Embodied Metaphor of Moral Concepts and Its Influencing Factors: Meta-Analytic Evidence Postprint

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Abstract

This study employs meta-analysis techniques to investigate embodied metaphors of moral concepts and their influencing factors. Through literature search and screening, a total of 65 studies comprising 153 independent samples met the criteria for meta-analysis (N=8659). Meta-analysis results revealed a moderate positive correlation between the source domain and target domain of embodied metaphors of moral concepts (r=0.34); moderation effect tests indicated that embodied metaphors of moral concepts are influenced by cultural background and metaphor dimension, but not by metaphor mapping direction, research paradigm, or sensory modality. These findings demonstrate that embodied metaphors of moral concepts possess psychological reality and are moderated by cultural background and metaphor dimension; specifically, individuals in Eastern cultural contexts exhibit stronger embodied metaphors of moral concepts, and the metaphorical associations between moral concepts and both spatial and size dimensions are more pronounced.

Full Text

Preamble

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Abstract

This study employed meta-analytic techniques to investigate embodied metaphors of moral concepts and their influential factors. Through systematic

literature retrieval and screening, 65 studies with 153 independent samples met the inclusion criteria (N = 8659). Meta-analytic results revealed a moderate positive correlation between the source and target domains of embodied moral metaphors (r = 0.34). Moderation analyses indicated that embodied metaphors of moral concepts were significantly influenced by cultural background and metaphorical dimension, but not by metaphorical mapping direction, research paradigm, or sensory channel. These findings demonstrate the psychological reality of embodied moral metaphors and their modulation by cultural background and metaphorical dimension. Specifically, individuals in Eastern cultural contexts exhibited stronger embodied moral metaphors, and the metaphorical connections between moral concepts and spatial/size dimensions were particularly robust.

Keywords: embodied metaphors; moral concepts; meta-analysis; moderating effect

1. Problem Statement

Embodied metaphors refer to the automatic process through which individuals associate concrete concepts derived from bodily experiences (e.g., visual, tactile, thermal sensations) with abstract concepts (e.g., brightness/darkness, hardness/softness, coldness/warmth) (Wang, Ye, & Su, 2018). Embodied metaphors function not only as implicit mappings but also as linguistic representations (Fan & Ye, 2014). By establishing connections between bodily experience (source domain) and abstract concepts (target domain), individuals can activate existing metaphorical representations based on perceptual experiences, enabling faster and more accurate linguistic expression of embodied metaphors, and even creating new meanings for novel concepts through metaphorical mapping. As researchers have noted, embodied metaphors integrate the functions of linguistic representation, implicit cognition, and metaphorical creation (Fan & Ye, 2014).

Notably, embodied metaphors of moral concepts also exhibit psychological reality. Research has demonstrated metaphorical associations between moral concepts and black-white experiences (Chiou & Cheng, 2013; Yin & Ye, 2014; Zhong, Bohns, & Gino, 2010), automatic metaphorical connections between moral concepts and vertical spatial experiences (Chasteen, Burdzy, & Pratt, 2010; Hill & Lapsley, 2009; Lu, Jia, & Zhai, 2017), and metaphorical mappings between physical cleanliness and moral concepts (Lee & Schwarz, 2010; Schnall, Benton, & Harvey, 2008; Zhong, Strejcek, & Sivanathan, 2010). However, some studies have questioned the metaphorical link between size concepts and moral concepts (Lu, Guo, & Jiang, 2017), challenged whether cleanliness priming leads to more lenient moral judgments (Johnson, Cheung, & Donnellan, 2014; Schnall et al., 2008), and identified cross-cultural inconsistencies in the cleanliness-morality metaphor connection (Fayard, Bassi, Bernstein, & Roberts, 2009; Gámez, Díaz, & Marrero, 2011). Thus, research on embodied moral metaphors remains characterized by certain disagreements, which will likely intensify as the number of studies continues to grow.

