39: General instruction to the feature ratings of the metaphor *The teacher is a candle*. Under the other conditions, the metaphor provided here could be replaced correspondently by one of the following two metaphors, *The teacher is a captain* or *The teacher is a shepherd*! <page 39>



Wie gut passt der Begriff zu Ihrer Vorstellung,

"der Lehrer ist eine Kerze"

## Besinnung

passt überhaupt nicht      passt in vollem Maße

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

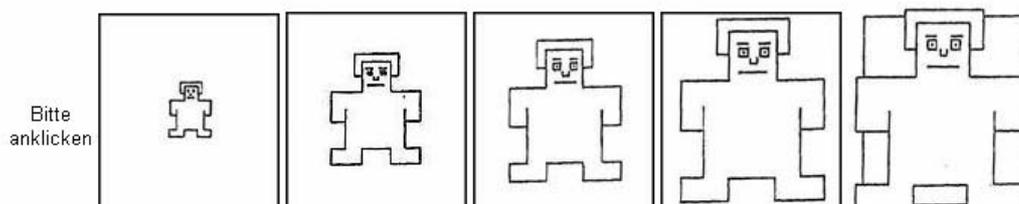
Figure C1-40: The feature ratings of the metaphor *The teacher is candle*, feature *Besinnung* (thoughtfulness). <page 40>

**Remarks:** the format of the following 32 pages was identical to this one, except the feature *Besinnung* were replaced by one of the following features: *Verantwortung, Intelligenz, Führung, Wachsamkeit, Sorglosigkeit, Freude, Geduld, Schlichtheit, Leidenschaft, Vorbild, Fleiß, Liebe, Orientierung, Autorität, Einfluß, Romantik, Hilfsbereitschaft, Selbstlosigkeit, Erfahrung, Gelassenheit, Mut, Ruhe, Gerechtigkeit, Strenge, Aufopferung, Optimismus, Freundlichkeit, Toleranz, Vertrauen, Wärme, Helligkeit, Fürsorge.*



Jetzt kommen wir zum Begriff "**Kerze**". Wir alle haben bestimmte Vorstellungen von **einer Kerze**. Versuchen Sie sich eine Kerze vorzustellen. Welche Gefühle verbinden Sie mit dieser Vorstellung?

Welches der folgenden Bilder passt am besten zu Ihrem Gefühl? Klicken Sie nur ein Bild an, das am besten dazu passt.



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-73: The SAM ratings of the concept *candle*, dominance dimension (Under other conditions associated with other teacher metaphor, the concept *candle* could be replaced by the correspondent vehicle concept *captain* or *shepherd*). <page 73>

**Remarks:** the next two pages were to measure the pleasure dimension and the arousal dimension. Since the format is similar to what is presented in the Figure C1-37 and Figure C1-38 unless the concept *teacher* in the metaphor *The teacher is a candle* is replaced by the concept "candle" as shown in the Figure C1-73, space is saved to be repeated here.



Zu Ihrer Vorstellung von der Kerze passen sicherlich bestimmte Begriffe sehr gut, andere dagegen sehr schlecht.

Sie erhalten nun eine Reihe von Begriffen.  
Bitte geben Sie für jeden Begriff an, in welchem Maße der Begriff zu Ihrer Vorstellung von der Kerze passt.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-76: General instruction to the feature ratings of the concept *candle* (Under other conditions associated with other teacher metaphor, the concept *candle* could be replaced by the correspondent vehicle concept *captain* or *shepherd*). <page 76>



Wie gut passt der Begriff zu Ihrer Vorstellung,

" eine Kerze"

**Besinnung**

passt überhaupt nicht

passt in vollem Maße

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-77: The Feature ratings of the concept *candle*, feature *Besinnung* (*thoughtfulness*)(under other conditions associated with the other metaphor, the other vehicle concept like *captain* or *shepherd* was rated). <page 77>

**Remarks:** the format of the following 32 pages are identical with this one, except the feature *Besinnung* will be replaced by one of the 33 features.( See the remarks under the figure C1-40)



Zurück zum Thema "Lehrer". Lehrer unterscheiden sich darin, an welchem Leitbild Sie sich beim Umgang mit Ihren Schülern orientieren. Sie werden noch zwei Leitbilder bekommen. Bitte geben Sie an, in welchem Maße die Leitbilder jeweils zu **dem von Ihnen vorgestellten typischen Lehrer** passen.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-110: General instruction to estimate the suitabilities of the other two teacher metaphors. <page 110>



Wie gut passt das Leitbild zu Ihrer Vorstellung

"der typische Lehrer"

"Der Lehrer ist ein Kapitän"

passt überhaupt nicht      passt in vollem Maße

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-111: The Suitability ratings of the other teacher metaphor. <page 111>

**Remarks:** Actually the page 111 and page 112 varied from condition to condition according to which teacher metaphor is actually provided under this condition. (see Table C1-5)

Table C1-5: The content of the page 111 and page 112 according to various conditions.

Page	The metaphor to be evaluated		
	The Condition associated with the metaphor "The teacher is a candle"	The Condition associated with the metaphor "The teacher is a captain"	The Condition associated with the metaphor "The teacher is a shepherd"
Page 111	Der Lehrer ist ein Kapitän („The teacher is a captain“)	Der Lehrer ist eine Kerze („The teacher is a candle“)	Der Lehrer ist ein Kapitän („The teacher is a captain“)
Page 112	Der Lehrer ist ein Hirte („The teacher is a shepherd“)	Der Lehrer ist ein Hirte („The teacher is a shepherd“)	Der Lehrer ist eine Kerze („The teacher is a candle“)

Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

**Finden Sie andere Leitbilder passender? Welche ?**

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C1-113: Other suitable teacher metaphors. <page 113>

Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

**Dieses Experiment ist nun zu Ende. Vielen Dank für Ihre Teilnahme!**

Hintergrund der Studie:  
Mein Name ist Dehui Zhou. Im Rahmen meiner Doktor-Arbeit möchte ich ermitteln, ob die Leitbilder, an denen sich Lehrer orientieren ihren Umgang mit Schülern im Klassenzimmer bestimmen. Speziell interessieren wir uns dafür, ob Deutsche und Chinesen sich in ihren Leitbildern unterscheiden. Diese und andere weitgehend ungeklärte Fragen wollen wir mit Ihrer Hilfe etwas genauer beantworten.  
Als Versuchsleiterin danke ich Ihnen herzlich für Ihre engagierte Teilnahme!

Wenn Sie Fragen haben, können Sie sich gerne an mich wenden:

[wsmum@web.de](mailto:wsmum@web.de)

**Bemerkung:** Die Situation der Klasse am Ende des Schuljahres war nicht abhängig von den emails, die Sie als Klassenlehrer geschrieben haben. Das Ergebnis wurde zu Untersuchungszwecken automatisch herausgegeben.

Möchten Sie noch eine Anmerkung zu diesem Experiment machen? Sie können dies in dem folgenden Feld tun. Bitte klicken Sie danach auf "Anmerkung absenden".

Figure C1-114: The closing page to explain the background of the study and provide subjects the possibility to write anonymous comments. <page 114>

**Remarks:** Under the condition of no role play, web pages related to the role play as presented from the Figure C1-7 to the Figure C1-33 were removed.

## C2: Chinese Version

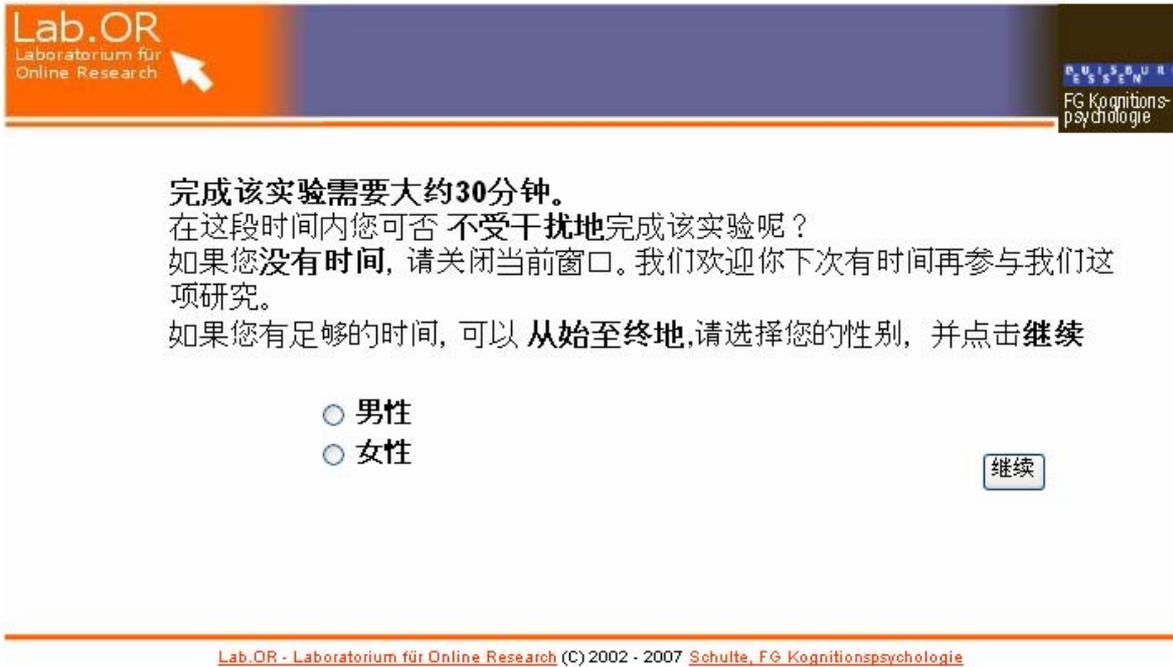
The Chinese version of the experimental web pages was the translation of the German version. The web pages provided to the Chinese subjects were used to evaluate their affective impression and conceptual representations of the three teacher metaphors. They are documented under the following URL address:

<http://heineken3.uni-duisburg.de/labor/versuche/dehui1/admin/administrationsmenue.php4>.

The screen shots of the Chinese web pages for exploring the understanding of the metaphor *The teacher is a candle* is provided here as a protocol. Each web page is labelled after C2-X:



Figure C2-1: Start page with greetings and brief introduction of Lab. OR . <page 1>



Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

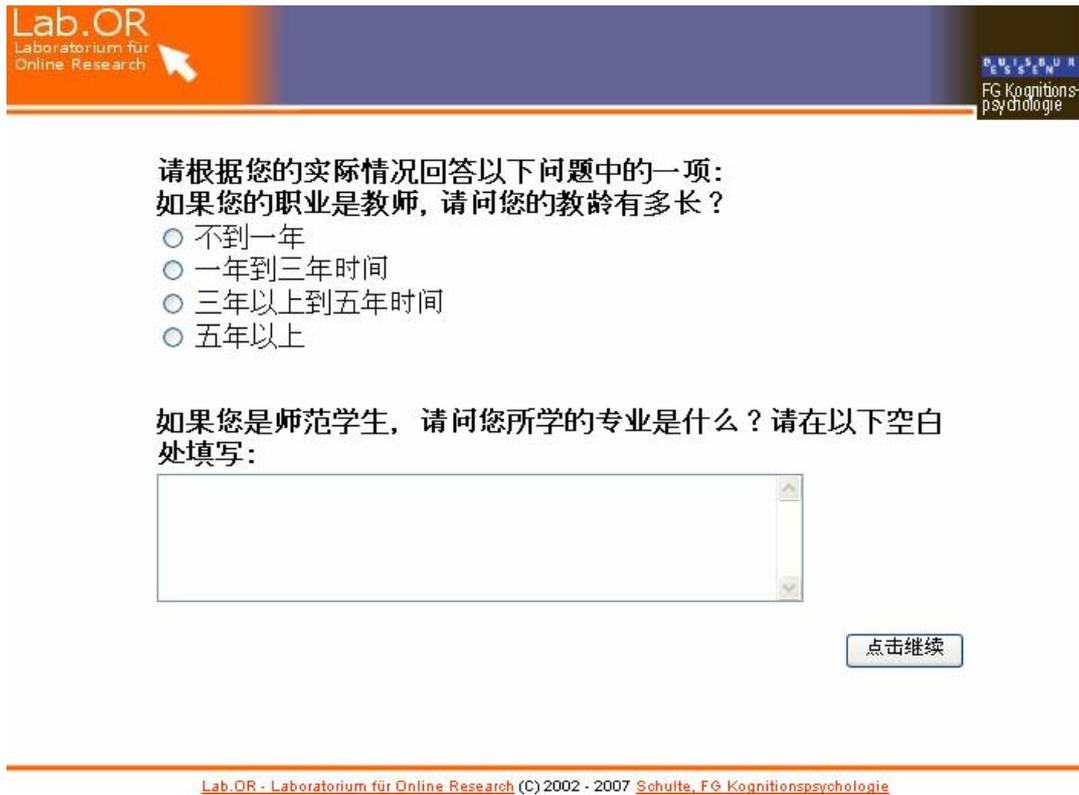
完成该实验需要大约**30分钟**。  
在这段时间内您可否 **不受干扰地**完成该实验呢？  
如果您**没有时间**，请关闭当前窗口。我们欢迎你下次有时间再参与我们这项研究。  
如果您有足够的时间，可以 **从始至终地**，请选择您的性别，并点击**继续**

男性  
 女性

继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-2: Filter page. Subjects were led randomly to one of the nine conditions according to their gender identity. <page 2>



Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

请根据您的实际情况回答以下问题中的一项：  
如果您的职业是教师，请问您的教龄有多长？

不到一年  
 一年到三年时间  
 三年以上到五年时间  
 五年以上

如果您是师范学生，请问您所学的专业是什么？请在以下空白处填写：

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-3: Acquisition of personal data-1<sup>st</sup> part. <page 3>

Lab.OR  
Laboratorium für  
Online Research

FG Kognitions-  
psychologie

在实验正式开始之前, 请您回答以下几个问题:  
您是通过何种渠道得知该项实验的? -----(可多选)

受实验设计者的邀请  
 从大学课堂上获悉  
 从中学获悉  
 从 Heineken教授的个人主页上获悉  
 从某位做过该实验的参加者得到该网页地址  
 在浏览网络时偶然发现的

如果您是通过其它渠道得知该实验的, 请告知来源:

请填写您参加该网上实验时的所在城市名?

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-4: Acquisition of personal data-2<sup>nd</sup> part. <page 4>

Lab.OR  
Laboratorium für  
Online Research

FG Kognitions-  
psychologie

请输入以下 个人信息:

年龄

母语  
 汉语  
 其它语种

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-5: Acquisition of personal data - 3<sup>rd</sup> part. <page 5>



我们每个人对教师都有自己的特定认识。现在您会进入一个情景游戏。并在其中扮演一位班主任的角色。特别之处是这位班主任会被要求按照“教师是蜡烛”这一职业形象来为人处事。

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

**Figure C2-6:** Presence of the teacher metaphor *The teacher is a candle* (The other teacher metaphors for the other correspondent subject groups under the same role play condition are *The teacher is a captain* or *The teacher is a shepherd*.) <page 6>



### 角色描述:

在以下的情景游戏中，您将扮演某高中10a班的新任班主任。  
该校是某大城市的一中等规模的中学。  
这家中学参加了“网上教学”的试验项目：教师与学生广泛使用互联网，并定期通过 **email**保持相互联系。

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

**Figure C2-7:** Description of the role to be taken by the subjects in the role play.



### 校领导指示:

校领导要求您与学生的邮件联系要起到以下作用:

- 推动班级进步
- 提高家长满意度

同时, 校领导要求该校的教职员工在与学生的交往中, 为人处事都要遵循以下教师职业形象:

## 教师是蜡烛

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-8: Instruction of the school leader with the emphasis of the target teacher metaphor (The teacher metaphor for the other subject groups under the same role play condition is either *The teacher is a captain* or *The teacher is a shepherd*). <page 8>



### 任务描述:

以下, 您会跟进10a班一整学年的发展状况。  
每一季度, 您都会得到以下方面的信息:

- 班级状况
- 学生行为
- 家长意见

每季度结束, 您都要按照校领导对您的要求, 给班上学生写一封email。

现在就请您开始扮演。班主任王老师的角色。

您准备好了吗? 请点击"继续"

继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-9: Defining the tasks for the subjects in the role play. <page 9>



新学期伊始, 您从学校得到有关班级状况, 学生行为及其家长意见方面的信息。

**注意:** 下一页上有关班级情况的信息在出现**60秒**后会自动消失, 请抓紧时间认真阅读。

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-10: Attention shield for the coming information page to the 1<sup>st</sup> Quarter of the role play. <page 10>



#### 班级状况:

班级成绩略高于年级平均分。  
 任课老师需要把握方向与进程。  
 班级需要更多照顾。  
 任课老师需要为班级牺牲很多业余时间

#### 学生行为

学生不总是服从任课老师。  
 学生受到社会不良风气的影响。  
 学生渴慕任课老师辛勤的付出。  
 学生有时上课精力不集中。

#### 家长意见:

任课老师应该尽职地完成教学任务。  
 学生的成绩要有明显地提高。  
 任课老师应尽心地向学生传播知识。  
 任课老师要尽力地照看学生。



Figure C2-11: Information for quarter 1 (presence only for 60 seconds). <page 11>

**Remarks:** This page will automatically disappear after 60 seconds.



看完学年伊始时该班班级状况的报告，您不一定能记下其中所有的内容。  
**请试着用关键字回答下面问题。**

请问您还记得哪些信息呢？请列举五项。

作为班主任，这些信息对您有什么意义呢？

您认为班级状况下一步会如何发展呢？

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-12: Acquisition of the situation awareness of the subjects from quarter 1 (three aspects: 1. Perception, 2. Comprehension, 3. Prospection). <page 12>



现在请给全班同学写一封电子邮件。注意不要忘记该校领导有关教师形象的指示和对您的期望。

请您尽量在**四分钟**时间内完成这封邮件。因为课间休息时间很快就过去，您还要赶着去上课。写完邮件请点击继续进入下一页。

发件人: wang23@10amiddleschoola.com.cn

收件人: groupall@10amiddleschoola.com.cn

标题: 新学期开始

点击继续

Figure C2-13: First action page, on which the subjects were asked to write their pupils an email. <page 13>

Lab.OR  
Laboratorium für  
Online Research

FG Kognitions-  
psychologie

您觉得您这封**email**会产生什么效果呢？  
(关键字)

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-14: Self estimation of the effect result from subjects' action. <page 14>

Lab.OR  
Laboratorium für  
Online Research

FG Kognitions-  
psychologie

不久后您收到班长刘军发给您的回复邮件。邮件内容如下：

发件人: liujun@ 10amiddleschoola.com.cn  
收件人: wang23@ 10amiddleschoola.com.cn

王老师:

您好!  
非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力, 争取学业上的进步。

此致

敬礼!

