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OCCUPATIONAL STEREOTYPE: UP-DOWN SPATIAL EMBODIMENT OF THE COMPETENCE CONTENT

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Previous studies have documented the centrality of the two basic dimensions of warmth and competence in stereotype. This study aims at further investigating the embodiment of the competence content, by testing whether occupational words with high/low competence can activate spatial image schema. A modified version of the spatial cuing paradigm was used in which participants first indicated whether an occupational word represented a mental or manual occupation (e.g., scientist or farmer), and then carried out an arrow direction judgment task (Experiment 1) or a letter identification task (Experiment 2). It was shown that the mere processing of occupations with high/low competence both primed upward/downward arrow judgments and oriented attention to the higher/lower area of visual space, respectively. The interpretation of the results indicated that the competence dimension of stereotype automatically refers to vertical space, suggesting the embodiment of the competence content.

Key words: occupational stereotype, competence, metaphor, visual spatial attention

INTRODUCTION

According to the stereotype content model, different stereotype contents respond to fixed principles that apply across varied individuals and groups (Fiske, Cuddy, Glick, & Xu, 2002). Stereotype content, in particular, correlates closely with social structure which has proved systematic in three aspects (Cuddy, Fiske, & Glick, 2007; Fiske & Fiske, 2007; Fiske et al., 2002; Fiske, Xu, Cuddy, & Glick, 1999). First, across groups, stereotypes share common dimensions of content—warmth and competence, though sometimes with different labels (e.g., communion versus agency, Abele & Wojciszke, 2007). Second, many

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out-groups are given ambivalent stereotypes—more positive in one dimension and less positive in the other. That is, most stereotypes are made up of different combinations of warmth and competence stereotypic attributes (Fiske et al., 2002). Third, group stereotypes follow on from social structure: perceived status predicts competence stereotypes and perceived competitiveness predicts (lack of) warmth stereotypes.

Along with the manipulation of two dimensions in stereotype content, considerable evidence suggests that warmth and competence are not given equal weight, with warmth representing a more central dimension relative to competence in perceiving others (Abele & Wojciszke, 2007; Fiske, Cuddy, & Glick, 2007; Peeters, 2002; Wojciszke, 1994). However, other studies indicate that the primacy of warmth over competence in judging someone could be attenuated or even reversed depending on the context. For example, Wojciszke (2005) argued that when the target is much closer to the self, the evaluation of the target in the two dimensions will more closely resemble the self-perception in which competence content is more relevant than warmth content. Further, Wojciszke and Abele (2008) showed that this 'Warmth over Competence' pattern is typical when judging distant individuals but is reversed when people judge themselves or related others. These findings demonstrated that the context, or the observer's motivation, played a significant role in determining which of the two basic dimensions of warmth and competence has greater influence on social judgment (Richetin, Durante, Mari, Perugini, & Volpato, 2012; Smith & Semin, 2007).

So far the primacy of competence has only been confirmed on the explicit level. That is, research supporting the stereotype content model or the primacy of competence has almost exclusively relied on explicit self-reports. For example, recent studies by Lee and Fiske (2006) applied the measures of competence and warmth adopted from the research of the stereotype content model (Fiske et al., 2002) to various immigrant groups and found that members of some Asian immigrant groups (i.e., Japanese and Chinese) who are stereotypically viewed as more competent (i.e., high social status), but less warm than Americans, are often considered as posing a considerable threat to the well-being of Americans. Building on Fiske et al.'s stereotype content model, Eckes (2002) showed that career women, as part of a high status group in society, may be perceived as competent; however, because they are also female, and thus perceived as being in competition with the dominant gender group, they may also be simultaneously evaluated as cold and unlikeable. Obviously, the explicit self-report indicates greater endorsement of the strategy or could easily be influenced by personal motivation. Therefore, it is not surprising that previous studies found that the context (e.g., observer's motivation) could moderate the relative weight between competence and warmth (Otto, Taylor, & Markman, 2011).