What, then, is the true strength of the metaphorical relationship between moral concepts and bodily experiences? How are these metaphorical connections formed? Which factors influence this relationship, and to what extent? These questions require further investigation. This study employed meta-analysis to systematically examine embodied metaphors of moral concepts and their influential factors, aiming to: (1) integrate findings from multiple empirical studies to reduce measurement and sampling errors inherent in single studies; (2) provide a comprehensive and accurate understanding of embodied moral metaphors and their influential factors through quantitative review and meta-analytic techniques; and (3) offer new research directions and practical guidance for moral education and intervention. Specifically, this meta-analysis addresses two questions: First, what is the overall strength of embodied moral metaphors? Second, which factors moderate the relationship between moral concepts and embodied metaphors?

1.1 Embodied Metaphors

Embodied metaphors developed from the theoretical foundations of embodied cognition and conceptual metaphor theory. Embodied cognition theory emphasizes that abstract concepts originate from universal bodily experiences, with perceptual sensations forming the basis of abstract concept formation (Gibbs, 2006; Lakoff & Johnson, 1999). Conceptual Metaphor Theory (CMT) posits that metaphors enable people to express abstract, intangible target domain concepts through concrete, tangible source domain concepts, thereby facilitating abstract thought (Lakoff & Johnson, 1999). The source domain refers to familiar, concrete, directly experienced cognitive domains such as color, weight, and spatial orientation, while the target domain encompasses abstract, difficult-to-understand cognitive domains such as moral concepts, social emotions, and authority status. Through mutual metaphorical mapping between source and target domains, individuals establish associations between bodily experiences and abstract concepts. Thus, embodied cognition and conceptual metaphor theory share common ground in emphasizing the influence of bodily experience on cognition. Building on these theories, embodied metaphor research investigates how bodily experiences form metaphorical connections with abstract concepts and the underlying mechanisms of metaphorical influence. Researchers have argued that even the most abstract psychological concepts depend on metaphorical mapping from bodily experiences (Williams & Bargh, 2008), and that bodily experiences and metaphorical cognition may form specific neural circuits in the brain (Lakoff, 2014), suggesting a neurophysiological basis for embodied metaphors.

1.2 Embodied Metaphors of Moral Concepts

Embodied metaphors of moral concepts primarily involve dimensions of morality and cleanliness, morality and color, morality and space, and morality and brightness (Chen, Jiang, Hou, & Zhu, 2014). First, the morality-purity metaphor

emphasizes automatic associations between moral concepts and physical cleanliness, and between immoral concepts and physical dirtiness. People commonly use cleanliness to describe moral character and dirtiness to describe immorality (Lakoff & Johnson, 1999). Abstract moral concepts such as "innocence" and "evil" originally developed from concrete experiences of physical cleanliness and dirtiness (Haidt & Joseph, 2004; Schnall et al., 2008; Yang, Guo, & Wang, 2017; Zhong & Liljenquist, 2006). Research shows that after performing immoral acts with their hands, participants show increased demand for hand-cleaning products, while those performing immoral acts with their mouths show increased demand for mouth-cleaning products (Lee & Schwarz, 2010). Second, moral color metaphors emphasize metaphorical mappings between moral concepts and visual colors. Studies have found that black-white color metaphors influence judgments of positive and negative words, facilitating responses when white words match positive concepts and black words match negative concepts (Meier, Robinson, & Clore, 2004). Chinese participants show automatic metaphorical connections between black-white colors and moral concepts, associating white with moral words and black with immoral words (Yin & Ye, 2014). Third, spatial metaphors represent another important dimension of moral concepts. Spatial metaphors map abstract target domain concepts onto spatial concepts as source domains (Lakoff & Turner, 1989). The metaphorical connection between moral concepts and spatial size appears to be automatic (Lu et al., 2017), with participants tending to associate moral words with upward positions and immoral words with downward positions (Meier, Sellbom, & Wygant, 2007; Wang & Lu, 2013). Finally, brightness also influences embodied moral metaphors. Previous research has found metaphorical associations between moral concepts and "brightness," and between immoral concepts and "darkness" (Niu, 2014). Compared to recalling moral events, participants who recalled immoral events judged the experimental environment as darker (Banerjee, Chatterjee, & Sinha, 2012). However, no previous meta-analytic research has examined whether bodily experiences influence embodied moral metaphors. This study hypothesizes that metaphorical relationships between bodily experience (source domain) and moral concepts (target domain) possess psychological reality.