班长: 刘军

点击继续

Figure C2-15: First E-Mail feedback from the class representative. <page 15>

三个月后。。。

第一季度末:

您从校领导得到该班最新的评估报告。

**注意:**请在**最短时间内**阅读下一页上有关该班级情况的信息。阅读完毕后,请点击**继续**进入任务单元。由于在任务单元中您会使用到这些信息,所以请您在整个阅读过程中务必**认真仔细**。

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-16: Attention shield of the coming information page to Quarter 2 of the role play. <page 16>

**Remarks:** In the coming 17 pages, similar format of the role play quarter as shown in Figure C2-11 to C2-15 were repeated for three times with an attention shield as shown in Figure C2-16. However, the content of the class report (see Table C2-1 and Table C2-2) and the email feedback from the class representative (see Table C2-3 and Table C2-4) differed in different role play quarter of either the positive role-play condition or the negative role-play condition.

Table C2-1: The content of the class reports under the condition of the role play with the positive development.

学习季度 (Quarters)	班级状况 (Situation of the class)	学生行为 (Behaviours of the pupils)	家长意见 (Opinions of the parents)
1	班级成绩略高于年级平均分。 老师把握方向与进程。 班级需要更多照看。 老师为班级牺牲很多业余时间。	学生不总是服从老师。 学生受到社会不良风气的影响。 学生羡慕老师辛勤的付出。 学生有时上课精力不集中。	老师们应该尽职尽责地完成教学任务。 学生的成绩要有明显地提高。 老师们应呕心沥血地向学生传授知识。 老师们要强有力地照看学生。
2	老师们力求保持班级合一。 老师辛勤地为学生备课直到深夜。 各科成绩都有所提高。 全班都听从老师的指令。	学生感到满意。 学生对老师全身心投入的教学评价很高。 学生遵守纪律。 学生体会到老师对他们的照顾。	老师们倾心投入值得称赞。 老师们对学生谨慎的照看表示赞赏。 班级进步值得称赞。 老师们的权威形像深得人心。
3	老师们牺牲业余时间为学生提供课外补习。 班级前进目标明确, 赶超其他班级。 全班信从老师们的引导。 该班成绩好于年级其他班。	几个游手好闲的学生重归班集体。 学生完成老师布置的一切任务。 学生从老师完全的投入中获益匪浅。 学生上课努力学习。	老师们有杰出的领导管理才能。 老师在课堂上全身心地付出。 班级成绩保持持续进步。 班级合一, 无人掉队。
4	该班获得年度成绩最高分。 老师们保护班级免受外在的不良影响。 老师们为该班作到鞠躬尽瘁。 全班在老师带领下驶向胜利的港湾。	学生用优异的成绩回报老师的无私奉献。 学生上课积极参与。 学生尊重老师的权威。 学生喜欢老师的保护。	老师们谨慎地照看学生。 家长对老师表示满意。 即使在困境中, 老师也把持住了前进的方向。 老师们无私的奉献值得称赞。

Table C2-2: The content of the class reports under the condition of the role play with the negative development.

学习季度 (Quarter)	班级状况 (Situation of the class)	学生行为 (Behaviours of the pupils)	家长意见 (Opinions of the parents)
1	<p>班级成绩略高于年级平均分。 老师把握方向与进程。 班级需要更多照看。 老师为班级牺牲很多业余时间。</p>	<p>学生不总是服从老师。 学生受到社会不良风气的影响。 学生羡慕老师辛勤的付出。 学生有时上课精力不集中。</p>	<p>老师们应该尽职尽责地完成教学任务。 学生的成绩要有明显地提高。 老师们应呕心沥血地向学生传授知识。 老师们要强有力地照看学生。</p>
2	<p>老师们无法保持班级合一，防止学生掉队。 老师没能安排足够的时间给学生备课。 10 a 班成绩不及其他班级。 班级不听从老师的指令。</p>	<p>学生感到不满意。 学生不在乎老师们身心投入的教学。 学生不遵守纪律。 学生体会不到老师对他们的照顾。</p>	<p>老师们的付出还不彻底。 老师们对学生没有谨慎地照看。 学生成绩下降令人不满。 老师整天发号施令是行不通的。</p>
3	<p>老师们不愿牺牲业余时间为学生课外补习。 班级前进目标不明确，前进迟缓。 全班都不愿跟随老师带领。 该班平均成绩继续下降。</p>	<p>几个学生游手好闲，完全脱离班级。 学生不完成老师布置的任务。 学生感觉不到老师的付出。 学生上课不努力学习。</p>	<p>老师们没什么领导管理才能。 老师在课堂上没有全身心地付出。 班级成绩一直没有改善。 班上很多学生都掉队。</p>
4	<p>该班沦为年度成绩最低分。 老师们没能保护班级免受外在不良影响。 老师们对该班没有作到鞠躬尽瘁。 老师显然没能带领学生驶向胜利。</p>	<p>学生没能用良好的成绩回报老师的奉献。 学生上课一点儿也不积极。 学生不尊重老师的权威。 学生对老师的保护感到厌烦。</p>	<p>老师们没有谨慎地照看学生。 家长对老师表示不满。 在困境中老师们没能把持住前进的方向。 老师们在没有完全的奉献精神。</p>

Table C2-3: The content of the email feedbacks from the class representative under the condition of the role play with the positive development.

学习季度 (Quarter)	Text of the Email feedback for conditions of different teacher metaphors		
	蜡 烛 (candle)	船 长 (captain)	牧 羊 人 (shepherd)
1.	非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力，争取学习上的进步。	非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力，争取学习上的进步。	非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力，争取学习上的进步。
2.	谢谢您的来信。知道您对我们成绩进步感到满意，让我和班上的同学都觉得非常开心。感谢您为我们牺牲的时间与精力。	谢谢您的来信。知道您对我们成绩进步感到满意，让我和班上的同学都觉得非常开心。非常感谢您强有力的领导，让我们一切行动都有章可循。	谢谢您的来信。知道您对我们成绩进步感到满意，让我和班上的同学都觉得非常开心。感谢您对我们很好的照看。
3.	很高兴我们班的成绩进步这么快。非常感谢您课堂上的倾心付出。您能成为我们的任课老师，是我们的幸运。	很高兴我们班的成绩进步这么快。我们看到您严格的管理是我们成绩的保障。您能成为我们的任课老师，是我们的幸运。	很高兴我们班的成绩进步这么快。非常感谢您如此悉心地照顾我们。您能成为我们的任课老师，是我们的幸运。
4.	很高兴再次收到您的电邮。感谢您无私的奉献。	很高兴再次收到您的电邮。请继续卓有成效地管理我们。	很高兴再次收到您的电邮。来年请继续照看我们。

Table C2-4: The content of the email feedbacks from the class representative under the condition of the role play with the negative development.

学习季度 (Quarter)	Text of the Email feedback for conditions of different teacher metaphors		
	蜡 烛 (candle)	船 长 (captain)	牧 羊 人 (shepherd)
1.	非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力，争取学习上的进步。	非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力，争取学习上的进步。	非常感谢您的来信。我们很高兴您成为我们的新班主任。我们希望能和您共同努力，争取学习上的进步。
2.	让您失望，真是不好意思。可能是因为我们还没有完全适应您的缘故。我们希望能够有所改进。	让您失望，真是不好意思。可能是因为我们还没有完全适应您的缘故。我们希望能够有所改进。	让您失望，真是不好意思。可能是因为我们还没有完全适应您的缘故。我们希望能够有所改进。
3.	您对我们要求过高，我们显然没办法让您满意。我们不知道将来该怎么办。我们希望有更多的自由，而不是被局限。我们觉得您额外提供的课外辅导没什么效果。我们也很伤心。长期以来的失望，让我们很难振作精神。	您对我们要求过高，我们显然没办法让您满意。我们不知道将来该怎么办。您这样的管理方式可把我们吓坏了。您是不是过于严格了？我们也很伤心。长期以来的失望，让我们很难振作精神。	您对我们要求过高，我们显然没办法让您满意。我们不知道将来该怎么办。每个人有不同的生活方式，为什么我们一定要跟从您呢？我们也很伤心。长期以来的失望，让我们很难振作精神。
4.	转眼就过一年，我们感觉很有压力。在这种情况下，您的关心和您的牺牲对我们的帮助似乎不大。似乎您越是让我们快点儿提高成绩，我们的进展就越缓慢。好像这一年的时间，就这样白白浪费掉了一样。	转眼就过一年，我们感觉很有压力。在这样的专制的氛围中我们没法学习。似乎您越是让我们快点儿提高成绩，我们的进展就越缓慢。好像这一年的时间，就这样白白浪费掉了一样。	转眼就过一年，我们感觉很有压力。您照看我们的意图是好的，但我们却时常有被监视的感觉。似乎您越是让我们快点儿提高成绩，我们的进展就越缓慢。好像这一年的时间，就这样白白浪费掉了一样。

Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
ESSEN  
FG Kognitions-  
psychologie

请问,您还记得该校领导所倡导的教师职业形象是什么?

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-34: Inquiry about the teacher metaphor provided at the beginning of the role play. <page 34>

Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
ESSEN  
FG Kognitions-  
psychologie

该校领导所倡导的教师职业形象是:

**"教师是蜡烛"**

您是否认同该教师职业形象模式呢?

完全不认同      完全认同

该职业形象帮助我更好地理解该班在不同阶段时的状况。

完全不认同      完全认同

该职业形象决定了我在情景游戏中的行为方式。

完全不认同      完全认同

点击继续

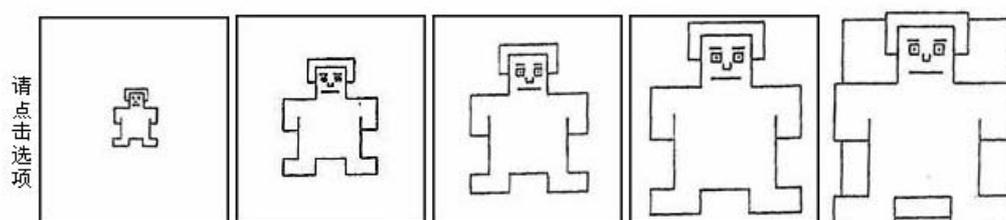
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-35: Estimation of the metaphor provided. <page 35>

在这个情景游戏中您扮演了10a班的班主任，并被要求按照“教师是蜡烛”的职业形象行事为人。针对您所想象的

## 教师

也一定伴随着某些内在的心理感受。以下一系列图中哪一幅最能表达您内心所产生的这种感受呢？请选出最能反映您感受的那幅图。



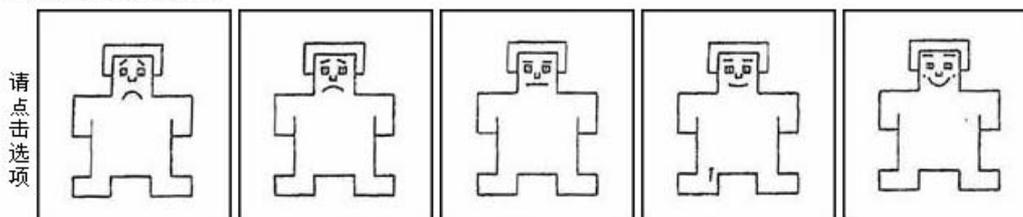
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-36: The SAM ratings of the metaphor *The teacher is a candle*, dominance dimension. (Under other conditions, the metaphor *The teacher is a candle* as provided here could be replaced correspondingly by one of the following two metaphors *The teacher is a captain* or *The teacher is a shepherd*). <page 36>

现在请看另一组图片。请您选出其中最能反映您对所想象的那位

## 教师

的感受的那幅图。



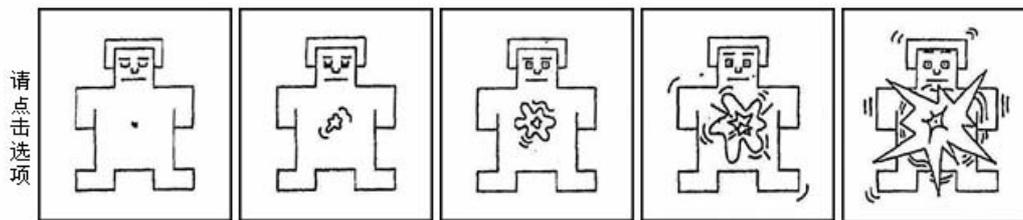
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-37: The SAM ratings of the metaphor *The teacher is a candle*, pleasure dimension. (Under other conditions, the metaphor provided here could be replaced correspondently by one of the following two metaphors, *The teacher is a captain* or *The teacher is a shepherd*.) <page 37>

请看第三列图：其中哪一幅图最能反映您所想象的

## 教师

的感受。



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-38: The SAM ratings of the metaphor *The teacher is a candle*, arousal dimension. (Under other conditions, the metaphor provided here could be replaced correspondently by one of the following two metaphors , *The teacher is a captain* or *The teacher is a shepherd*) <page 38>

在刚才的角色扮演中，您曾经尝试按照

## 教师是蜡烛

这一形象来行动。针对您所扮演的教师角色，用某些特征词来描述，肯定非常合适，而另一些相比之下却不那么合适。紧接着出现的一组特征词下面都有从最不合适到最合适的五个不同的等级，请联系您所扮演的蜡烛式教师，给予适当的判断。

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-39: General instruction to the feature ratings of the metaphor *The teacher is a candle*. Under other conditions, the metaphor provided here could be replaced correspondently by one of the following two metaphors, *The teacher is a captain* or *The teacher is a shepherd*.<page 39>



如果用下面这个特征词来形容您所想象的那位

"教师"

您认为是否适合？请由低到高选择其适合程度：

深思熟虑

非常不合适



非常合适

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-40: The feature ratings of the metaphor *The teacher is candle*, feature 深思熟虑, (thoughtfulness)". <page 40>

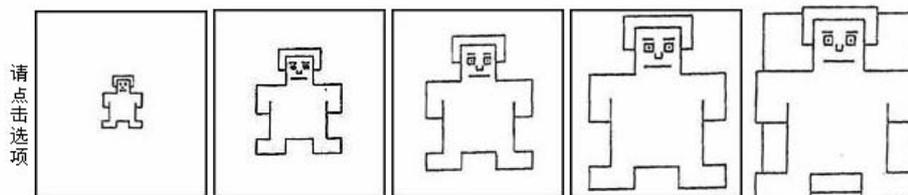
**Remarks:** the format of the following 32 pages are identical to this one, except the feature "Besinnung" will be replaced by one of the following features: 责任, 睿智, 领导才能, 警惕性, 无忧无虑, 快乐, 耐心, 朴实, 热情, 以身作责, 辛劳, 爱心, 方向感, 专制, 影响力, 浪漫, 乐于助人, 无私, 经验, 镇定, 勇气, 安静, 公正, 严格, 奉献, 乐观, 友好, 耐心, 信任, 温暖, 光明, 关怀.