Thus, an important question is whether the competence content could also extend to the implicit level. If so, then the activation of competence would be found in implicit social perception, namely, during the process of implicit stereotypes. Although social psychology has eschewed the study of stereotype content, and gradually given way to issues of stereotyping processes, the content and process of stereotype are inextricably bound together. Currently, the specific attributes in stereotypes such as their strength, valence and inaccuracy, which are detailed in content studies, have been used in process

studies to examine when stereotypes will influence social reality and social perception. To our knowledge, there are no studies examining the stereotype content from a cognitive perspective. The current study primarily took a close look at the embodiment of competence to reveal its automatic activation during the stereotype process.

In order to address the above issue, the present study focused on one common stereotype, namely, occupational stereotype. A large number of studies has provided empirical evidence that people organize their image of occupations in a highly stereotyped, socially learned manner (e.g., Farkas, England, Vicknair, & Kilbourne, 1997). Occupational stereotypes do not reflect the image of jobs but the image of people who hold those jobs. For example, there is a high consensus in occupational prestige ranking among individuals located in different social positions, across different societal contexts, and over time (e.g., Fujishiro, Xu, & Gong, 2010; Hodge, Treiman, & Rossi, 1966). According to the aforementioned correlation between stereotype content and its social structure, perceived status predicts stereotypic competence. Because occupational prestige strongly embedded in occupations represents social standing which predicts competence, it was hypothesized that there would be a strong representation of competence in occupational stereotype.

Conceptual Metaphor Theory argues that metaphors provide grounding for abstract concepts by connecting them to more concrete representations (Gibbs, 1994; Lakoff & Johnson, 1980). Thus, it postulates that understanding the meaning of words and utterances engages the same systems we use to perceive and interact with the physical world. So far, an increasing body of evidence has shown that there is interplay between image schemas (structures of concrete concepts) and abstract concepts (e.g., Boot & Pecher, 2010; Casasanto & Boroditsky, 2008). For example, it was shown that words related to God were identified more quickly when they appeared above or to the right of a fixation point, while Devil-related-words were identified more rapidly if they were below or to the left (Chasteen, Burdzy, & Pratt, 2010).

Recently, Meier and Robinson (2004) proved the metaphor that 'good is up, bad is down'. In their study, participants performed a spatial letter identification task after evaluating positive and negative words. The result showed that participants respond faster to letters at the top after evaluating positive words (good is 'up') and they respond faster to letters at the bottom after evaluating negative words (bad is 'down'). Their findings suggest that valence (good or bad) is embodied along a physical up-down orientation. The competence dimension of stereotype is also related to positive and negative outcomes (Fiske et al., 2002). For example, high status (more competent) represents a positive outcome, whereas low status (less competent) represents a negative outcome. More recently, Zanolie et al. (2012) used terms denoting social roles differing in power (e.g., king; servant), and showed that participants responded faster to a letter recognition task presented at the implied position after the power rating was explicitly identified by the participant. Theses findings suggest that power is 'up'. Therefore, in line with recent evidence, the activation of competence was hypothesized to show the automatic activation of up-down spatial representation.

Specifically, the present study has two purposes. First, it examines the psychological reality of up-down spatial schemas of competence in occupational stereotype. We were

particularly interested in the question of whether occupations with high/low competence might be associated with an upwards/downwards spatial bias in space-irrelevant tasks. Second, it provides experimental evidence on whether the up-down spatial schemas are automatically accessed in occupation processing, and sheds light on the automatic activations of competence in the occupational stereotype process. Overall, the results of this study will provide insight into the embodied contents of the occupational stereotype.