1.3 Influential Factors of Embodied Moral Metaphors

Metaphorical Mapping Direction: Current perspectives on metaphorical direction include: (1) **Unidirectional mapping:** Metaphors map only from source to target domain (Lakoff & Johnson, 1999). Research shows that emotional priming affects vertical spatial concept processing, but not vice versa (Meier & Robinson, 2004), and that size perception and moral concepts show unidirectional metaphorical mapping (Lu et al., 2017). (2) **Bidirectional and flexible mapping:** Metaphors can map from source to target domain and from target to source domain (Black, 1993). Studies confirm that fishy smells induce suspicion and undermine cooperation, while social suspicion improves accurate identification of fishy smells (Lee & Schwarz, 2012); power and size show bidi-

rectional metaphorical associations (He, Chen, & Li, 2015); and moral concepts and vertical space exhibit mutual metaphorical mapping (Jia & Jiang, 2016). (3) **Asymmetric mapping:** Research indicates that vertical spatial metaphorical mapping of moral concepts is asymmetric, with weaker mapping from source to target domain than from target to source domain (Lu et al., 2017). Children' s spatial and temporal metaphorical mappings are also asymmetric, with spatial information exerting greater influence on temporal concepts than temporal information on spatial concepts (Casasanto, Fotakopoulou, & Boroditsky, 2010). These inconsistencies suggest that different mapping directions may yield different effect sizes for embodied moral metaphors. We therefore hypothesize that metaphorical mapping direction may differentially influence the relationship between bodily experience and moral concepts.

Cultural Background: Culture influences not only individual embodied metaphors (Gibbs, 1999) but also metaphorical representations in thought and language (Yin & Lu, 2015). Researchers term culturally variable conceptual metaphors "Complex Metaphors" (Lakoff, 2014), which result from cultural accumulation and reflect cross-cultural differences in metaphorical mapping. Western culture emphasizes original sin and "evil suppression" (Yin & Lu, 2015), leading to stronger embodied experiences of "immorality is down" (relative to "morality is up") (Hill & Lapsley, 2009). In contrast, Eastern culture emphasizes original goodness and "goodness promotion," along with the pursuit of virtue, which strengthens embodied experiences of "morality is up" over time (Wang & Lu, 2013). In Eastern cultures, where facial appearance symbolizes public self-image, facial cleanliness produces particularly strong moral effects, whereas Western participants show no significant differences in moral judgments following facial cleansing (Lee et al., 2015). No research has yet examined whether cultural background moderates the relationship between bodily experience and moral concept metaphors. This study hypothesizes that different cultural backgrounds may moderate the relationship between moral concepts and embodied metaphors.

Metaphorical Dimension: Previous research indicates that embodied moral metaphors involve spatial, purity, size, and other dimensions (Chen et al., 2014; Yang et al., 2017). Because human bodies exist within gravitational fields, vertical spatial positions constitute fundamental experiences (Gibson, 1969). Research shows that children' s vertical spatial metaphors exceed their temporal metaphors (Casasanto et al., 2010), and that vertical metaphors are most closely related to moral concepts (Lu et al., 2017). Numerous studies demonstrate "morality is up, immorality is down" (Chasteen et al., 2010; Meier et al., 2007; Lu et al., 2017; Wang & Lu, 2013; Yang et al., 2017). However, some studies find no metaphorical connection between moral concepts and spatial size (Xu, 2012), while others suggest purity metaphors show stronger implicit connections with moral concepts than size metaphors (Yin, 2014). Additionally, moral concepts relate closely to black-white (Meier et al., 2004), fragrant-foul (Liljenquist, Zhong, & Galinsky, 2010), weight (Ding, 2018), temperature (Luan, 2013), and sweet-bitter (Zhao, 2009) dimensions. While these various dimensions appear

to have psychological reality, whether embodied moral metaphors are consistent across dimensions and which dimensions exert stronger effects remain underexplored. This study hypothesizes that different metaphorical dimensions moderate embodied moral metaphors.