现在让我们看看另一概念：

蜡烛

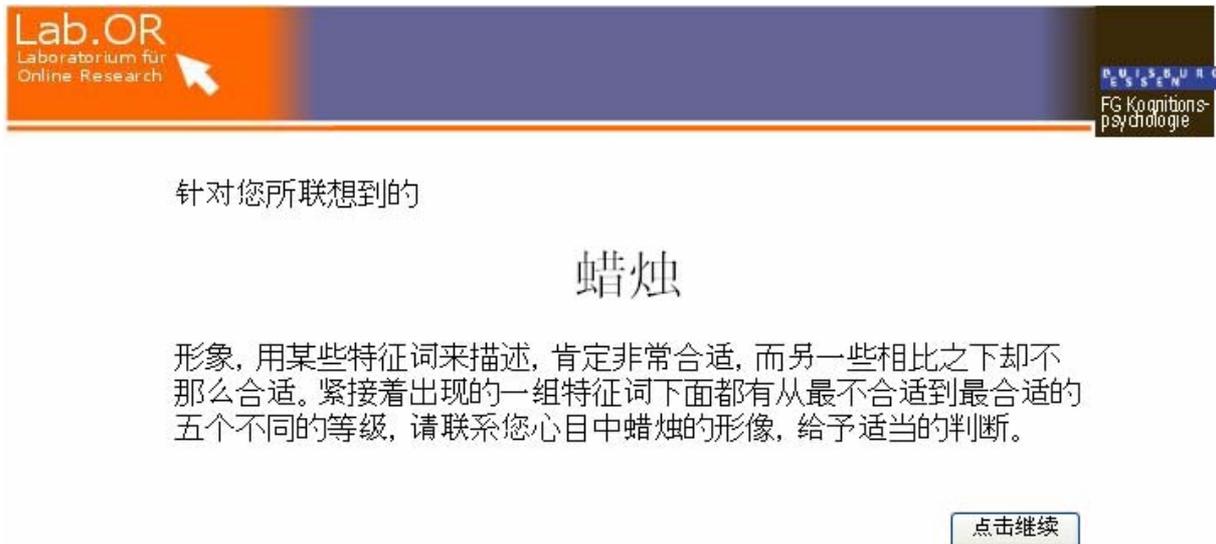
我们都知道蜡烛。如果请您现在在心里想象一根蜡烛，这一蜡烛形象一定会带给您某些特定的内在感受。下面几幅图中哪一幅最能反映您的这种感受？请选出其中最能反映您感受的那幅图。



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-73: The SAM ratings of the concept *candle*, dominance dimension (Under other conditions associated with other teacher metaphor, the concept *candle* could be replaced by the correspondent vehicle concept *captain* or *shepherd*). <page 73>

**Remarks:** The next two pages were to measure the pleasure dimension and the arousal dimension. Since the format is similar to what is presented in Figure C2-37 and Figure C2-38 unless the candle metaphor is replaced by the concept “candle” as shown in the Figure C2-73, space is saved to be repeated here.



Lab.OR  
Laboratorium für  
Online Research

DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

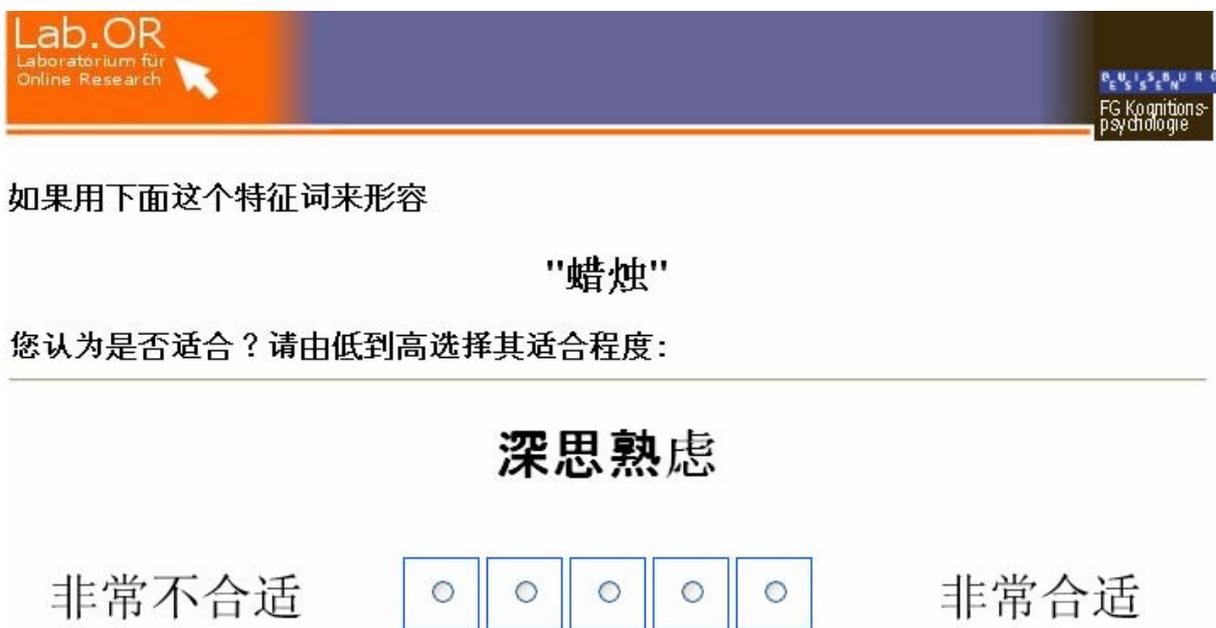
针对您所联想到的

## 蜡烛

形象, 用某些特征词来描述, 肯定非常合适, 而另一些相比之下却不那么合适。紧接着出现的一组特征词下面都有从最不合适到最合适的五个不同的等级, 请联系您心目中蜡烛的形像, 给予适当的判断。

点击继续

Figure C2-76: General instruction to the feature ratings of the concept *candle*. (Under other conditions associated with other teacher metaphor, the concept *candle* could be replaced by the correspondent vehicle concept *captain* or *shepherd*.) <page 76>



Lab.OR  
Laboratorium für  
Online Research

DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

如果用下面这个特征词来形容

## "蜡烛"

您认为是否适合? 请由低到高选择其适合程度:

### 深思熟虑

非常不合适                非常合适

Figure C2-77: The feature ratings of the concept *candle*, feature “深思熟虑”, (thoughtfulness) (under the other condition associated with the other metaphor, the other vehicle concepts like *captain* or *shepherd* were rated). <page 77>

**Remarks:** The format of the following 32 pages were identical to this one, except the feature "Besinnung" will be replaced by one of the 33 features.( See the remarks under the figure C2-40)



重新回到教师这个话题。同样是教师，其对教师职业形象的定位却有可能不同。不同的教师职业形象直接会影响其对学生的态度。除开在情景游戏中涉及的教师职业形象，接下来还提供两种不同的教师职业形象，请问它们多大程度符合您所理想中的那位教师？

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-110: General instruction to estimate the suitabilities of the other two teacher metaphors. <page 110>



下面这一教师职业形象多大程度符合您想象的那位

"教师"

"教师是船长"

非常不合适



非常合适

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-111: The suitability ratings of the other teacher metaphors. <page 111>

**Remarks:** Actually the page 111 and page 112 varied from condition to condition according to which teacher metaphor is actually provided under this condition. Since the Chinese version is exactly the translation version of the German one, please refer to the Table C2-5).

此外, 您认为还有哪些教师职业形象(比喻)更适合您想象中的那位教师呢?

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure C2-113: Other suitable teacher metaphors. <page 113>

实验到此结束, 感谢您的参与!

**研究背景:**

实验设计者周德慧, 在这项实验中主要调查有关教师的不同隐喻模式是否会决定师生课堂交际行为的课题。该实验还涉及到中德文化中存在有关教师的不同隐喻模式。希望在您的协助下, 我们能立求更深入地探究这方面的问题。

作为该实验的设计者, 我对您的协作表示衷心感谢。  
如果您有相关问题, 欢迎给我发邮件。

[wsmum@web.de](mailto:wsmum@web.de)

**备注:** 在情景游戏中, 10a班的发展趋势是由计算机根据实验的需要随机分配的, 与您给所写的邮件并无直接关系, 并不反映您与学生沟通技巧的成效。

如果您对给实验有何意见建议, 也欢迎您下面的空白处填写出您的反馈意见。填好后, 请点击“意见发送”。

Figure C2-114: The closing page to explain the background of the study and provide subjects the possibility to write anonymous comments. <page 114>

**Remarks:** Actually page 111 and page 112 varied from condition to condition according to which teacher metaphor is actually provided under this condition. (see Table C2-5)

Table C2-5: The content of page 111 and page 112 according to various conditions.

Page	The metaphor to be evaluated		
	The Condition associated with the metaphor „The teacher is a candle“ ”	The Condition associated with the metaphor „The teacher is a captain“ ”	The Condition associated with the metaphor „The teacher is a shepherd“ ”
Page 111	教师是船长 („The teacher is a captain“)	教师是蜡烛 („The teacher is a candle“)	教师是船长 („The teacher is a captain“)
Page 112	教师是牧羊人 („The teacher is a shepherd“)	教师是牧羊人 („The teacher is a shepherd“)	教师是蜡烛 („The teacher is a candle“)

## Appendix D: Documentation of Statistical Data

### D1-1: Affective Impression-SAM Ratings

A three-factorial multivariate analysis of variance of the SAM ratings of the topic concept *teacher* in three metaphors. (Cultural group: Chinese/ Germans; Role play: no role play/ positive/ negative; Metaphors: The teacher is a candle/ The teacher is a captain/ The teacher is a shepherd)

Multivariate Tests(c)

Effekt	Wert	F	Hypothese df	Fehler df	Signifikan z	
constant Term	Pillai-Spur	,970	1559,292(a)	3,000	144,000	,000
	Wilks-Lambda	,030	1559,292(a)	3,000	144,000	,000
	Hotelling-Spur	32,485	1559,292(a)	3,000	144,000	,000
	Größte charakteristische Wurzel nach Roy	32,485	1559,292(a)	3,000	144,000	,000
Cultural group	Pillai-Spur	,009	,424(a)	3,000	144,000	,736
	Wilks-Lambda	,991	,424(a)	3,000	144,000	,736
	Hotelling-Spur	,009	,424(a)	3,000	144,000	,736
	Größte charakteristische Wurzel nach Roy	,009	,424(a)	3,000	144,000	,736
Role play	Pillai-Spur	,502	16,186	6,000	290,000	,000
	Wilks-Lambda	,555	16,414(a)	6,000	288,000	,000
	Hotelling-Spur	,698	16,639	6,000	286,000	,000
	Größte charakteristische Wurzel nach Roy	,487	23,559(b)	3,000	145,000	,000
Metaphor	Pillai-Spur	,130	3,347	6,000	290,000	,003
	Wilks-Lambda	,872	3,399(a)	6,000	288,000	,003
	Hotelling-Spur	,145	3,450	6,000	286,000	,003
	Größte charakteristische Wurzel nach Roy	,130	6,290(b)	3,000	145,000	,000
Cultural group * Role play	Pillai-Spur	,032	,796	6,000	290,000	,573
	Wilks-Lambda	,968	,796(a)	6,000	288,000	,574
	Hotelling-Spur	,033	,795	6,000	286,000	,574
	Größte charakteristische Wurzel nach Roy	,031	1,518(b)	3,000	145,000	,212
Role play * Metaphor	Pillai-Spur	,071	,883	12,000	438,000	,564
	Wilks-Lambda	,930	,878	12,000	381,280	,570
	Hotelling-Spur	,073	,872	12,000	428,000	,576
	Größte charakteristische Wurzel nach Roy	,041	1,495(b)	4,000	146,000	,207
Cultural group * Metaphor	Pillai-Spur	,231	6,313	6,000	290,000	,000
	Wilks-Lambda	,774	6,551(a)	6,000	288,000	,000
	Hotelling-Spur	,285	6,786	6,000	286,000	,000
	Größte charakteristische Wurzel nach Roy	,258	12,480(b)	3,000	145,000	,000

a Exakte Statistik

b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt.

c Design: Intercept+cultural group+role play+Metaphor+cultural group \*role play+role play \* Metaphor+cultural group \* Metaphor

## Tests of Between- Subject Effects

Source	Dependent variables	Type III Sum of squares	Df	Mean square	F	Sig.
Corrected model	Dominance	76,375(a)	13	5,875	5,620	,000
	Pleasure	29,603(b)	13	2,277	2,517	,004
	Arousal	93,956(c)	13	7,227	6,298	,000
Intercept	Dominance	1564,938	1	1564,938	1497,074	,000
	Pleasure	2329,738	1	2329,738	2575,060	,000
	Arousal	1650,630	1	1650,630	1438,433	,000
Cultural group	Dominance	1,328	1	1,328	1,271	,261
	Pleasure	,007	1	,007	,008	,929
	Arousal	,013	1	,013	,011	,916
Role play	Dominance	31,304	2	15,652	14,973	,000
	Pleasure	7,090	2	3,545	3,918	,022
	Arousal	77,989	2	38,994	33,981	,000
Metaphor	Dominance	9,788	2	4,894	4,682	,011
	Pleasure	7,092	2	3,546	3,919	,022
	Arousal	2,413	2	1,207	1,052	,352
Cultural group* Role play	Dominance	2,733	2	1,367	1,307	,274
	Pleasure	,964	2	,482	,533	,588
	Arousal	1,526	2	,763	,665	,516
Role play* Metaphor	Dominance	4,827	4	1,207	1,154	,334
	Pleasure	2,672	4	,668	,738	,567
	Arousal	3,901	4	,975	,850	,496
Cultural group* Metaphor	Dominance	26,251	2	13,126	12,557	,000
	Pleasure	11,728	2	5,864	6,481	,002
	Arousal	8,740	2	4,370	3,808	,024
Error	Dominance	152,618	146	1,045		
	Pleasure	132,091	146	,905		
	Arousal	167,538	146	1,148		
Total	Dominance	1861,000	160			
	Pleasure	2541,000	160			
	Arousal	1945,000	160			
Corrected total	Dominance	228,994	159			
	Pleasure	161,694	159			
	Arousal	261,494	159			

a R-Squared = ,334 (adjusted R-squared = ,274)

b R-squared = ,183 (adjusted R-squared = ,110)

c R-squared = ,359 (adjusted R-squared= ,302)

**D1-2: A two-factorial multivariate analysis of variance of the SAM ratings of the vehicle concept *candle* in the metaphor *The Teacher is a candle*. (Cultural group: Chinese/ Germans; Role play: no role play/ positive/ negative)**

**Multivariate Tests(c)**

Effekt		Wert	F	Hypothese df	Fehler df	Signifikanz
Konstanter Term	Pillai-Spur	,953	311,426(a)	3,000	46,000	,000
	Wilks-Lambda	,047	311,426(a)	3,000	46,000	,000
	Hotelling-Spur	20,310	311,426(a)	3,000	46,000	,000
	Größte charakteristische Wurzel nach Roy	20,310	311,426(a)	3,000	46,000	,000
Roleplay	Pillai-Spur	,112	,933	6,000	94,000	,475
	Wilks-Lambda	,890	,919(a)	6,000	92,000	,485
	Hotelling-Spur	,121	,906	6,000	90,000	,494
	Größte charakteristische Wurzel nach Roy	,091	1,420(b)	3,000	47,000	,249
Cultural group	Pillai-Spur	,193	3,670(a)	3,000	46,000	,019
	Wilks-Lambda	,807	3,670(a)	3,000	46,000	,019
	Hotelling-Spur	,239	3,670(a)	3,000	46,000	,019
	Größte charakteristische Wurzel nach Roy	,239	3,670(a)	3,000	46,000	,019
Role play *	Pillai-Spur	,694	8,321	6,000	94,000	,000
Cultural group	Wilks-Lambda	,425	8,181(a)	6,000	92,000	,000
	Hotelling-Spur	1,072	8,039	6,000	90,000	,000
	Größte charakteristische Wurzel nach Roy	,622	9,749(b)	3,000	47,000	,000

a Exakte Statistik b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt. c Design: Intercept+PN+Na+PN \* Na

## Tests of Between- Subject Effects

Source	Dependent variables	Type III Sum of squares	df	Mean square	F	Sig.
Corrected model	Dominance	37,012(a)	5	7,402	5,817	,000
	Pleasure	31,568(b)	5	6,314	4,026	,004
	Arousal	28,726(c)	5	5,745	3,988	,004
Intercept	Dominance	452,119	1	452,119	355,295	,000
	Pleasure	716,360	1	716,360	456,855	,000
	Arousal	253,484	1	253,484	175,969	,000
Role play	Dominance	3,826	2	1,913	1,503	,233
	Pleasure	1,574	2	,787	,502	,608
	Arousal	2,219	2	1,110	,770	,469
Cultural group	Dominance	10,427	1	10,427	8,194	,006
	Pleasure	2,336	1	2,336	1,490	,228
	Arousal	1,890	1	1,890	1,312	,258
Role play*	Dominance	21,481	2	10,741	8,440	,001
Cultural group	Pleasure	26,957	2	13,479	8,596	,001
	Arousal	21,936	2	10,968	7,614	,001
	Error	Dominance	61,081	48	1,273	
Error	Pleasure	75,265	48	1,568		
	Arousal	69,144	48	1,440		
	Total	Dominance	543,000	54		
Pleasure		855,000	54			
Arousal		369,000	54			
Corrected total	Dominance	98,093	53			
	Pleasure	106,833	53			
	Arousal	97,870	53			

a R-squared = ,377 (corrected R-squared= ,312)

b R-squared= ,295 (corrected R-squared = ,222)

c R-squared= ,294 (corrected R-squared = ,220)

**D1-3: A two-factorial multivariate analysis of variance of the SAM ratings of the vehicle concept *captain* in the metaphor *The Teacher is a captain*. (Cultural group: Chinese/ Germans; Role play: no role play/ positive/ negative)**