Moreover, it was worth noting that earlier investigation of occupational prestige (stereotype) is primarily located within the framework of social stratification processes, especially the importance of authority relationships and economic resources that explicitly affect either the perceptions of those who rate occupations or the perceived status of the occupations being rated (e.g. Zhou, 2005). Thus, in order to avoid the possible confounding effect from authority relationships and economic resources, the present study recruited participants who were not currently employed. They were required to complete a key-pressing neutral task to categorize occupations into mental or manual types, rather than directly rating the occupational prestige, authority relationships, or economic resources, which made the participants blind to the purpose of the current study. Specifically, the two experiments reported herein use a common paradigm in which an occupation concept must be kept in working memory while cuing effects are tested on an arrow direction judgment task (Experiment 1) or a letter identification task (Experiments 2).

Experiment 1

Method

Participants

Twenty four undergraduates (11 males, mean age = 20 ± .98 years) were paid to participate in this experiment. All were right-handed native speakers of mandarin Chinese with normal or corrected-to-normal vision. Written informed consent was obtained from each participant following a research protocol approved by the Institutional Review Board of the university.

Materials

The target stimuli consisted of 54 familiar occupational words that denote either high-competence occupations (e.g., scientist; N = 27) or low-competence occupations (e.g., farmer; N = 27); they are presented in the Appendix. Occupational competence and warmth ratings were obtained from 27 participants from the same subject pool who did not contribute to the test data. They were asked to rate the degree of competence and warmth of the occupations on a 5-point Likert scale with 1 for very low competence or warmth and 5 for very high competence or warmth. The competence ratings of 27 occupations were higher than 3 with a mean of 4.0. These made up the high competence condition (HC). The competence ratings of the remaining 27 occupations were lower than 3 with a mean of 2.7. These made up the low competence condition (LC). The difference of the competence rating between HC and LC was statistically significant, $F(1, 52) = 292.79$, $p < .001$. However, the difference in warmth rating between HC (3.34) and LC (3.24) was not significant, $F(1, 52) = 1.54$, $p > .05$. Another 10 occupational words were selected as practice materials.

Procedure

Following Zanolie et al. (2012), we conducted three sessions, including an occupational categorization training session, an arrow orientation identification training session and the test session. In the occupation categorization training session, participants were asked to categorize the occupational words as quickly and

accurately as possible. The choice to be made was always between 'mental occupation' and 'manual occupation'. Mental occupations mainly require mental effort (e.g., salesperson, teacher, and clerk), while manual occupations mainly require physical effort (e.g., miner and factory worker), which was assumed not to strategically and directly activate the competence information of occupations. There was a total of 10 trials in this session (5 mental and 5 manual occupational words, respectively). Each trial began with a red fixation cross at the center of the screen for 500 ms, followed by an occupational word. Participants were instructed to respond by pressing the key labeled 'Mental' if the displayed word reflected a mental occupation or the key labeled 'Manual' if the word reflected a manual occupation. When the response was inaccurate, the word 'incorrect' appeared in red for 1500 ms. When the response was accurate, the word 'correct' appeared in blue for 1500 ms.

The first training session was followed by the arrow orientation identification training session. Each trial began with a red fixation cross at the center of the screen for 500 ms, followed by an occupational word. Similar to the first session, participants were required to categorize the occupational words by pressing the 'Mental' or 'Manual' key, but no feedback was given to the participant's response. After a 200 ms blank screen, a bold black arrow was displayed, pointing upward or downward. Participants were asked to identify the orientation of the black arrow by pressing the key 'Upward' or 'Downward' as quickly and as accurately as possible. The 'correct' or 'incorrect' feedback was given at the center of the screen for 1500 ms. Only when the accuracy rate had reached as high as 85% by the end of this session could the participants proceed to the test session; otherwise, training would be repeated until the same criterion was met.