Research Paradigm: Research paradigms for embodied moral metaphors include Stroop, IAT, situational manipulation, and mood induction paradigms (Chen et al., 2014; Li, 2014). The IAT paradigm has demonstrated metaphorical connections between moral concepts and vertical spatial positions (Meier et al., 2007). Stroop-based research shows that "immorality is down" but "morality is not necessarily up" (Hill & Lapsley, 2009). Studies using situational and mood manipulation paradigms have examined relationships between cleanliness contexts, personal cleanliness, and moral concepts, finding that mood manipulation paradigms involving personal cleanliness produce stronger effects on moral judgments than situational manipulation paradigms (Ding, Wang, & Liu, 2017). Mood manipulation paradigms priming bodily cleanliness experiences show that personally clean participants make harsher judgments of immoral behavior than personally dirty participants (Zhong et al., 2010). Situational manipulation paradigms reveal that participants in dirty environments express stronger condemnation of immoral behavior than those in clean environments (Schnall et al., 2008). Researchers suggest that different priming paradigms for cleanliness concepts (conceptual vs. environmental) contribute to inconsistent findings (Chen, Guo, He, & Yan, 2014). However, whether different research paradigms influence embodied moral metaphors through distinct mechanisms remains unclear. This study examines the effects of different research paradigms as a moderating factor.

Sensory Channel: Research findings on sensory channel effects are also inconsistent. Studies examining differences between physical cleanliness (tactile) and semantic cleanliness (visual) priming found that physical cleanliness priming produced more lenient moral concepts than semantic cleanliness priming (Leung, 2013). Other research found no significant effects of sensory channel on embodied moral metaphors (Su & Sun, 2014). Additionally, some studies show that personal (tactile) cleanliness priming produces harsher judgments of moral dilemmas than environmental (visual) cleanliness priming (Ding et al., 2017). Researchers argue that various sensory modalities—including touch, vision, and olfaction—all influence moral cognition and concepts (Yang et al., 2017). These findings suggest that embodied moral metaphors involve multiple bodily perceptual systems, with different sensory channels exerting different effects. We therefore hypothesize that sensory channel may moderate embodied moral metaphors.

2. Method

2.1 Literature Search

Comprehensive literature searches were conducted in both Chinese and English databases from September 2006 to September 2018. Chinese databases included CNKI, Wanfang, and VIP, using keywords: metaphor, moral metaphor, moral concept metaphor, moral concept, embodied metaphor, embodied morality, embodied cognition, and conceptual metaphor. English databases included SpringerLink, ElsevierSD, Wiley, Emerald, ProQuest Dissertations & Theses, SCI, and Google Scholar, using keywords: metaphor, moral metaphor, moral concept metaphor, moral judgment, embodied metaphor, embodied morality, embodied cognition, and conceptual metaphor. Full texts not available online were obtained through interlibrary loan.

2.2 Inclusion and Exclusion Criteria

Literature was screened according to the following criteria: (1) Studies must be empirical investigations of embodied moral metaphors with complete data and clear sample sizes; theoretical and review articles were excluded. (2) Participants must be normal populations; special populations were excluded. (3) Studies must report correlation coefficients (r) or convertible statistics (F, t, or ^{2} values); data from structural equation modeling, regression analysis, or other methods were excluded, and outliers beyond 2 SD were removed. (4) To ensure homogeneity, studies using physiological responses as dependent measures were excluded. (5) Duplicate data were eliminated; if a dissertation was published as a journal article, the published version was used. Ultimately, 65 studies (33 Chinese, 32 English) with 153 independent effect sizes met the inclusion criteria (see Figure 1 [Figure 1: see original paper]).

2.3 Literature Coding and Data Analysis

Coding: Each included study was coded for: (1) bibliographic information (author + year), (2) sample size, (3) cultural background, (4) metaphorical mapping direction, (5) metaphorical dimension, (6) sensory channel, (7) research paradigm, and (8) effect size Zr. Coding followed these principles: (a) independent samples were coded separately; if one paper reported multiple independent samples, each was coded separately. If one sample had multiple statistics, the more conservative (less significant) statistic was selected. (b) Correlation coefficients were converted to Fisher' s Z based on normal distribution principles. (c) Duplicate publications were eliminated. Inter-coder reliability between two independent coders was 95.45%, indicating effective and accurate coding. Discrepancies were discussed until consensus was reached.