**Multivariate Tests(c)**

Effekt		Wert	F	Hypothese df	Fehler df	Signifikanz
Konstanter Term	Pillai-Spur	,975	620,861(a)	3,000	48,000	,000
	Wilks-Lambda	,025	620,861(a)	3,000	48,000	,000
	Hotelling-Spur	38,804	620,861(a)	3,000	48,000	,000
	Größte charakteristische Wurzel nach Roy	38,804	620,861(a)	3,000	48,000	,000
Role play	Pillai-Spur	,320	3,115	6,000	98,000	,008
	Wilks-Lambda	,690	3,258(a)	6,000	96,000	,006
	Hotelling-Spur	,433	3,395	6,000	94,000	,004
	Größte charakteristische Wurzel nach Roy	,395	6,447(b)	3,000	49,000	,001
Cultural group	Pillai-Spur	,018	,286(a)	3,000	48,000	,835
	Wilks-Lambda	,982	,286(a)	3,000	48,000	,835
	Hotelling-Spur	,018	,286(a)	3,000	48,000	,835
	Größte charakteristische Wurzel nach Roy	,018	,286(a)	3,000	48,000	,835
Role play *	Pillai-Spur	,203	1,847	6,000	98,000	,098
Cultural group	Wilks-Lambda	,800	1,885(a)	6,000	96,000	,091
	Hotelling-Spur	,245	1,920	6,000	94,000	,085
	Größte charakteristische Wurzel nach Roy	,226	3,684(b)	3,000	49,000	,018

a Exakte Statistik

b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt.

c Design: Intercept+PN+Na+PN \* Na

## Tests of Between- Subject Effects

Source	Dependent variables	Type III Sum of squares	df	Mittel der Quadrate	F	Sig.
Corrected model	Dominance	3,025(a)	5	,605	,818	,543
	Pleasure	22,270(b)	5	4,454	3,757	,006
	Arousal	17,989(c)	5	3,598	2,325	,056
Intercept	Dominance	1098,025	1	1098,025	1484,819	,000
	Pleasure	704,526	1	704,526	594,205	,000
	Arousal	520,372	1	520,372	336,296	,000
Role play	Dominance	1,136	2	,568	,768	,469
	Pleasure	14,332	2	7,166	6,044	,004
	Arousal	12,947	2	6,474	4,184	,021
Cultural group	Dominance	,013	1	,013	,017	,896
	Pleasure	,591	1	,591	,498	,483
	Arousal	,255	1	,255	,165	,687
Role play* cultural group	Dominance	1,663	2	,831	1,124	,333
	Pleasure	8,523	2	4,261	3,594	,035
	Arousal	3,417	2	1,709	1,104	,339
Error	Dominance	36,975	50	,740		
	Pleasure	59,283	50	1,186		
	Arousal	77,368	50	1,547		
Total	Dominance	1174,000	56			
	Pleasure	803,000	56			
	Arousal	636,000	56			
Corrected total	Dominance	40,000	55			
	Pleasure	81,554	55			
	Arousal	95,357	55			

a R-squared= ,076 (corrected R-squared = -,017)

b R-squared = ,273 (corrected R-squared = ,200)

c R-squared = ,189 (corrected R-squared = ,108)

**D1-4: A two-factorial multivariate analysis of variance of the SAM ratings of the vehicle concept *shepherd* in the metaphor *The Teacher is a shepherd*. (Cultural group: Chinese/ German; Role play: no role play/ positive/ negative)**

**Multivariate Tests(c)**

Effekt		Wert	F	Hypothese df	Fehler df	Signifikanz
Konstanter Term	Pillai-Spur	,978	630,136(a)	3,000	42,000	,000
	Wilks-Lambda	,022	630,136(a)	3,000	42,000	,000
	Hotelling-Spur	45,010	630,136(a)	3,000	42,000	,000
	Größte charakteristische Wurzel nach Roy	45,010	630,136(a)	3,000	42,000	,000
Role play	Pillai-Spur	,146	1,130	6,000	86,000	,352
	Wilks-Lambda	,859	1,109(a)	6,000	84,000	,364
	Hotelling-Spur	,159	1,088	6,000	82,000	,377
	Größte charakteristische Wurzel nach Roy	,109	1,558(b)	3,000	43,000	,213
Cultural group	Pillai-Spur	,641	25,008(a)	3,000	42,000	,000
	Wilks-Lambda	,359	25,008(a)	3,000	42,000	,000
	Hotelling-Spur	1,786	25,008(a)	3,000	42,000	,000
	Größte charakteristische Wurzel nach Roy	1,786	25,008(a)	3,000	42,000	,000
Role play *	Pillai-Spur	,540	5,301	6,000	86,000	,000
Cultural group	Wilks-Lambda	,507	5,665(a)	6,000	84,000	,000
	Hotelling-Spur	,881	6,018	6,000	82,000	,000
	Größte charakteristische Wurzel nach Roy	,759	10,881(b)	3,000	43,000	,000

a Exakte Statistik

b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt.

c Design: Intercept+PN+Na+PN \* Na

## Tests of Between- Subject Effects

Source	Dependent variables	Type III Sum of squares	df	Mean square	F	Sig.
Corrected model	Dominance	47,495(a)	5	9,499	16,569	,000
	Pleasure	24,670(b)	5	4,934	6,005	,000
	Arousal	19,970(c)	5	3,994	2,893	,024
Intercept	Dominance	414,008	1	414,008	722,154	,000
	Pleasure	787,876	1	787,876	958,964	,000
	Arousal	497,931	1	497,931	360,641	,000
Role play	Dominance	,016	2	,008	,014	,986
	Pleasure	2,189	2	1,095	1,332	,274
	Arousal	5,292	2	2,646	1,917	,159
Cultural group	Dominance	44,422	1	44,422	77,485	,000
	Pleasure	3,531	1	3,531	4,298	,044
	Arousal	,776	1	,776	,562	,457
Role play *cultural group	Dominance	1,954	2	,977	1,704	,194
	Pleasure	17,439	2	8,720	10,613	,000
	Arousal	13,882	2	6,941	5,027	,011
Error	Dominance	25,225	44	,573		
	Pleasure	36,150	44	,822		
	Arousal	60,750	44	1,381		
Total	Dominance	476,000	50			
	Pleasure	837,000	50			
	Arousal	580,000	50			
Corrected total	Dominance	72,720	49			
	Pleasure	60,820	49			
	Arousal	80,720	49			

a R-squared = ,653 (corrected R-squared= ,614)

b R-squared= ,406 (corrected R-squared= ,338)

c R-squared = ,247 (corrected R-squared= ,162)

## D2: Conceptual Representation - Feature Analysis

Table D2- 1: The most central and the most peripheral features according to the Chinese and the Germans' ratings at three teacher metaphors under various conditions - summarized from the correspondent dendrograms in 4.3.2 --- bold highlighting indicates that the common features that both the Chinese and the Germans shared as the central features or the peripheral features; red colour indicates that the central features taken by the Chinese (Germans) are regarded by their Germans (Chinese) as the most peripheral features or vice versa.

Metaphors	Role play conditions	Features clusters	of Cultural groups	Features
"Teacher is a candle"	no role play	most central features	Chinese	<b>unselfishness, self-sacrifice, tolerance, friendliness, care, plainness, diligence, warmth, brightness, trust, patience, model, delight,</b>
			Germans	<b>warmth, brightness, plainness, friendliness, romance, optimism, calmness</b>
		Chinese	intelligence, authority, watchfulness, <b>influence</b> , quietness	
		Germans	<b>tolerance, care,</b> thoughtfulness, orientation, helpfulness, leadership, strictness, experience, <b>self-sacrifice, unselfishness,</b> courage, <b>diligence,</b> justice, responsibility, <b>influence, authority,</b>	
	role play-positive	most central features	Chinese	<b>warmth, care, love, unselfishness, patience, model, self-sacrifice, enthusiasm, tolerance, trust, responsibility, optimism, thoughtfulness, influence, justice, orientation, diligence, courage, plainness, leadership, friendliness, intelligence, experience, calmness, brightness, delight, helpfulness</b>
			Germans	<b>enthusiasm, diligence, helpfulness, justice, responsibility, patience, care, warmth, brightness, friendliness, trust, quietness, delight, love, tolerance, orientation, optimism, thoughtfulness, calmness, plainness, influence, experience, courage</b>
		Chinese	<b>Lightheartedness</b>	
		Germans	<b>light-heartedness,</b> romance, model	
	role play-negative	most central features	Chinese	justice, <b>brightness, model, friendliness, patience, warmth, plainness,</b> optimism, responsibility, unselfishness, calmness, quietness, enthusiasm, helpfulness, <b>love, thoughtfulness,</b> self-sacrifice, <b>care,</b> tolerance, trust, diligence
			Germans	<b>friendliness, care,</b> helpfulness, <b>brightness,</b> justice, <b>warmth, thoughtfulness, patience, model</b>
		Chinese	<b>Romance</b>	
		Germans		

		features	Germans	plainness, unselfishness, love, romance
"Teacher is a captain"	no role play	most central features	Chinese	responsibility, model, authority, trust, leadership, influence, delight, friendliness, diligence, love, enthusiasm, tolerance, care, patience, watchfulness, quietness, intelligence, justice, optimism, courage, strictness, orientation, experience, helpfulness, thoughtfulness
			Germans	responsibility, model, watchfulness, diligence, leadership, authority, influence, experience, courage, strictness, friendliness, patience, optimism, orientation, helpfulness, intelligence, quietness, justice
		most peripheral features	Chinese	Lightheartedness
			Germans	lightheartedness, romance, plainness, brightness, delight
		most central features	Chinese	experience, calmness, responsibility, model, optimism, trust, justice, orientation, influence, authority, leadership, intelligence, strictness, diligence, warmth, self-sacrifice, plainness, enthusiasm, love, patience, courage, tolerance, care, brightness, unselfishness, thoughtfulness, helpfulness, quietness, watchfulness, friendliness
			Germans	watchfulness, influence, leadership, orientation, enthusiasm, model, authority, diligence, experience, responsibility, courage, care, unselfishness, justice, trust, thoughtfulness, quietness, intelligence, calmness
	most peripheral features	Chinese	light-heartedness, romance, delight	
		Germans	light-heartedness, romance	
	role play-positive	most central features	Chinese	responsibility, orientation, quietness, strictness, optimism, thoughtfulness, leadership, care, authority, influence, unselfishness
			Germans	experience, courage, watchfulness, unselfishness, optimism, leadership, orientation, responsibility, authority, calmness, justice, influence, strictness, enthusiasm, intelligence, model, quietness, thoughtfulness
		most peripheral features	Chinese	light-heartedness, romance, delight, watchfulness
	role play-negative	most peripheral features	Germans	romance, care, love, warmth, light-heartedness
Chinese			plainness, optimism, friendliness, tolerance, patience, helpfulness, experience	
"Teacher is a shepherd"	no role play	most central features	Chinese	plainness, optimism, friendliness, tolerance, patience, helpfulness, experience

			Germans	orientation, <b>care</b> , leadership, watchfulness, <b>responsibility</b> , courage, intelligence, <b>optimism</b> , love, <b>helpfulness</b> , <b>friendliness</b> , <b>experience</b> , model
	most peripheral features		Chinese	<b>responsibility, care</b>
			Germans	light-heartedness
	most central features		Chinese	<b>enthusiasm</b> , calmness, <b>diligence</b> , <b>orientation</b> , <b>patience</b> , <b>tolerance</b> , <b>lightheartedness</b> , plainness, optimism, <b>friendliness</b> , <b>delight</b>
			Germans	<b>tolerance</b> , care, unselfishness, <b>friendliness</b> , trust, responsibility, <b>orientation</b> , watchfulness, <b>delight</b> , <b>patience</b> , <b>enthusiasm</b> , love, model, <b>diligence</b> , leadership, influence, experience, intelligence
role play-positive	most peripheral features		Chinese	Romance
			Germans	<b>Lightheartedness</b>
	most central features		Chinese	<b>tolerance</b> , <b>trust</b> , <b>patience</b> , <b>helpfulness</b> , enthusiasm, <b>friendliness</b> , diligence, <b>optimism</b> , <b>justice</b> , <b>plainness</b> , <b>romance</b> , <b>unselfishness</b> , self-sacrifice, brightness, <b>care</b> , warmth, <b>responsibility</b> , <b>love</b>
			Germans	courage, <b>care</b> , <b>trust</b> , watchfulness, <b>friendliness</b> , <b>love</b> , quietness, <b>patience</b> , orientation, <b>model</b> , <b>helpfulness</b> , <b>responsibility</b> , leadership, influence, <b>unselfishness</b> , <b>thoughtfulness</b> , <b>intelligence</b> , strictness, <b>plainness</b> , calmness, <b>tolerance</b> , <b>justice</b> , <b>optimism</b>
role play-negative	most peripheral features		Chinese	<b>thoughtfulness</b> , <b>model</b> , <b>intelligence</b>
			Germans	light-heartedness, <b>romance</b>

**Table D2- 2: The most central and the most peripheral features according to the Chinese and the Germans' ratings at the correspondent vehicle concepts of the three teacher metaphors under various conditions - summarized from the correspondent dendrograms in 4.3.2 --- bold highlighting indicates that the common features that both the Chinese and the Germans shared as the central features or the peripheral features; red colour indicates that the central features taken by the Chinese (Germans) are regarded by their Germans (Chinese) as the most peripheral features or vice versa.**

Metaphors	Role play conditions	Features clusters	of Cultural groups	Features	
vehicle concept "candle " in the metaphor "Teacher is a candle"	no role play	most central features	Chinese	<b>warmth, brightness</b> , self-sacrifice, <b>plainness</b> , friendliness, calmness, tolerance, patience, care, trust, responsibility, unselfishness, romance, <b>quietness</b>	
			Germans	<b>warmth, brightness, plainness, quietness</b>	
		most peripheral features	Chinese	thoughtfulness, lightheartedness, strictness	
			Germans	Intelligence	
		role play-positive	most central features	Chinese	self-sacrifice, <b>warmth</b> , unselfishness, <b>brightness, plainness, love</b> , diligence, trust, tolerance, orientation, justice, <b>enthusiasm, friendliness, quietness</b>
				Germans	<b>warmth, brightness, quietness, romance</b> , love, friendliness, enthusiasm, helpfulness, calmness, <b>plainness</b>
	role play-negative	most peripheral features	Chinese	delight, <b>romance</b>	
			Germans	watchfulness, patience, leadership	
	vehicle concept "captain" in the metaphor	no role play	most central features	Chinese	<b>warmth, brightness, self-sacrifice</b> , friendliness, <b>calmness</b> , unselfishness, trust, <b>tolerance</b>
				Germans	<b>warmth, brightness</b> , love, romance, quietness, delight, <b>calmness</b>
			most peripheral features	Chinese	Leadership
				Germans	model, diligence, care, responsibility, <b>tolerance</b> , justice, <b>self-sacrifice</b> , watchfulness, influence, leadership
no role play	most central features	Chinese	<b>leadership, authority, influence, model</b> , strictness, <b>watchfulness, responsibility</b> , thoughtfulness, <b>experience</b>		
		Germans	<b>model, influence, watchfulness, leadership, authority, responsibility, experience</b> , diligence, courage, quietness, optimism, intelligence, orientation, trust		

"Teacher is a captain"		most peripheral features	Chinese	love, brightness, self-sacrifice
			Germans	light-heartedness
	role play-positive	most central features	Chinese	<b>orientation</b> , strictness, <b>leadership</b> , <b>responsibility</b> , <b>intelligence</b> , <b>model</b> , <b>experience</b> , <b>influence</b> , calmness, <b>authority</b> , thoughtfulness, <b>courage</b> , <b>justice</b> , <b>helpfulness</b> , care, friendliness, <b>trust</b> , patience
			Germans	<b>responsibility</b> , <b>model</b> , <b>authority</b> , <b>leadership</b> , watchfulness, <b>influence</b> , <b>courage</b> , <b>diligence</b> , <b>justice</b> , <b>self-sacrifice</b> , <b>quietness</b> , <b>orientation</b> , <b>intelligence</b> , <b>helpfulness</b> , <b>experience</b> , <b>trust</b>
	role play-positive	most peripheral features	Chinese	<b>diligence</b> , love, <b>quietness</b> , enthusiasm, <b>self-sacrifice</b> , unselfishness, brightness, <b>lightheartedness</b> , warmth, plainness, <b>romance</b>
			Germans	<b>light-heartedness</b> , <b>romance</b>
	role play-negative	most central features	Chinese	<b>leadership</b> , <b>courage</b> , <b>watchfulness</b> , thoughtfulness, <b>intelligence</b> , <b>model</b> , <b>trust</b> , <b>experience</b> , <b>calmness</b> , <b>responsibility</b> , <b>influence</b> , <b>orientation</b> , <b>strictness</b> , authority
			Germans	authority, influence, <b>leadership</b> , <b>watchfulness</b> , <b>responsibility</b> , <b>intelligence</b> , <b>orientation</b> , <b>experience</b> , <b>courage</b> , quietness, optimism, <b>model</b> , <b>strictness</b> , <b>calmness</b>
		most peripheral features	Chinese	light-heartedness, romance
			Germans	tolerance, brightness, delight
vehicle concept "shepherd" in the concept "Teacher is a shepherd"			Chinese	<b>patience</b> , <b>friendliness</b> , calmness, <b>tolerance</b> , <b>love</b> , quietness, <b>enthusiasm</b> , diligence
		most central features	Germans	orientation, care, influence, responsibility, watchfulness, <b>courage</b> , <b>love</b> , plainness, diligence, model, <b>optimism</b> , delight, <b>enthusiasm</b> , helpfulness, justice, <b>patience</b> , trust, calmness, <b>friendliness</b> , <b>tolerance</b> , experience, unselfishness
	no role play	most peripheral features	Chinese	<b>courage</b> , strictness, <b>optimism</b> , delight
			Germans	Authority
	role play-positive		Chinese	enthusiasm, tolerance, patience, diligence, <b>watchfulness</b> , romance, responsibility, friendliness, <b>helpfulness</b>
		most central features	Germans	leadership, care, responsibility, <b>watchfulness</b> , <b>helpfulness</b> , unselfishness, trust, <b>thoughtfulness</b> , warmth
		most peripheral features	Chinese	authority, strictness, <b>thoughtfulness</b>

		features	Germans	Lightheartedness
		most central features	Chinese	<b>love, care, intelligence, justice, responsibility, patience</b>
			Germans	<b>responsibility, watchfulness, patience, trust, care, love, helpfulness, leadership, experience, quietness, diligence, orientation, influence, courage, self-sacrifice, thoughtfulness, delight, friendliness, model, plainness, calmness, enthusiasm, optimism, justice</b>
role play-negative	most peripheral features		Chinese	warmth, brightness, unselfishness, self-sacrifice, model
			Germans	lightheartedness, romance