The test session followed a similar procedure as the second training session, except for the feedback regarding the arrow direction judgment. If the judgment was correct, there appeared a blank screen for 500 ms; if the judgment was incorrect, there appeared a red 'incorrect' word for 1500 ms. Each word was repeated twice which, respectively, matched the upward and downward arrow. The test session included two blocks, with all occupational words appearing once in each block. Each block had 60 trials, including six warm-up trials and 54 test trials (27 for HC occupations and 27 for LC occupations). In half of the trials, the occupational words were paired with the upward arrow requiring an 'upward' response, and in the other half, they were paired with the downward arrow requiring a 'downward' response. There was a one minute break between blocks. The four key-pressing responses (i.e., mental/manual word judgments and arrow direction judgments) involved A, S versus K, L keys on the keyboard and were counterbalanced across participants. Additionally, the combination of A, S versus K, L keys always remained on the same hand side.

Results and Discussion

Prior to the data analysis, we removed outlier data points which included 8.9% due to errors in categorizing occupational words, 1.7% because reaction time to occupational words exceeded 3000 ms or reaction time to the arrow direction differentiation exceeded 2000 ms (Zanolie et al., 2012), and 4.5% because reaction time fell outside the two standard deviations above or below each participant's condition mean. The RT results and the error rate results were shown in Table 1.

Reaction times and error rates were submitted to a 2 (occupation words: HC versus LC) × 2 (arrow orientation: upward versus downward) within-subject ANOVA. There was no significant main effect for occupation type or orientation of the arrow (Fs < 1). However, there was a significant interaction between these two variables, $F(1, 23) = 13.49$, $p < .001$. The response time to upward arrows was shorter when they were primed by HC ($M = 479$ ms; $SD = 107$ ms) rather than LC occupational words ($M = 519$ ms; $SD = 137$ ms, $t = –3.16$, $p = .004$), whereas the response time to downward arrows was shorter when they were primed by LC ($M = 482$ ms; $SD = 110$ ms) rather than HC occupational words ($M = 512$ ms; $SD = 122$ ms; $t = 2.95$, $p = .007$). In error rate analysis, there were no significant main

Table 1. Mean latencies of correct responses (in ms) and error rate (%) for upward arrow and downward arrow in each priming condition (HOP and LOP occupational words) in Experiment 1.

Arrow direction	Occupational type	
	HOP	LOP
Upward arrow	479 (107)	519 (137)
Downward arrow	512 (122)	482 (110)
	Error rate	Error rate
Upward arrow	2.16 (3.07)	3.40 (4.22)
Downward arrow	4.94 (6.15)	4.94 (8.29)

Note: Numbers in parentheses are standard deviations.

effects or interaction effect (all *ps* > .05).

The results of Experiment 1 provided evidence for vertical spatial representation activated in the processing of occupational words. That is, HC occupations represent 'up', while LC occupations represent 'down'. It can be said that the cognitive processing of the HC and LC occupational words evoked the corresponding up-down spatial representation so as to influence the participants' response time to the following judgment on the orientation of the arrow. These results support the embodiment of the competence content of occupational stereotype, but not the embodiment of the warmth content because warmth was comparable between HC and LC occupations. Recently, a number of studies has found that the activated internal representation of space in abstract concepts could generate shifts of attention to corresponding regions of external space (Chasteen et al., 2010; Zanolie et al., 2012), indicating the automatic access of spatial representation. Therefore, Experiment 2 was designed to further investigate whether activated vertical spatial representation of the competence content in occupational stereotype could cause attention shift to corresponding physical space, so as to confirm the automatic activation of the competence content in occupational stereotype. Specifically, HC occupational words were hypothesized to shift attention to the higher areas of visual space, whereas LC occupational words, to the lower areas of visual space.

EXPERIMENT 2

METHOD

A new group of 24 participants from the same subject population as in Experiment 1 was recruited for this experiment (10 males, mean age = 20.8 ± 2 years). The design, stimulus set and the procedure were all the same as those in Experiment 1 except that identifying the orientation of the black arrow was changed to discriminating the position of a horizontally centered letter (p or q) which was presented at the top or bottom of the computer screen (at 25% and 75% of the screen height, respectively).

Table 2. Mean latencies of correct responses (in ms) and error rate (%) for top letter and bottom letter in each priming condition (HOP and LOP occupational words) in Experiment 2.