Data Analysis: Comprehensive Meta-Analysis 3.0 (CMA 3.0) software was used. Effect sizes were calculated as correlation coefficients (r). When studies reported F, t, or ^{2} values instead of r, conversion formulas were applied (Shadish, Robinson, & Lu, 1999):

r = [t²/(t² + df)]¹/², where df = n + n -2;
r = [F/(F + df(error))]¹/²;
r = [²/(² + N)]¹/².
Because r distributions are skewed and variances depend on correlations, the Fisher' s Z transformation was used to obtain effect size Zr (Borenstein, Hedges, Higgins, & Rothstein, 2009).

3. Results

3.1 Homogeneity Test

Homogeneity test results (Table 2) showed a significant Q statistic ($p < 0.001$), indicating heterogeneity among effect sizes. The I^2 statistic quantified this heterogeneity: values of 75%, 50%, and 25% indicate high, moderate, and low heterogeneity, respectively (Higgins, Thompson, Deeks, & Altman, 2003). The I^2 value of 84.10 indicated that 84.10% of observed variance resulted from true effect size differences, while 15.90% resulted from random error. The Tau^2 value of 0.10 suggested that 10% of between-study variance could be used to calculate weights in the random-effects model. Given the high heterogeneity, a random-effects model was adopted.

3.2 Publication Bias Assessment

Funnel plot inspection (Figure 2 [Figure 2: see original paper]) showed effect sizes distributed primarily at the top of the funnel, roughly symmetrical, suggesting no substantial publication bias. To confirm this quantitatively, Classic Fail-safe N and Egger' s regression tests were conducted (Table 3). The Classic Fail-safe N indicated that over 30,000 additional null-effect studies would be needed to render the overall effect non-significant. Egger' s regression tests showed no significant publication bias ($p > 0.05$).

3.3 Main Effect

As shown in Table 4 , the correlation between source and target domains of embodied moral metaphors was $r = 0.34$ (CI = 0.28–0.40, $Z = 11.93$, $p < 0.001$), indicating a moderate positive relationship.

3.4 Moderation Analyses

Given the heterogeneity, moderation analyses also used random-effects models, following previous research (Fernández-Castilla et al., 2018; Garcia-Argibay, Santed, & Reales, 2018). Results (Table 5) showed: (1) Metaphorical mapping direction did not significantly moderate the effect ($Qb = 0.67$, $p = 0.41$). (2) Cultural background significantly moderated embodied moral metaphors ($Qb = 4.47$, $p < 0.05$): Eastern cultures showed stronger metaphorical connections ($r = 0.39$) than Western cultures ($r = 0.26$). (3) Metaphorical dimension significantly moderated the effect ($Qb = 31.66$, $p < 0.01$), with spatial ($r = 0.52$)

and size (r = 0.52) dimensions showing the strongest connections, and color dimension the weakest (r = 0.14). (4) Research paradigm (Qb = 1.43, p = 0.70) and sensory channel (Qb = 3.15, p = 0.37) did not significantly moderate the effect.

3.5 Meta-Regression Analysis

Meta-regression analyses (Table 6) confirmed that cultural background and metaphorical dimension significantly influenced embodied moral metaphors (p < 0.001), consistent with moderation analysis results.

4. Discussion

4.1 Psychological Reality of Embodied Moral Metaphors

The meta-analysis found a moderate positive correlation between source and target domains (r = 0.34, p < 0.001), indicating a robust relationship consistent with previous findings (Banerjee et al., 2012; Haidt & Joseph, 2004; Lee & Schwarz, 2010; Lee et al., 2015; Lu et al., 2017; Meier et al., 2004; Schnall et al., 2008; Yin & Ye, 2014; Zhong et al., 2010). This supports the psychological reality of embodied moral metaphors. The mechanism involves two aspects: First, humans understand abstract concepts through familiar bodily experiences, creating natural connections between moral concepts and bodily sensations. Second, everyday linguistic expressions reinforce semantic associations, such as using spatial terms (“high,” “up”) to describe moral virtue (“noble,” “upright”) and spatial terms (“low,” “down”) to describe immorality (“lowly,” “degenerate”), or praising the innocent as “white jade without blemish” while condemning the malicious as “black-hearted.” These linguistic practices provide a psychological foundation for automatic metaphorical connections, with practical applications in moral education. For instance, morality-purity metaphors can be integrated into ideological and political education by intervening on personal and environmental cleanliness experiences, offering feasible pathways for school-based moral education that can extend to families, communities, and society to enhance moral cultivation.