### D3: Suitability of Three Teacher Metaphors

#### D3-1: Descriptive statistics of the suitability rating of three teacher metaphors.

	Cultural groups	Role play	The Metaphor provided in the experiment	Means	standard deviation
Suitability of the metaphor: „The teacher is a candle“	Chinese	no role play	candle metaphor	5,00	,000
			captain metaphor	3,70	,1703
			shepherd metaphor	4,10	,1287
		role play -positive	candle metaphor	4,80	,422
			captain metaphor	4,60	,699
			shepherd metaphor	4,40	,516
		role play -negative	candle metaphor	2,60	,843
			captain metaphor	4,56	,882
			shepherd metaphor	4,50	,707
		Total	candle metaphor	4,13	1,224
			captain metaphor	4,28	1,222
			shepherd metaphor	4,33	,884
	Germans	no role play	candle metaphor	2,60	1,174
			captain metaphor	1,80	1,229
			shepherd metaphor	2,20	1,317
		role play -positive	candle metaphor	3,00	1,633
			captain metaphor	2,20	1,135
			shepherd metaphor	1,60	,843
		role play -negative	candle metaphor	2,20	1,317
			captain metaphor	3,00	1,333
			shepherd metaphor	2,50	1,080
Total		candle metaphor	2,60	1,380	
		captain metaphor	2,33	1,295	
		shepherd metaphor	2,10	1,125	
Suitability of the metaphor: „The teacher is a captain“	Chinese	no role play	candle metaphor	4,20	1,033
			captain metaphor	3,80	,919
			shepherd metaphor	3,10	1,197
		role play -positive	candle metaphor	4,30	,823
			captain metaphor	4,20	,632
			shepherd metaphor	3,80	,789
		role play -negative	candle metaphor	4,10	,994
			captain metaphor	2,22	1,202
			shepherd metaphor	3,90	,876
		Total	candle metaphor	4,20	,925
			captain metaphor	3,45	1,242
			shepherd metaphor	3,60	1,003
	Germans	no role play	candle metaphor	3,90	1,197
			captain metaphor	3,60	,966
			shepherd metaphor	4,20	,919
		role play -positive	candle metaphor	3,50	1,581
			captain metaphor	4,00	1,054
			shepherd metaphor	3,90	,738
		role play -negative	candle metaphor	3,90	1,101

			captain metaphor	2,40	1,265
			shepherd metaphor	4,70	,675
		Total	candle metaphor	3,77	1,278
			captain metaphor	3,33	1,269
			shepherd metaphor	4,27	,828
Suitability of the metaphor: "The teacher is a shepherd"	Chinese	no role play	candle metaphor	1,70	1,252
			captain metaphor	3,20	1,033
			shepherd metaphor	3,70	1,494
		role play -positive	candle metaphor	2,00	,816
			captain metaphor	2,20	,632
			shepherd metaphor	3,10	1,287
		role play -negative	candle metaphor	3,00	1,333
			captain metaphor	2,00	,707
			shepherd metaphor	1,10	,316
		Total	candle metaphor	2,23	1,251
			captain metaphor	2,48	,949
			shepherd metaphor	2,63	1,586
	Germans	no role play	candle metaphor	4,50	,972
			captain metaphor	3,60	,966
			shepherd metaphor	4,90	,316
		role play -positive	candle metaphor	4,80	,632
			captain metaphor	4,00	1,054
			shepherd metaphor	4,90	,316
		role play -negative	candle metaphor	4,60	,516
			captain metaphor	4,10	,738
			shepherd metaphor	2,80	1,135
Total		candle metaphor	4,63	,718	
		captain metaphor	3,90	,923	
		shepherd metaphor	4,20	1,215	

**Table D3-2: A three-factorial multivariate analysis of variance of the SAM ratings of the metaphor suitability. (Cultural group: Chinese/ Germans; Role play: no role play/ positive/ negative; The metaphors appeared in the experiment: The teacher is a candle/ The teacher is a captain/ The teacher is a shepherd)**

**Multivariate Tests(c)**

Effekt		Wert	F	Hypothese df	Fehler df	Signifikanz
Konstanter Term	Pillai-Spur	,973	1902,577(a)	3,000	159,000	,000
	Wilks-Lambda	,027	1902,577(a)	3,000	159,000	,000
	Hotelling-Spur	35,898	1902,577(a)	3,000	159,000	,000
	Größte charakteristische Wurzel nach Roy	35,898	1902,577(a)	3,000	159,000	,000
Cultural group	Pillai-Spur	,650	98,441(a)	3,000	159,000	,000
	Wilks-Lambda	,350	98,441(a)	3,000	159,000	,000
	Hotelling-Spur	1,857	98,441(a)	3,000	159,000	,000
	Größte charakteristische Wurzel nach Roy	1,857	98,441(a)	3,000	159,000	,000
Role play	Pillai-Spur	,124	3,510	6,000	320,000	,002
	Wilks-Lambda	,878	3,566(a)	6,000	318,000	,002
	Hotelling-Spur	,137	3,621	6,000	316,000	,002
	Größte charakteristische Wurzel nach Roy	,125	6,649(b)	3,000	160,000	,000
Metaphor	Pillai-Spur	,086	2,403	6,000	320,000	,028
	Wilks-Lambda	,914	2,436(a)	6,000	318,000	,026
	Hotelling-Spur	,094	2,468	6,000	316,000	,024
	Größte charakteristische Wurzel nach Roy	,090	4,808(b)	3,000	160,000	,003
Cultural group * Role play	Pillai-Spur	,083	2,299	6,000	320,000	,035
	Wilks-Lambda	,919	2,294(a)	6,000	318,000	,035
	Hotelling-Spur	,087	2,288	6,000	316,000	,035
	Größte charakteristische Wurzel nach Roy	,062	3,330(b)	3,000	160,000	,021
Cultural group * Metaphor	Pillai-Spur	,133	3,793	6,000	320,000	,001
	Wilks-Lambda	,869	3,849(a)	6,000	318,000	,001
	Hotelling-Spur	,148	3,905	6,000	316,000	,001
	Größte charakteristische Wurzel nach Roy	,131	6,987(b)	3,000	160,000	,000
Role play * Metaphor	Pillai-Spur	,588	9,809	12,000	483,000	,000
	Wilks-Lambda	,495	10,667	12,000	420,966	,000
	Hotelling-Spur	,852	11,198	12,000	473,000	,000
	Größte charakteristische Wurzel nach Roy	,566	22,779(b)	4,000	161,000	,000
Cultural group * Role play * Metaphor	Pillai-Spur	,106	1,478	12,000	483,000	,128
	Wilks-Lambda	,895	1,497	12,000	420,966	,122
	Hotelling-Spur	,115	1,513	12,000	473,000	,116
	Größte charakteristische Wurzel nach Roy	,098	3,928(b)	4,000	161,000	,005

a Exakte Statistik

b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt.

c Design: Intercept+CG+RP+Me+CG \* RP+CG \* Me+RP \* Me+CG \* RP \* Me

## Tests of Between- Subject Effects

Source	Dependent variable	Type III Sum of squares	df	Mean square	F	Signifikanz
Corrected model	Suitability of the candle metaphor	222,672(a)	17	13,098	10,971	,000
	Suitability of the captain metaphor	65,153(b)	17	3,833	3,663	,000
	Suitability of the shepherd metaphor	240,427(c)	17	14,143	16,218	,000
Intercept	Suitability of the candle metaphor	1945,260	1	1945,260	1629,296	,000
	Suitability of the captain metaphor	2532,313	1	2532,313	2420,237	,000
	Suitability of the shepherd metaphor	2001,004	1	2001,004	2294,598	,000
Cultural group	Suitability of the candle metaphor	162,504	1	162,504	136,109	,000
	Suitability of the captain metaphor	,126	1	,126	,120	,729
	Suitability of the shepherd metaphor	144,906	1	144,906	166,167	,000
Role play	Suitability of the candle metaphor	1,656	2	,828	,693	,501
	Suitability of the captain metaphor	5,188	2	2,594	2,479	,087
	Suitability of the shepherd metaphor	15,326	2	7,663	8,787	,000
Metaphor	Suitability of the candle metaphor	,687	2	,344	,288	,750
	Suitability of the captain metaphor	13,734	2	6,867	6,563	,002
	Suitability of the shepherd metaphor	2,316	2	1,158	1,328	,268
Cultural group * Role play	Suitability of the candle metaphor	8,209	2	4,104	3,438	,035
	Suitability of the captain metaphor	2,820	2	1,410	1,347	,263
	Suitability of the shepherd metaphor	3,333	2	1,667	1,911	,151
Cultural group * Metaphor	Suitability of the candle metaphor	3,721	2	1,861	1,558	,214
	Suitability of the captain metaphor	9,434	2	4,717	4,508	,012
	Suitability of the shepherd metaphor	8,196	2	4,098	4,700	,010
Role play * Metaphor	Suitability of the candle metaphor	39,599	4	9,900	8,292	,000

	Suitability of the captain metaphor	33,930	4	8,482	8,107	,000
	Suitability of the shepherd metaphor	56,205	4	14,051	16,113	,000
Cultural group * Role play * Metaphor	Suitability of the candle metaphor	6,456	4	1,614	1,352	,253
	Suitability of the captain metaphor	1,310	4	,328	,313	,869
	Suitability of the shepherd metaphor	10,613	4	2,653	3,043	,019
Fehler	Suitability of the candle metaphor	192,222	161	1,194		
	Suitability of the captain metaphor	168,456	161	1,046		
	Suitability of the shepherd metaphor	140,400	161	,872		
Total	Suitability of the candle metaphor	2353,000	179			
	Suitability of the captain metaphor	2779,000	179			
	Suitability of the shepherd metaphor	2392,000	179			
Corrected Total	Suitability of the candle metaphor	414,894	178			
	Suitability of the captain metaphor	233,609	178			
	Suitability of the shepherd metaphor	380,827	178			

a R-Squared = ,537 (adjusted R-Squared = ,488)

b R-Squared = ,279 (adjusted R-Squared= ,203)

c R-Squared= ,631 (adjusted R-Squared = ,592)

Table D3-3: Correlation test of the metaphor suitability.

		Cultural groups	Role play	Metaphors provided	Suitability of the candle metaphors	Suitability of the captain metaphor	Suitability of the shepherd metaphor
Cultural groups	Korrelation nach Pearson	1	,000	,000	-,625(**)	,016	,615(**)
	Signifikanz (2-seitig)		1,000	1,000	,000	,834	,000
	N	180	180	180	179	179	179
Role play	Korrelation nach Pearson	,000	1	,000	-,008	-,085	-,182(*)
	Signifikanz (2-seitig)	1,000		1,000	,919	,256	,015
	N	180	180	180	179	179	179
Metaphors provided	Korrelation nach Pearson	,000	,000	1	-,040	-,018	-,005
	Signifikanz (2-seitig)	1,000	1,000		,592	,812	,950
	N	180	180	180	179	179	179
Suitability of the candle metaphor	Korrelation nach Pearson	-,625(**)	-,008	-,040	1	-,032	-,464(**)
	Signifikanz (2-seitig)	,000	,919	,592		,667	,000
	N	179	179	179	179	179	179
Suitability of the captain metaphor	Korrelation nach Pearson	,016	-,085	-,018	-,032	1	,022
	Signifikanz (2-seitig)	,834	,256	,812	,667		,775
	N	179	179	179	179	179	179
Suitability of the shepherd metaphor	Korrelation nach Pearson	,615(**)	-,182(*)	-,005	-,464(**)	,022	1
	Signifikanz (2-seitig)	,000	,015	,950	,000	,775	
	N	179	179	179	179	179	179

\*\* Die Korrelation ist auf dem Niveau von 0,01 (2-seitig) signifikant.

\* Die Korrelation ist auf dem Niveau von 0,05 (2-seitig) signifikant.

## Appendix E: Documentation of a Relevant Study

Actually, the concepts involved in the three metaphors, namely *teacher*, *candle*, *captain* and *shepherd* have also been measured without the association of any metaphor according to the affective dimension through rating the SAM and through rating the 33 features, just as the online experiment of metaphor comprehension presented in the thesis. In that study, Altogether 93 participants took part in it. However, 22 participants dropped out (drop-out rate 23.65%) and the data sets of another 11 participants were judged as invalid although they did go through all the web pages. In this sense, only 30 Chinese (15 males and 15 females) and 30 German participants (13 females and 17 males) were entrusted as subjects. Both the Chinese participants and the German participants involve a homogenous age group. The average age for the Chinese subjects was 22,25 years ( $s = .275$ ) and for the German group was 22.04 years ( $s = .321$ ). In the following, E1 and E2 provide the screen shots of the Chinese and the German version of the study. E3 includes the results from the SAM ratings

### E1: The Screenshots (German Version)

This study was designed to evaluate the three concept pairs *teacher* and *candle*, *teacher* and *captain*, and *teacher* and *shepherd*. They are documented under the following URL address:

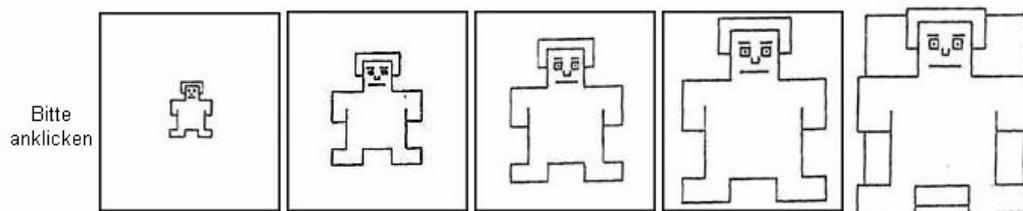
<http://heineken3.uni-duisburg.de/labor/versuche/huber1/admin/administrationsmenue.php4>.

The content, the structure and the order of the pages correspondent exactly to the display of the experiments implemented in internet. Since three conditions of the this study were based on the same protocol, the screen shots of the web pages for evaluating the concept pair, *teacher* and *candle* are provided here as an example. Moreover, the first five pages are identical to the opening pages of the Experiment (see Figure C1-1 to C1-5). They are not repeated here.



Wir alle haben bestimmte Vorstellungen von einem Lehrer . Auch Sie können sich leicht einen typischen Lehrer vorstellen.

Verbunden mit dieser Vorstellung sind gewiss auch bestimmte Gefühle. Wir möchten erfassen, welche Gefühle Sie mit dem Lehrer verbinden, den Sie sich jetzt vorstellen. Welches der folgenden Bilder passt am besten zu diesem Gefühl? Klicken Sie nur ein Bild an, das am besten passt.



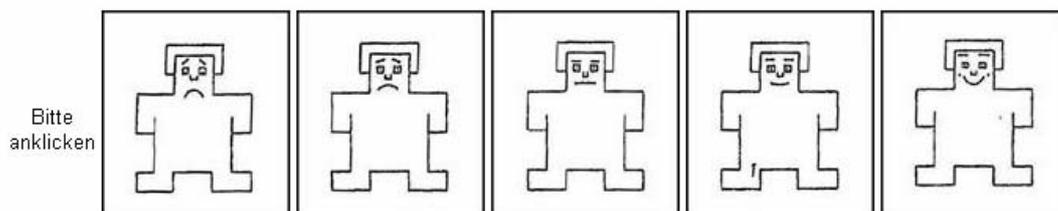
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-6: The SAM ratings of the concept *teacher*, *dominance* dimension. <page 6>



Jetzt erhalten Sie eine neue Reihe von Bildern.

Klicken Sie bitte wiederum das Bild an, das am ehesten zu Ihrem Gefühl passt, das sie mit dem von Ihnen vorgestellten typischen Lehrer verbinden.