Letter position	Occupational type	
	HOP	LOP
Top letter	617 (145)	643 (152)
Bottom letter	649 (168)	630 (157)
	Error rate	Error rate
Top letter	4.48 (5.46)	4.48 (4.63)
Bottom letter	5.41 (5.78)	6.94 (7.10)

Results and Discussion

As in Experiment 1, prior to data analysis, trials with incorrect responses to either occupational words or to letters were rejected which totaled 8.9%. Trials with reaction times longer than 3000 ms to the occupational word or longer than 2000 ms to the letter were excluded from analysis, totaling 2.5%. Trails with reaction times that exceeded two standard deviations above or below each participant's condition mean were eliminated from the RT analyses, totaling 4.0%. The RT results and the error rate results are shown in Table 2.

Data analysis was conducted in the same way as in Experiment 1 using a 2×2 ANOVA with occupation type (HC versus LC) and the letter position (top versus bottom) as within-subject factors. There was no significant main effect for either occupational type or position of letters (Fs less than or near 1). There was a significant interaction between these two variables, $F(1, 23) = 27.73$, $p < .001$. When the letter was presented at the top of the screen, it took less time to identify the letter when it was preceded by an HC occupational word ($M = 617$ ms; $SD = 145$ ms) than by an LC occupational word ($M = 643$ ms, $SD = 152$ ms; $t = -4.31$, $p < .001$), whereas the reverse was true when the letter was at the bottom of the screen ($M = 630$ ms, $SD = 157$ ms for LC; $M = 649$ ms, $SD = 168$ ms for HC; $t = 2.44$, $p = .02$). The analyses of error rates showed no significant main effects or interaction effect (all Fs less than or near 1).

The results in Experiment 2 were consistent with those in Experiment 1, showing that the competence content of occupational stereotype could automatically activate the underlying spatial up-down image schema and thereby direct spatial attention in an image schema congruent way. That is, HC occupations could induce shifts of attention to the upper visual field; LC occupations to the lower visual field.

General Discussion

A major finding of our study was that after processing occupations with high/low competence, the identification of unrelated targets was faster when presented in the image schema-congruent direction or location. Supportive of our hypotheses, these results provide strong evidence that the underlying spatial up-down image schema of competence content is automatically activated. The current findings are the first to report on the processing of occupational stereotype that involves automatic activation of spatial representation. We tried to tease apart the competence and warmth dimensions of stereotype by making the warmth ratings comparable between HC and LC occupations. Thus, the automatic activation of spatial representation found in the current study should not be attributed to the warmth content, but reflects the embodiment of the competence content. It is possible that high vs. low competence and mental vs. manual work are partially aligned with each other, such that the effect found in the current study might be due to a combination of influences. Such a speculation will require more evidence.

Additionally, in line with previous results that challenge the traditional primacy of warmth over competence in out-group perception (e.g., Abele & Wojciszke, 2007), this study sheds some light on the primacy of competence over warmth in occupational stereotype. It should be noted that occupations not only refer to regular activities primarily performed for payment, but also carry symbolic values that would make them more or less attractive and prestigious. Gottfredson (1981) argues that people's spontaneous classification of occupations is dominated by two orthogonal dimensions: prestige and gender-type. Recently, Fujishiro et al. (2010) have documented that occupational prestige as a socioeconomic status indicator explicitly represents social standing. Therefore, competence/social standing is very representative of an occupation. It is sensible that competence is dominant in occupation stereotype relative to warmth. Recently, Richetin et al. (2012) showed that observers use the information provided by the stereotype content about the out-group to interpret out-group members' behavior. In particular, the warmth dimension better predicts the interpretation of higher status out-group members' behavior than the competence dimension; whereas the competence dimension predicts the interpretation of lower status out-group members' behavior more than the warmth dimension. Oldmeadow and Fiske (2010) found that high- and low-status groups showed in-group favoritism in separate domains, namely, competence stereotypes amongst high-status groups. In other words, the competence dimension is closely correlated with the judgment of higher-status in-group members and of lower-status out-group members.