These findings align with embodied cognition theory, which posits that cognition cannot exist independently of bodily experience. Understanding moral concepts thus depends on bodily experiences, as in “cleanliness is next to virtue,” where concrete cleanliness experience expresses abstract moral concepts. Neuroscientific research further supports the physiological basis for connections between moral concepts and bodily experiences (Borg, Lieberman, & Kiehl, 2008). Across practical, theoretical, and neurophysiological levels, evidence supports the psychological reality of embodied moral metaphors. Future research should actively construct connections between “morality” and “cleanliness experience,” revealing underlying psychological mechanisms to purify minds, enhance moral consciousness, elevate moral standards, and promote positive moral conceptual mappings.

4.2.1 Metaphorical Mapping Direction Moderation analyses revealed no significant effect of mapping direction ($Qb = 0.67$, $p = 0.41$), supporting the bidirectionality of embodied moral metaphors: mapping can proceed from source to target domain and vice versa (Black, 1993; Lee & Schwarz, 2012). Initially, metaphorical language may be unidirectional, using concrete concepts to understand abstract ones (e.g., "open and aboveboard" for moral integrity). However, with linguistic reinforcement, reverse expression becomes possible (e.g., morally upright individuals are also open and upright). Psychologically, once metaphorical mapping is established, activation between source and target domains becomes bidirectional (Lu et al., 2017). Faueonnier (1998) proposed that metaphorical mapping occurs through semantic activation. Even if initially unidirectional, repeated reinforcement in thought and language strengthens source-target connections, enabling mutual activation and diminishing the moderating effect of direction. This supports metaphorical bidirectionality (Black, 1993; Lee & Schwarz, 2012; Jia & Jiang, 2016), emphasizing the correspondence between embodied experience and abstract concepts. Moral education should thus promote both bodily cleanliness experiences and moral cognition, emotion, and behavior education to stimulate clean minds and positive environmental perceptions.

4.2.2 Cultural Background Cultural background significantly moderated embodied moral metaphors ($Qb = 4.47$, $p < 0.05$), with Eastern cultures ($r = 0.39$) showing stronger connections than Western cultures ($r = 0.26$). Previous research also indicates cultural differences (Lee et al., 2015). Three factors explain this: First, metaphors are culturally variable, as they represent individual thought and language, which culture shapes. Westerners think about time using horizontal metaphors, whereas Easterners prefer vertical spatial metaphors (Boroditsky, 2001). Second, embodied metaphors are culturally situated. Bodily experiences vary across cultures in communication styles, gait, and posture, producing culturally specific metaphors. For example, curled body posture metaphorically represents rejection and weakness in Western cultures but respect in Eastern Confucian cultures (Li, Du, & Ye, 2016). Third, embodied moral metaphors themselves differ culturally. Western "evil-suppression" cultures produce stronger "immorality is down" metaphors (Hill & Lapsley, 2009), while Eastern "goodness-promotion" cultures emphasize "morality is up" metaphors (Wang & Lu, 2013). Thus, cultural background significantly moderates embodied moral metaphors, with stronger effects in Eastern contexts. Chinese individuals should inherit and disseminate Confucian culture, emphasizing noble moral cultivation, particularly when explaining cultural differences in moral ascent and decline.

4.2.3 Metaphorical Dimension Meta-analytic results showed significant dimensional effects ($Qb = 31.66$, $p < 0.01$), with spatial ($r = 0.52$) and size ($r = 0.52$) dimensions showing the strongest connections, and color the weakest ($r = 0.14$). This contradicts previous findings of no dimensional differences (Su

& Sun, 2014), likely because that study only examined brightness and purity dimensions, whereas this meta-analysis covered eight dimensions more comprehensively. Spatial metaphors occupy a central role in abstract concept formation (Lakoff & Johnson, 2003) and show the strongest connections with moral concepts (Hill & Lapsley, 2009; Wang & Lu, 2013). Early experiential accounts suggest metaphorical mapping originates from basic infant experiences (Fiske, 2004). Spatial and size perceptions are more primitive than warmth or cleanliness, yielding stronger metaphorical connections. The weak color metaphor effect may stem from broader color inclusion beyond black-white, reducing specificity. Additionally, research has focused heavily on spatial ($k = 50$) and purity ($k = 32$) dimensions, with limited attention to fragrance ($k = 5$) and temperature ($k = 7$), restricting understanding and potentially biasing results. Future research should clarify connections between specific dimensions and moral concepts to determine which metaphorical training most effectively enhances moral judgment and whether combined dimensions produce additive effects.