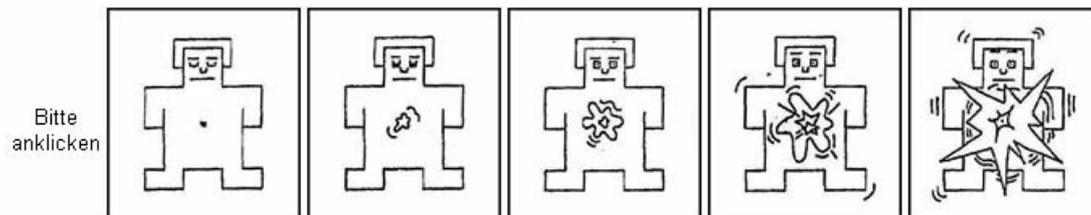


Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-7: The SAM ratings of the concept *teacher*, *pleasure* dimension. <page 7>



Noch eine Bilderreihe: Welches der Bilder passt am ehesten zu Ihrem Gefühl, das Sie mit dem vorgestellten typischen Lehrer verbinden?



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-8: The SAM ratings of the concept *teacher*, arousal dimension. <page 8>



Zu Ihrer Vorstellung von einem typischen Lehrer passen sicherlich bestimmte Begriffe sehr gut, andere dagegen sehr schlecht.

Sie erhalten nun eine Reihe von Begriffen, die zu dem Bild, das man sich von Lehrern macht, passen könnten.

Bitte geben Sie für jeden Begriff an, in welchem Maße der Begriff zu dem typischen Lehrer aus Ihrer Vorstellung passt.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-9: Instruction to feature evaluation. <page 9>



Wie gut passt der Begriff zu Ihrer Vorstellung

"der typische Lehrer"

## Besinnung

passt überhaupt nicht



passt in vollem Maße

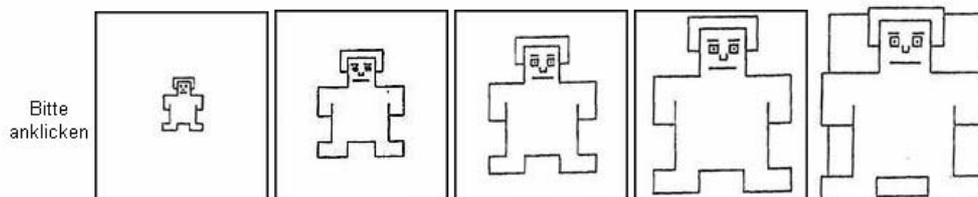
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-10: The feature ratings of a typical teacher- *Besinnung (thoughtfulness)* as the first feature of the 33 selected features. <page 10>

**Remarks:** The next 32 web pages (from page 11 to page 43) are identical in their formats with this one. Only the feature "Besinnung (thoughtfulness)" will be replaced by one of the features in the following listed order, *Verantwortung, Intelligenz, Führung, Wachsamkeit, Sorglosigkeit, Freude, Geduld, Schlichtheit, Leidenschaft, Vorbild, Fleiß, Liebe, Orientierung, Autorität, Einfluß, Romantik, Hilfsbereitschaft, Selbstlosigkeit, Erfahrung, Gelassenheit, Mut, Ruhe, Gerechtigkeit, Strenge, Aufopferung, Optimismus, Freundlichkeit, Toleranz, Vertrauen, Wärme, Helligkeit, Fürsorge*. To save space, E1-11 to E1-43 are not presented here.



Nun etwas anderes: Wir alle haben bestimmte Vorstellungen von einer Kerze. Versuchen Sie sich eine **KERZE** vorzustellen. Welche Gefühle verbinden Sie mit dieser Vorstellung? Welches der folgenden Bilder passt am besten zu diesem Gefühl? Klicken Sie nur ein Bild an, das am besten passt.



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-44: The SAM ratings of the concept *candle*, dominance dimension <page 44> (Under other conditions, the concept *candle* could be replaced by one of the other concepts, namely *captain* or *shepherd*.)

**Remarks:** the next 36 web pages (E1-45- E1-80) are not presented here, as their format are identical to those of the web pages, page 7 to page 43 ( Figure E1-7 to Figure E1-43 ) unless the concept *teacher* is replaced by the concept *candle* .



Zurück zum Thema "Lehrer": Lehrer unterscheiden sich darin, an welchem Leitbild Sie sich beim Umgang mit Ihren Schülern orientieren. Sie erhalten nun drei Leitbilder.  
Bitte geben Sie an, in welchem Maße die Leitbilder jeweils zu dem von Ihnen vorgestellten typischen Lehrer passen.

WEITER

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-81: General instruction to the suitability evaluation of the three teacher metaphors. <page 81>



Wie gut passt das Leitbild zu Ihrer Vorstellung,

"der typische Lehrer"

"Der Lehrer ist eine Kerze"

passt überhaupt nicht      passt in vollem Maße

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E1-82: The suitability evaluation of the teacher metaphor *The teacher is a candle*. <page 82>

**Remarks:** The next two web pages (from page 83 to page 84) are identical in their formats with this one. The only difference is that the page 83 is devoted to rate the suitability of the teacher metaphor, *The teacher is a captain*, and page 84 is to rate the suitability of the teacher metaphor *The teacher is a shepherd*.



Finden Sie andere Leitbilder passender? Welche ?

WEITER

[Lab.OR - Laboratorium für Online Research](#) (C) 2002 - 2007 [Schulte, FG Kognitionspsychologie](#)

Figure E1-85: Other suitable teacher metaphors. <page 85>



**Das Experiment ist nun zu Ende. Vielen Dank für Ihre Teilnahme!**

**Hintergrund der Studie:**

Mein Name ist Dehui Zhou. Im Rahmen meiner Doktor-Arbeit möchte ich ermitteln, ob die Leitbilder, an denen sich Lehrer orientieren, ihren Umgang mit Schülern im Klassenzimmer bestimmen. Speziell interessieren wir uns dafür, ob Deutsche und Chinesen sich in ihren Leitbildern unterscheiden. Diese und andere weitgehend ungeklärte Fragen wollen wir mit Ihrer Hilfe etwas genauer beantworten.

Als Versuchsleiterin danke ich Ihnen herzlich für Ihre engagierte Teilnahme!  
Wenn Sie Fragen haben, können Sie sich gerne an mich wenden:

[wsmum@web.de](mailto:wsmum@web.de)

Möchten Sie noch eine Anmerkung zu diesem Experiment machen? Sie können dies in dem folgenden Feld tun. Bitte klicken Sie danach auf "Anmerkung absenden".

Anmerkung absenden

Figure E1-86: The closing page to explain the background of the study and provide subjects the possibility to write anonymous comments. <page 86 >

## E2: The Screenshots (Chinese Version)

The Chinese version of this relevant study was the translation of the German version. The Chinese version was provided to the Chinese subjects to evaluate the three concept pairs, *teacher* and *candle*, *teacher* and *captain*, and *teacher* and *shepherd* without referring to the correspondent metaphor. They are documented under the following URL address:

<http://heineken3.uni-duisburg.de/labor/versuche/dehui1/admin/administrationsmenue.php4>.

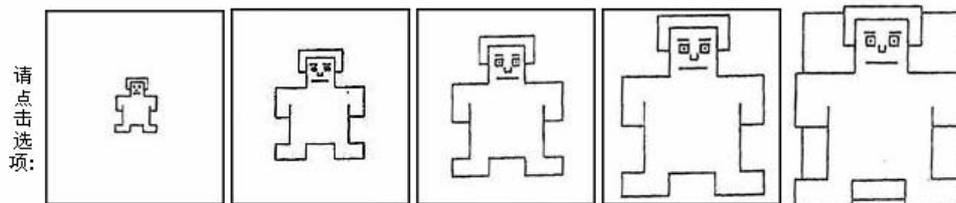
Since the three various conditions of this study was based on the same protocol, the screen shots of the Chinese web pages for evaluating the concept pair *teacher* and *candle* are provided as the following figures numbered after E2-X:



我们每个人对教师都有自己特定的认识。现在请您试着想象一位

### 典型的教师

对于您心目中这位典型教师的形象, 也一定伴随着某些内在的心理感受。以下一系列图中哪一幅最能表达您对典型教师的所产生的感受呢? 请选出最能反映您感受的那幅图。



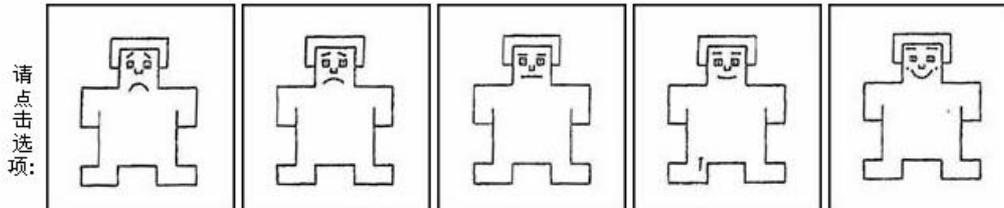
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-6: The SAM ratings of the concept *teacher*, *dominance* dimension. <page 6>

现在请看另一组图片。请您选出其中最能反映您对心目中的

## 典型教师

的感受的那幅图。



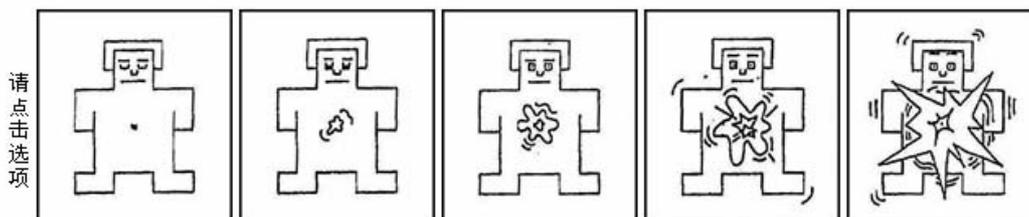
Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-7: The SAM ratings of the concept *teacher*, *pleasure* dimension. <page 7>

请看第三列图：其中哪一幅图最能反映您心目中对

## 典型教师

的感受。



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-8: The SAM ratings of the concept *teacher*, *arousal* dimension. <page 8>



针对您所联想到的

## 典型教师

的形象, 用某些特征词来描述, 肯定非常合适, 而另一些相比之下却不那么合适。紧接着出现的一组特征词下面都有从最不合适到最合适的五个不同的等级, 请联系您心目中典型教师的形像, 给予适当的判断。

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-9: Instruction to feature evaluation. <page 9>



如果用下面这个特征词来形容

## "典型教师"

您认为是否适合? 请由低到高选择其适合程度:

## 深思熟虑

非常不合适

○ ○ ○ ○ ○

非常合适

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

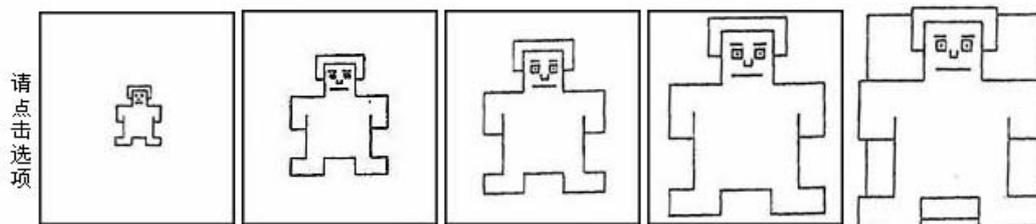
Figure E2-10: The feature evaluation of a typical teacher -*thoughtfulness* as the first feature of 33 feature list. <page 10>

**Remarks:** The next 32 web pages (from page 11 to page 43) are identical in their formats with this one. Only the feature "(thoughtfulness)" will be replaced by one of the features in the following listed order, 责任, 睿智, 领导才能, 警惕性, 无忧无虑, 快乐, 耐心, 朴实, 热情, 以身作则, 辛劳, 爱心, 方向感, 专制, 影响力, 浪漫, 乐于助人, 无私, 经验, 镇定, 勇气, 安静, 公正, 严格, 奉献, 乐观, 友好, 耐心, 信任, 温暖, 光明, 关怀. To save space, E2-11 to E2-43 are not presented here.

现在让我们看看另一概念:

## 蜡烛

我们都知道蜡烛。如果请您现在在心里想象一根蜡烛，这一蜡烛形象一定会带给您某些特定的内在感受。下面几幅图中哪一幅最能反映您的这种感受？请选出其中最能反映您感受的那幅图。



Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-44: The SAM ratings of the concept *candle*, dominance dimension. <page 44> (Under other conditions, the concept *candle* could be replaced by one of the other concepts, namely *captain* or *shepherd*.)

**Remarks:** The next 36 web pages (E2-45 to E2-80) are not presented here, as their format were identical to those of the web pages, page 7 to page 43 ( Figure E2-7 to Figure E2-43 ), unless the concept *teacher* was replaced by the concept *candle* .

重新回到教师这个话题。同样是教师，其对教师职业形象的定位却有可能不同。不同的教师职业形象直接会影响其对学生的态度。接下来提供三种不同的教师职业形象，请问这些职业形象多大程度符合您所想象的那位典型教师？

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-81: General instruction to the suitability evaluation of the three teacher metaphors. <page 81>



Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

下面这一教师职业形象多大程度符合您想象的那位  
"典型教师"

---

"教师是蜡烛"

非常不合适                非常合适

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-82: The suitability evaluation of the teacher metaphor *The teacher is a candle* . <page 82>

**Remarks:** The next two web pages (from page 83 to page 84) are identical in their formats with this Figure E2-82. The only difference is that the page 83 is devoted to rate the suitability of the teacher metaphor *The teacher is a captain*, and page 84 is to rate the suitability of the teacher metaphor, *The teacher is a shepherd*.



Lab.OR  
Laboratorium für  
Online Research

UNIVERSITÄT  
DUISBURG  
ESSEN  
FG Kognitions-  
psychologie

此外, 您认为还有哪些教师职业形象(比喻)更适合您心目中的典型教师呢?

点击继续

Lab.OR - Laboratorium für Online Research (C) 2002 - 2007 Schulte, FG Kognitionspsychologie

Figure E2-85: other suitable teacher metaphors. <page 85>

实验到此结束,感谢您的参与!

#### 研究背景:

实验设计者周德慧,在这项实验中主要调查有关教师的不同隐喻模式是否会决定师生课堂交际行为的课题。该实验还涉及到中德文化中存在有关教师的不同隐喻模式。希望在您的协助下,我们能立求更深入地探究这方面的问题。

作为该实验的设计者,我对您的协作表示衷心感谢。  
如果您有相关问题,欢迎给我发邮件。

[wsmum@web.de](mailto:wsmum@web.de)

如果您对给实验有何意见建议,也欢迎您下面的空白处填写出您的反馈意见。填好后,请点击“意见发送”。

发送意见

Figure E2-86: the closing page is to explain the background of the study and provide subjects the possibility to write anonymous comments. <page 86 >

### E3: Results of the SAM Ratings

#### E3-1: Descriptive statistics of the SAM ratings from the Study I

Concept pairs: concept1& concept2	cultural groups		Concept. 1- "dominance"	Concept1- "pleasure"	concept 1- "arousal"	concept 2- "dominance"	concept 2- "pleasure"	concept 2- "arousal"
teacher & candle	Chinese	means	3,30	4,30	3,80	1,90	3,50	3,70
		N	10	10	10	10	10	10
		standard deviation	1,059	0,675	0,789	0,568	1,434	0,949
	Germans	means	3,50	3,50	2,70	3,40	3,70	1,70
		N	10	10	10	10	10	10
		standard deviation	1,080	0,707	0,823	1,578	1,418	0,823
	Total	means	3,40	3,90	3,25	2,65	3,60	2,70
		N	20	20	20	20	20	20
		standard deviation	1,046	0,788	0,967	1,387	1,392	1,342
teacher & captain	Chinese	means	3,50	4,20	3,10	4,80	4,70	4,40
		N	10	10	10	10	10	10
		standard deviation	0,850	0,789	0,876	0,422	0,675	0,966
	Germans	means	3,60	3,20	2,40	4,20	4,80	3,50
		N	10	10	10	10	10	10
		standard deviation	1,075	0,789	0,843	0,919	0,422	0,972
	Total	means	3,55	3,70	2,75	4,50	4,75	3,95
		N	20	20	20	20	20	20
		standard deviation	0,945	0,923	0,910	0,761	0,550	1,050
teacher & shepherd	Chinese	means	3,10	4,10	2,80	2,60	3,80	3,00
		N	10	10	10	10	10	10
		standard deviation	1,101	0,568	1,135	1,075	0,789	1,247
	Germans	means	3,70	3,70	2,10	4,20	4,80	2,70
		N	10	10	10	10	10	10
		standard deviation	0,675	0,483	0,738	1,135	0,422	1,337
	total	means	3,40	3,90	2,45	3,40	4,30	2,85
		N	20	20	20	20	20	20
		standard deviation	0,940	0,553	0,999	1,353	0,801	1,268
Total	Chinese	means	3,30	4,20	3,23	3,10	4,00	3,70
		N	30	30	30	30	30	30
		standard deviation	0,988	0,664	1,006	1,447	1,114	1,179
	Germans	means	3,60	3,47	2,40	3,93	4,43	2,63
		N	30	30	30	30	30	30
		standard deviation	0,932	0,681	0,814	1,258	1,006	1,273
	total	means	3,45	3,83	2,82	3,52	4,22	3,17
		N	60	60	60	60	60	60
		standard deviation	0,964	0,763	1,000	1,408	1,075	1,330