According to Gottfredson's (1981) theory of vocational choice, individuals often do not consider pursuing occupations when the prestige of a job does not match their own socioeconomic background. In the current study, although the Chinese college student participants were not currently employed, they will choose an appropriate job as their future career. As potential bachelor degree holders, they will tend to choose a HC job and regard themselves as an in-group member of HC job holders. In this sense, our result that HC occupations indicate 'up' while LC occupations indicate 'down' suggest in-group favoritism towards HC occupations, which is consistent with the aforementioned findings.

Although our research was primarily focused on the embodiment of the competence content of occupational stereotype, it is interesting to note that our work adds to a growing body of literature showing that the experience of physical space is a fundamental part of human cognition (Lakoff & Johnson, 1980). Our findings are in conjunction with others that have shown that a variety of abstract concepts can influence the allocation of attention in the visual field (e.g., Chasteen et al., 2010; Fischer, Castel, Dodd, & Pratt, 2003). For example, Fischer et al. (2003) found that numbers high in magnitude (e.g., 9) induced a shift of attention to the right visual field and low numbers (e.g., 1) induced a shift of attention to the left visual field. Recently, Chasteen et al. (2010) showed that 'divine' had strong spatial components that could produce shifts of attention.

Therefore, the current study provides empirical evidence for the Conceptual Metaphor Theory, which states that metaphors provide grounding for abstract concepts by connecting them to more concrete representations. For example, prior research has revealed that the encoding of power stimuli was biased in a metaphorically consistent manner, namely, powerful equals 'up' while powerless equals 'down' (e.g., Zanolie et al., 2012). These empirical results support the view that metaphors are not merely an interesting linguistic phenomenon, but they play an important role in mental representation.

The current study showed the psychological reality of the competence content of stereotype, suggesting the automatic activation of the competence content during the stereotyping process. Moreover, the relative weight of the competence content and the warmth content varies as a function of the representativeness of competence and warmth. In occupational stereotype, competence is more representative than warmth and further grounded in the spatial representation.

Conclusion

The results of the present study indicate that centrally presented occupational words with high/low competence can activate spatial image schema in line with the top-high competence, bottom-low competence vertical spatial metaphor, supporting the embodiment of the competence content in occupational stereotype.

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Appendix

List of Occupations Used in Experiment 1 and Experiment 2

High-competence words (Mental occupations)		Low-competence words (Physical occupations)	
科学家	Scientist	搬运工	Porter
数学家	Mathematician	煤矿工	Coal miner
软件设计师	Software designer	消防员	Firefighter
工程师	Engineer	农民	Farmer
律师	Lawyer	水手	Sailor
医生	Doctor	渔民	Fisherman
精算师	Actuary	邮差	Postman
作家	Writer	瓦匠	Bricklayer
经理	Manager	电焊工	Electric Welder
教师	Teacher	清洁工	Cleaner
小说家	Novelist	木匠	Carpenter
艺术家	Artist	洗碗工	Washer-up
作曲家	Composer	油漆工	Painter
心理咨询师	Psychological consultant	快递员	Courier
会计	Accountant	保姆	Babysitter
编辑	Editor	水电工	Plumber
翻译	Translator	保洁员	Cleaner
企业培训师	Enterprise trainer	护林员	Forest ranger
雕刻家	Sculptor	服务员	Waiter
主持人	Anchor	司机	Driver
漫画家	Cartoonist	裁缝	Tailor
数控技师	CNC technician	列车员	Train attendant
钢琴家	Pianist	按摩师	Massagist
画家	Painter	保安	Security guard
服装设计师	Fashion designer	印刷工	Printer
魔术师	Magician	饲养员	Breeder
书法家	Calligrapher	打字员	Typist

Note: The 27 HC jobs also could be treated as mental ones and 27 LC jobs as manual ones.