4.2.4 Research Paradigm Research paradigm did not significantly moderate embodied moral metaphors ($Qb = 1.43$, $p = 0.70$). Previous findings are mixed: some suggest significant paradigm effects (Meier et al., 2007; Wang & Lu, 2013), while others find no effects (Jia & Jiang, 2016; Yin & Ye, 2014). Three explanations emerge: First, unclear paradigm specifications and experimental materials contribute to inconsistencies, as embodied moral metaphors are influenced by both paradigms and materials (Jia et al., 2018). Second, different paradigms serve different purposes and control different variables. Stroop paradigms assess unconscious responses while minimizing interference (Li, 2014). IAT paradigms effectively verify unconscious metaphorical connections, as abstract concepts are metaphorically constructed (Lakoff & Johnson, 1999). Situational paradigms address interactions between bodily experience and environment, while mood induction paradigms focus on perceptual changes affecting moral psychology (Chen et al., 2014). However, situational and mood paradigms are subjective and vulnerable to interference, producing unstable results. As empirical literature accumulates, further verification of paradigm moderation is necessary, with efforts toward standardized, rigorous paradigms to reduce interference.

4.2.5 Sensory Channel Sensory channel did not significantly moderate embodied moral metaphors ($Qb = 3.15$, $p = 0.37$). Previous research suggests that bodily experiences and psychological processes such as moral concepts are mutually embedded and influential, with activation of abstract concepts simultaneously activating multi-modal perceptual information (Yin, Qu, & Ye, 2012). Accordingly, moral concepts activate not single but multiple interacting sensory channels that integrate to produce overall effects, preventing any single channel from dominating. For example, processing the concept "rose" simultaneously activates visual (red), tactile (thorns), and olfactory (fragrance) information (Yin, Su, & Ye, 2013). Similarly, "cleanliness is next to virtue" involves visual (seen

cleanliness), tactile (felt cleanliness), and olfactory (smelled cleanliness) channels, with the resulting embodied metaphor depending on their combined action. This multi-channel integration enables environmental adaptation. Therefore, different sensory channels do not significantly influence embodied moral metaphors. This suggests that moral education should employ multi-channel integration—visual tidiness, tactile cleanliness, olfactory freshness, and verbal purity—to enhance moral consciousness.

4.3 Limitations and Future Directions

Limitations: (1) Unpublished literature may have been missed despite multi-database searches. (2) While many factors influence embodied moral metaphors, this study examined only five; other important factors like moral event types and actors were not addressed (Tobia, 2015; Zhang & Ye, 2016). (3) This study examined East-West cultural differences but not within-culture variations, such as differences between Chinese Han and Korean minorities in spatial and weight metaphors for seniority concepts (Wang, Yan, Zhang, & Dong, 2017).

Future Directions: (1) Employ multiple channels for more systematic, comprehensive literature collection. (2) Investigate a fuller range of influential factors. (3) Reveal within-culture differences across countries and regions. (4) Expand intervention research, such as cleanliness interventions for individuals with moral guilt, to promote physical health and moral self-image, providing reference for effective moral education.

5. Conclusion

This meta-analysis examined embodied metaphors of moral concepts and their influential factors, yielding three main conclusions: (1) Overall, a moderate positive correlation exists between source and target domains of embodied moral metaphors. (2) Cultural background and metaphorical dimension significantly moderate embodied moral metaphors: Eastern cultures show stronger effects, and spatial/size dimensions produce stronger connections than other dimensions. (3) Metaphorical mapping direction, research paradigm, and sensory channel do not significantly moderate embodied moral metaphors.

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