**E3-2: A two-factorial multivariate analysis of variance of the SAM ratings of the first concept teacher (Cultural group: Chinese/ German; concept pair: teacher-candle/ teacher -captain/ teacher-shepherd)**

**Multivariate Tests(c)**

Effekt		Wert	F	Hypothese df	Fehler df	Signifikanz
Konstanter Term	Pillai-Spur	,983	989,740(a)	3,000	52,000	,000
	Wilks-Lambda	,017	989,740(a)	3,000	52,000	,000
	Hotelling-Spur	57,100	989,740(a)	3,000	52,000	,000
	Größte charakteristische Wurzel nach Roy	57,100	989,740(a)	3,000	52,000	,000
Cultural group	Pillai-Spur	,393	11,233(a)	3,000	52,000	,000
	Wilks-Lambda	,607	11,233(a)	3,000	52,000	,000
	Hotelling-Spur	,648	11,233(a)	3,000	52,000	,000
	Größte charakteristische Wurzel nach Roy	,648	11,233(a)	3,000	52,000	,000
Concept pair	Pillai-Spur	,167	1,612	6,000	106,000	,151
	Wilks-Lambda	,836	1,620(a)	6,000	104,000	,149
	Hotelling-Spur	,191	1,626	6,000	102,000	,148
	Größte charakteristische Wurzel nach Roy	,165	2,912(b)	3,000	53,000	,043
Cultural group * Concept pair	Pillai-Spur	,060	,547	6,000	106,000	,771
	Wilks-Lambda	,941	,540(a)	6,000	104,000	,777
	Hotelling-Spur	,063	,532	6,000	102,000	,783
	Größte charakteristische Wurzel nach Roy	,050	,890(b)	3,000	53,000	,452

a Exakte Statistik

b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt.

c Design: Intercept+Cultural group+Concept pair+Cultural group \* Concept pair

## Test of Between Subjects Effect

Source	Dependent variables	Type III Sum of Squares	df	Mittel der Quadrate	F	Sig.
Corrected model	concept 1-"dominance"	2,350(a)	5	,470	,483	,787
	concept 1-"pleasure"	9,533(b)	5	1,907	4,152	,003
	concept 1-"arousal"	17,483(c)	5	3,497	4,550	,002
Intercept	concept 1-"dominance"	714,150	1	714,150	734,554	,000
	concept 1-"pleasure"	881,667	1	881,667	1919,758	,000
	concept 1-"arousal"	476,017	1	476,017	619,395	,000
Cultural group	concept 1-"dominance"	1,350	1	1,350	1,389	,244
	concept 1-"pleasure"	8,067	1	8,067	17,565	,000
	concept 1-"arousal"	10,417	1	10,417	13,554	,001
Concept pair	concept 1-"dominance"	,300	2	,150	,154	,857
	concept 1-"pleasure"	,533	2	,267	,581	,563
	concept 1-"arousal"	6,533	2	3,267	4,251	,019
Cultural group *	concept 1-"dominance"	,700	2	,350	,360	,699
Concept pair	concept 1-"pleasure"	,933	2	,467	1,016	,369
	concept 1-"arousal"	,533	2	,267	,347	,708
Fehler	concept 1-"dominance"	52,500	54	,972		
	concept 1-"pleasure"	24,800	54	,459		
	concept 1-"arousal"	41,500	54	,769		
Total	concept 1-"dominance"	769,000	60			
	concept 1-"pleasure"	916,000	60			
	concept 1-"arousal"	535,000	60			
Corrected Total	concept 1-"dominance"	54,850	59			
	concept 1-"pleasure"	34,333	59			
	concept 1-"arousal"	58,983	59			

a R-Quadrat = ,043 (korrigiertes R-Quadrat = -,046)

b R-Quadrat = ,278 (korrigiertes R-Quadrat = ,211)

c R-Quadrat = ,296 (korrigiertes R-Quadrat = ,231)

**E3-3: A two-factorial multivariate analysis of variance of the SAM ratings of the second concept (Cultural group: Chinese/ Germans; concept pair: teacher-candle/ teacher -captain/ teacher-shepherd)**

**Multivariate Tests(c)**

Effekt		Wert	F	Hypothese df	Fehler df	Signifikanz
Konstanter Term	Pillai-Spur	,977	735,713(a)	3,000	52,000	,000
	Wilks-Lambda	,023	735,713(a)	3,000	52,000	,000
	Hotelling-Spur	42,445	735,713(a)	3,000	52,000	,000
	Größte charakteristische Wurzel nach Roy	42,445	735,713(a)	3,000	52,000	,000
Cultural group	Pillai-Spur	,403	11,695(a)	3,000	52,000	,000
	Wilks-Lambda	,597	11,695(a)	3,000	52,000	,000
	Hotelling-Spur	,675	11,695(a)	3,000	52,000	,000
	Größte charakteristische Wurzel nach Roy	,675	11,695(a)	3,000	52,000	,000
Concept pair	Pillai-Spur	,562	6,897	6,000	106,000	,000
	Wilks-Lambda	,462	8,177(a)	6,000	104,000	,000
	Hotelling-Spur	1,116	9,483	6,000	102,000	,000
	Größte charakteristische Wurzel nach Roy	1,069	18,877(b)	3,000	53,000	,000
Cultural group * Concept pair	Pillai-Spur	,375	4,071	6,000	106,000	,001
	Wilks-Lambda	,657	4,059(a)	6,000	104,000	,001
	Hotelling-Spur	,476	4,045	6,000	102,000	,001
	Größte charakteristische Wurzel nach Roy	,334	5,907(b)	3,000	53,000	,001

a Exakte Statistik

b Die Statistik ist eine Obergrenze auf F, die eine Untergrenze auf dem Signifikanzniveau ergibt.

c Design: Intercept+Cultural group+Concept pair+Cultural group \* Concept pair

## Tests of Between-Subjects Effect

Source	Dependent variables	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected model	concept 2-"dominance"	60,483(a)	5	12,097	11,561	,000
	concept 2-"pleasure"	18,683(b)	5	3,737	4,076	,003
	concept 2-"arousal"	43,133(c)	5	8,627	7,612	,000
Intercept	concept 2-"dominance"	742,017	1	742,017	709,184	,000
	concept 2-"pleasure"	1066,817	1	1066,817	1163,800	,000
	concept 2-"arousal"	601,667	1	601,667	530,882	,000
Cultural Group	concept 2-"dominance"	10,417	1	10,417	9,956	,003
	concept 2-"pleasure"	2,817	1	2,817	3,073	,085
	concept 2-"arousal"	17,067	1	17,067	15,059	,000
Concept pair	concept 2-"dominance"	34,633	2	17,317	16,550	,000
	concept 2-"pleasure"	13,433	2	6,717	7,327	,002
	concept 2-"arousal"	18,633	2	9,317	8,221	,001
Cultural group *	concept 2-"dominance"	15,433	2	7,717	7,375	,001
Concept pair	concept 2-"pleasure"	2,433	2	1,217	1,327	,274
	concept 2-"arousal"	7,433	2	3,717	3,279	,045
	Error	concept 2-"dominance"	56,500	54	1,046	
Error	concept 2-"pleasure"	49,500	54	,917		
	concept 2-"arousal"	61,200	54	1,133		
	Total	concept 2-"dominance"	859,000	60		
Total	concept 2-"pleasure"	1135,000	60			
	concept 2-"arousal"	706,000	60			
	Corrected Total	concept 2-"dominance"	116,983	59		
Corrected Total	concept 2-"pleasure"	68,183	59			
	concept 2-"arousal"	104,333	59			

a R-Quadrat = ,517 (korrigiertes R-Quadrat = ,472)

b R-Quadrat = ,274 (korrigiertes R-Quadrat = ,207)

c R-Quadrat = ,413 (korrigiertes R-Quadrat = ,359)

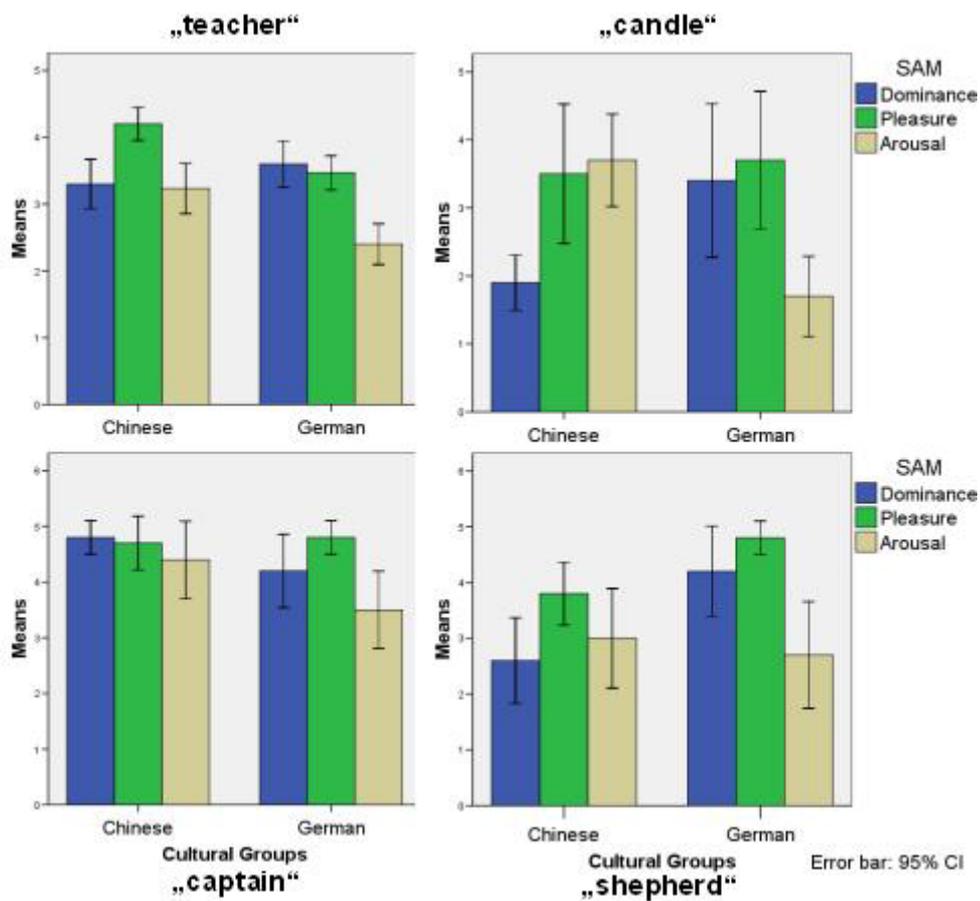


Figure E3-1: Bar grams based on the SAM rating on the four concepts.

## E4: Results of the Feature Ratings

Table E4-1: The  $C_D$  and the *density* of the bipartite networks constructed according to the 33 feature ratings of the concepts.

Concepts	Cultural groups	Network degree centralization ( $C_D$ )	Density
Teacher	Chinese	0,3440	0,3784
	Germans	0,5341	0,5085
Candle	Chinese	0,4487	0,7043
	Germans	0,3653	0,4983
Captain	Chinese	0,4114	0,7575
	Germans	0,3855	0,6645
Shepherd	Chinese	0,3152	0,5819
	Germans	0,4620	0,4785

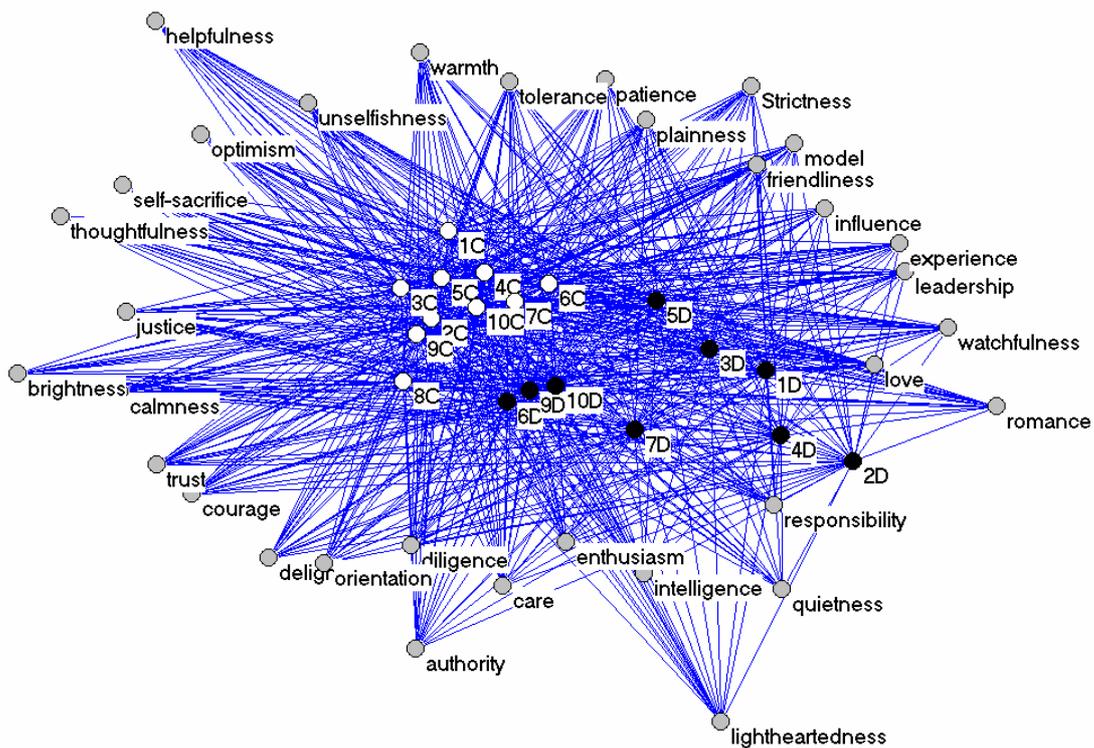


Figure E4-1: Bipartite graph of the feature network for the concept *teacher*.

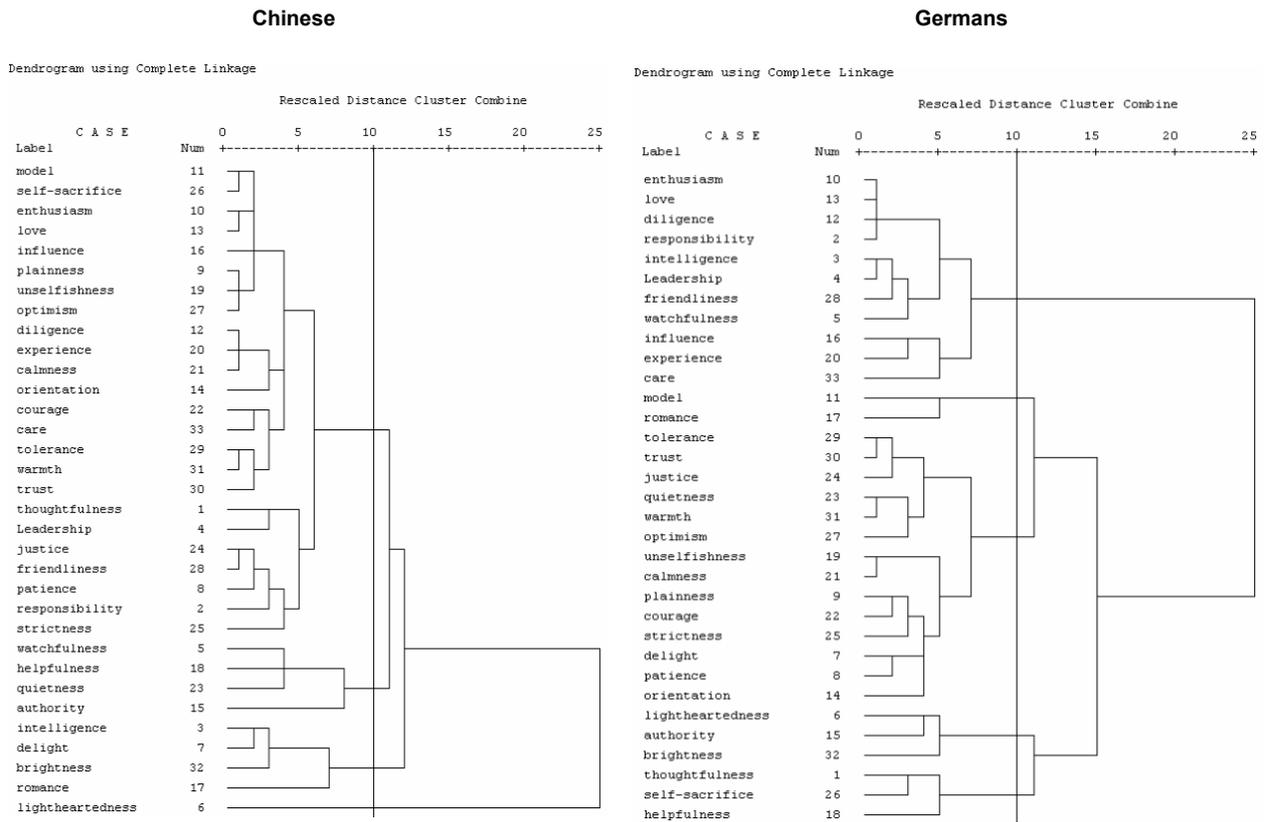


Figure E4-2: Dendrograms of the feature ratings for the concept *teacher* by the Chinese and the German subjects.

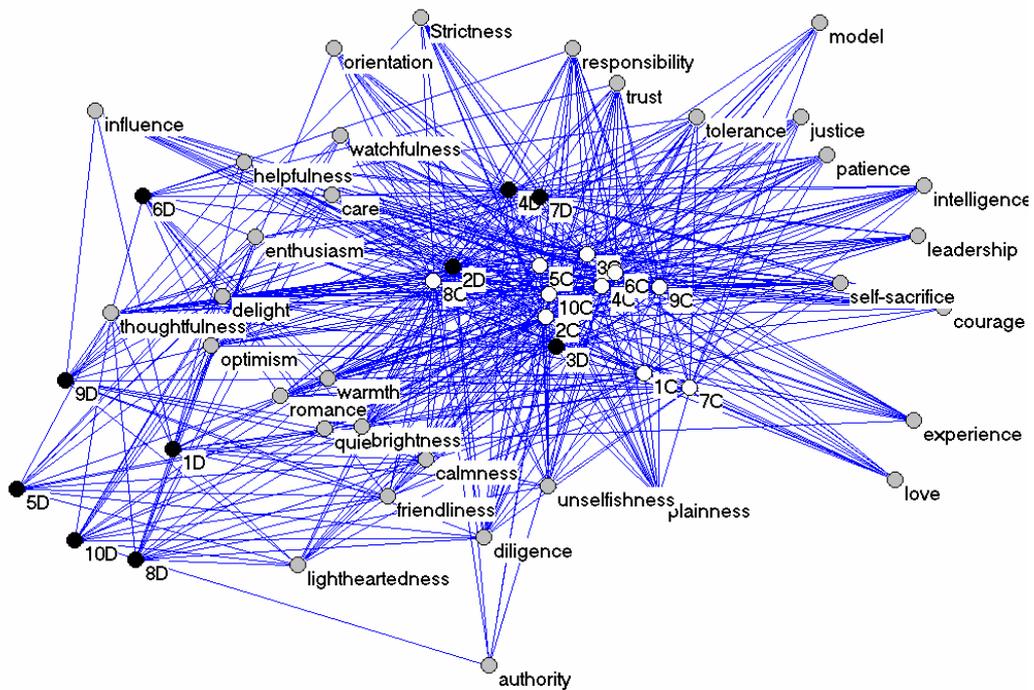


Figure E4-3: Bipartite graph of the feature network for the concept *candle*.

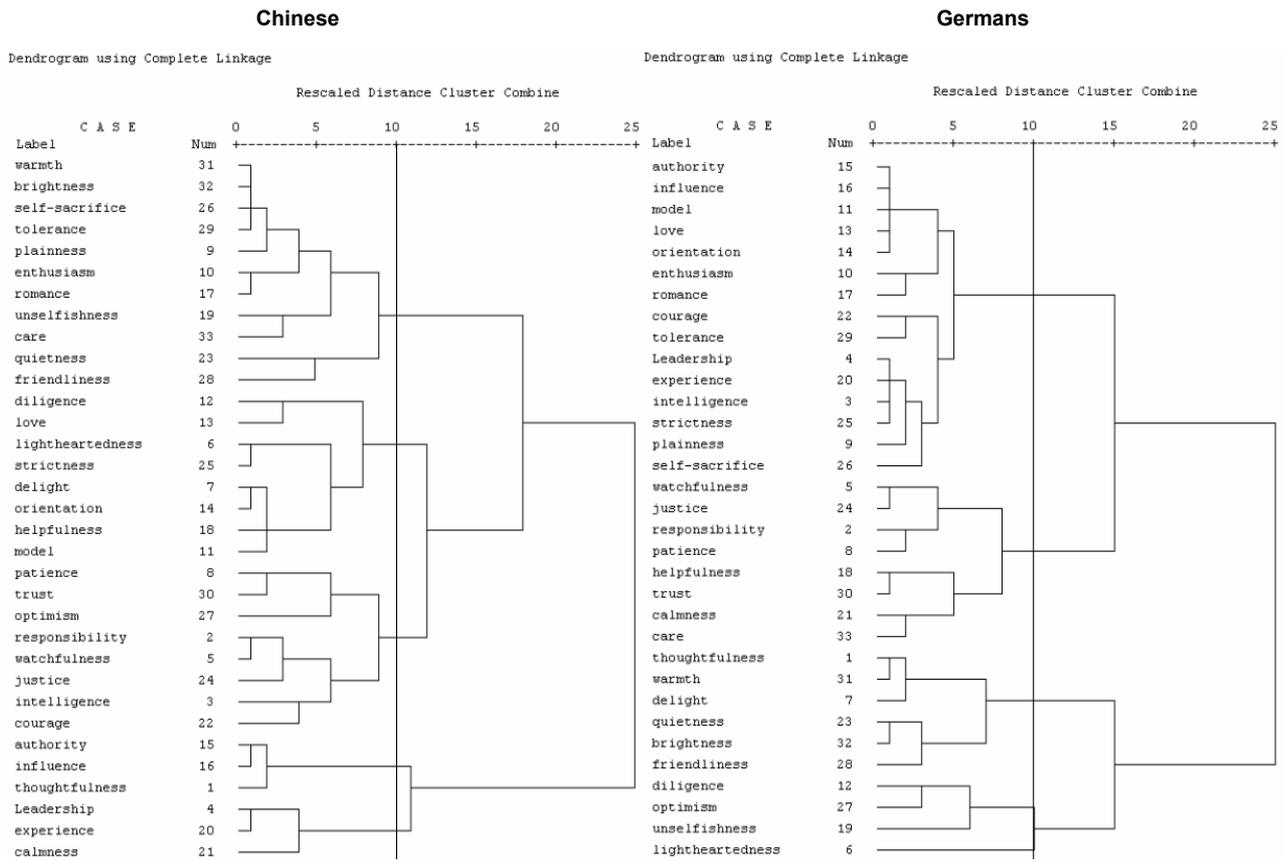


Figure E4-4: Dendrograms of the feature ratings for the concept *candle* by the Chinese and the German subjects.

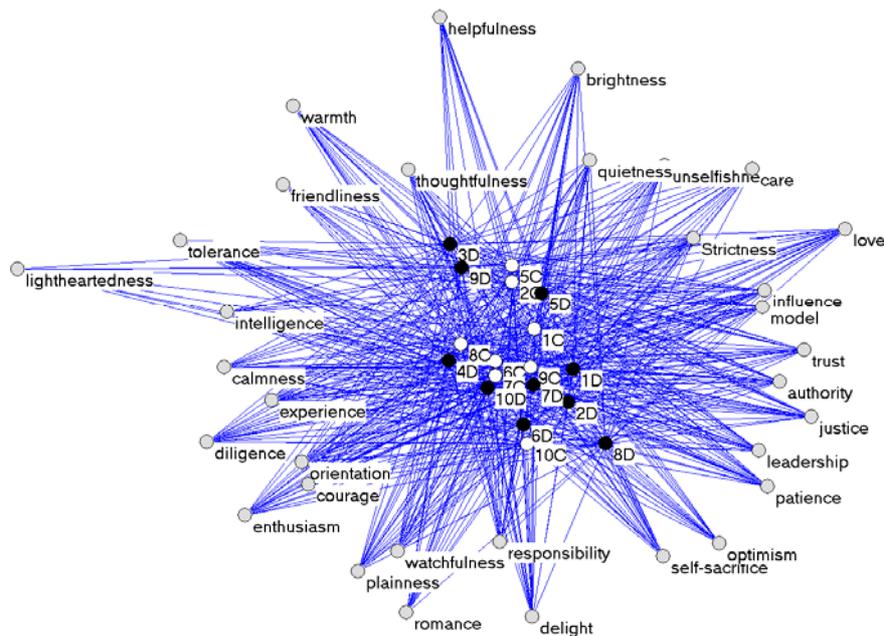


Figure E4-5: Bipartite graph of the feature network for the concept *captain*.

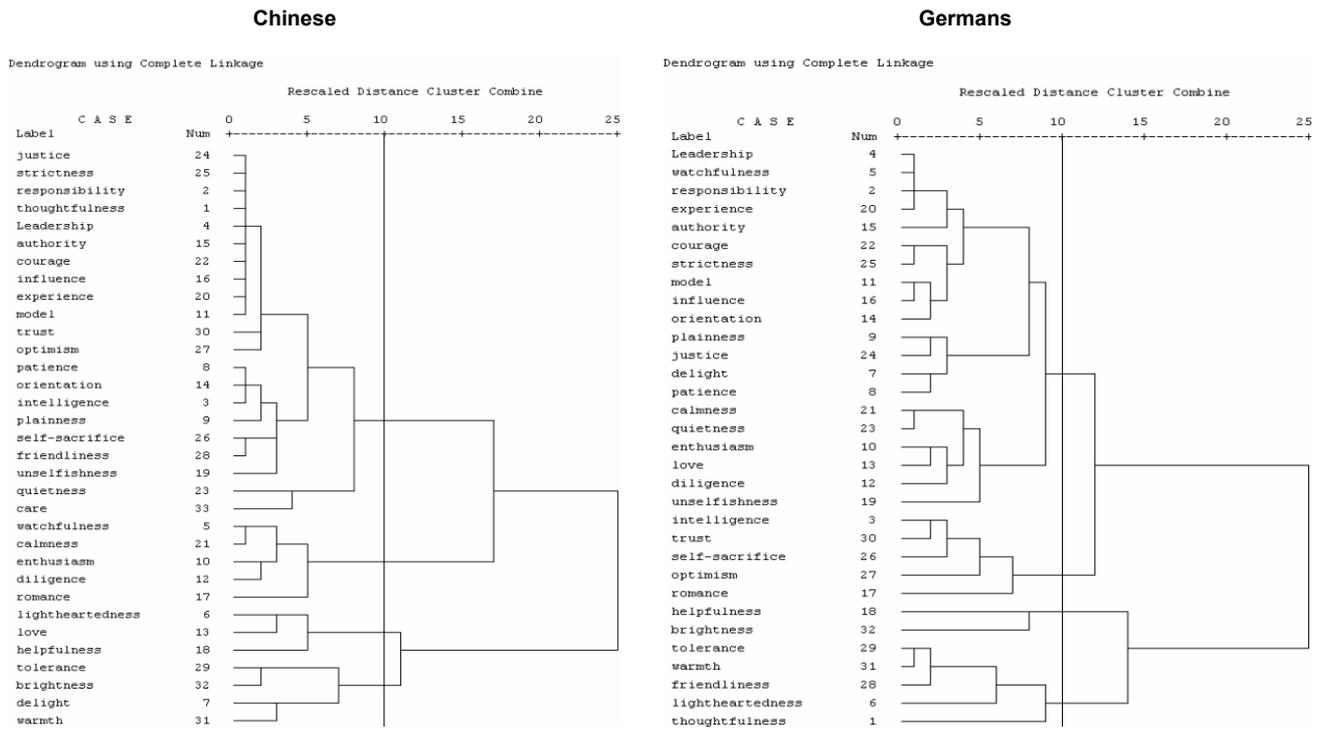


Figure E4-6: Dendrograms of the feature ratings for the concept *captain* by the Chinese and the German subjects.

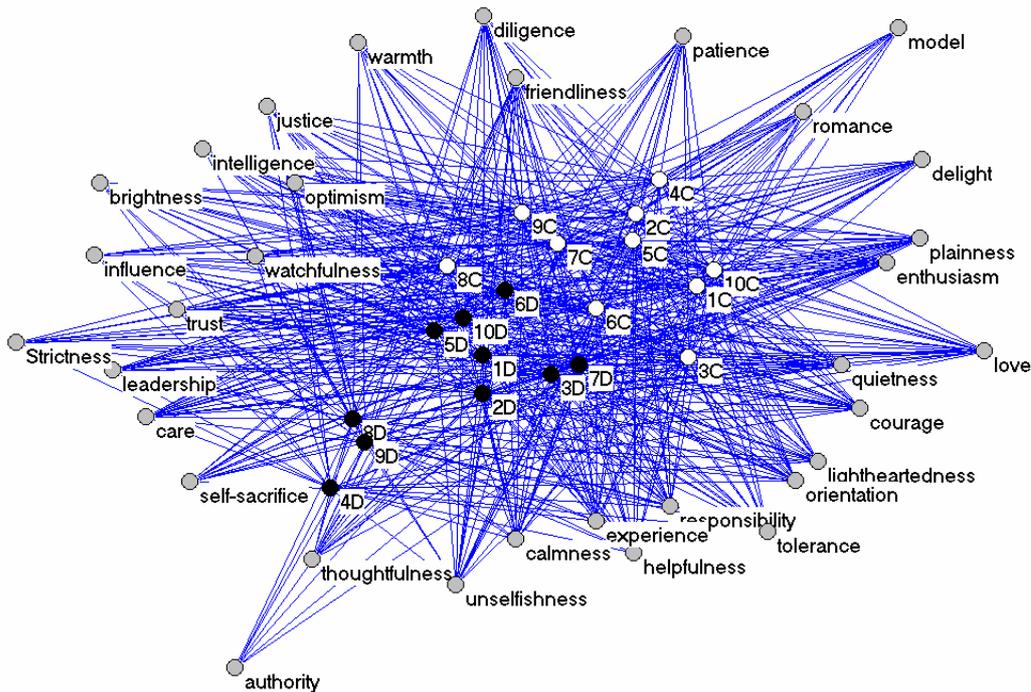


Figure E4-7: Bipartite graph of the feature network for the concept *shepherd*.

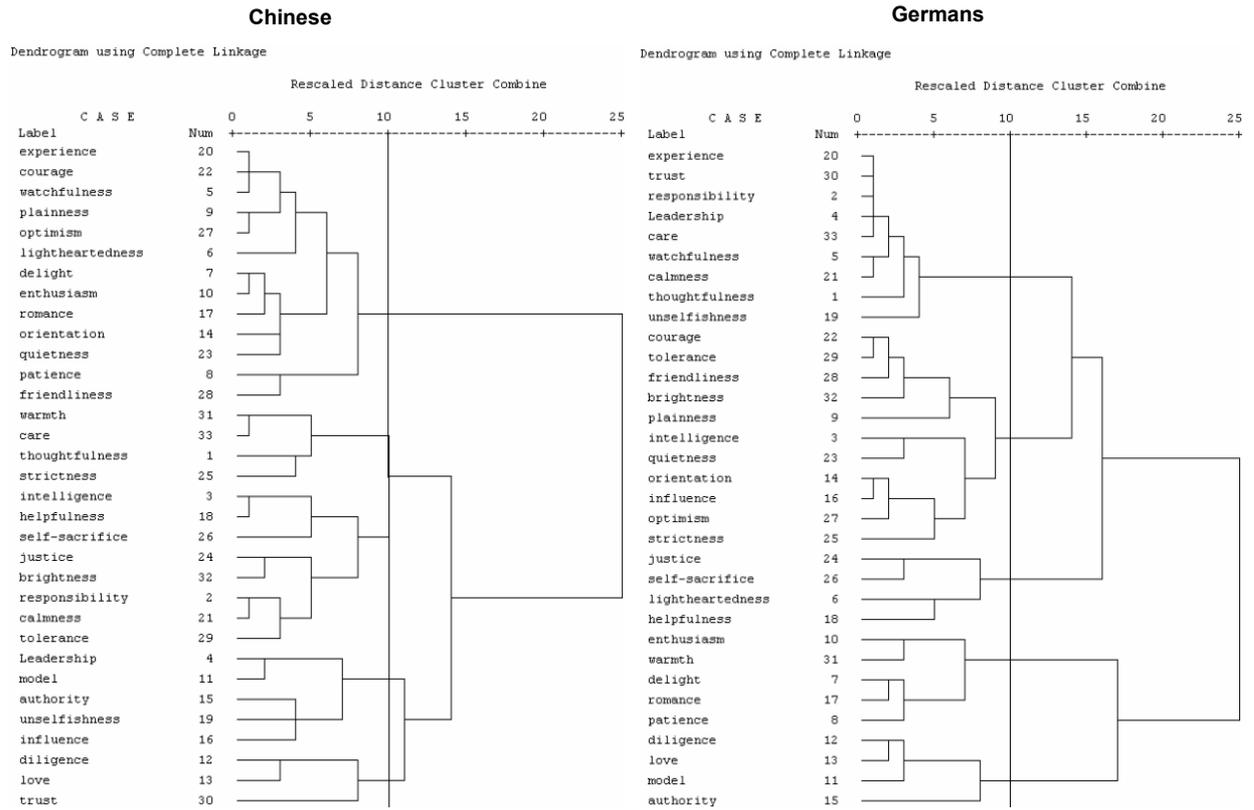


Figure E4-8: Dendrograms of the feature ratings for the concept *shepherd* by the Chinese and the German subjects.