# Associations between multimodal metaphor functions and signals in Chinese video ads

**Molly Xie Pan, The Hong Kong Polytechnic University**
(xiemo.pan@polyu.edu.hk)**/Dennis Tay, Nanyang Technological University**
(dennis.tayzm@ntu.edu.sg)

## Abstract

Most existing studies analyze the manifestation and functions of metaphors in multimodal video advertisements from a qualitative perspective, focusing on the content of selected examples and leaving potentially generalizable structural traits underexplored. Addressing this issue contributes to the systematic and empirical development of multimodal metaphor studies. This study demonstrates how quantitative analyses can provide insights into the structural traits of metaphors in video ads by examining the associations among metaphor signals, functions, and product types in 197 metaphors from 66 metaphorical Chinese video ads. Reliable procedures for identifying metaphors and coding functions and signals were applied. Results from a set of categorical data analytics showed i) a significant association between metaphor functions and product type, ii) a significant association between metaphor functions and signals, and iii) a non-significant association between product types and signals. This provides empirical evidence for stable structural traits across large metaphor samples.

Die meisten vorliegenden Studien analysieren die Formen und Funktionen von Metaphern in multimodaler Videowerbung aus einer qualitativen Perspektive. Dabei konzentrieren sie sich auf den Inhalt ausgewählter Beispiele und lassen potenziell verallgemeinerbare Struktur-merkmale unerforscht. Eine Auseinandersetzung mit diesem Thema leistet einen Beitrag zur systematischen und empirischen Entwicklung der multimodalen Metaphernforschung. Die vorliegende Studie zeigt, wie quantitative Analysen Einblicke in die strukturellen Merkmale von Metaphern in Videoanzeigen liefern können, indem sie die Verbindung zwischen Metaphersignalen, -funktionen und Produkttypen bei 197 Metaphern aus 66 metaphorischen chinesischen Videoanzeigen untersucht. Dabei kommen verlässliche Verfahren zur Identifikation von Metaphern und zur Kodierung von Funktionen und Signalen zur Anwendung. Die Ergebnisse einer Reihe kategorialer Datenanalysen zeigen i) einen signifikanten Zu-sammenhang zwischen Metaphernfunktionen und Produkttyp, ii) einen signifikanten Zusammenhang zwischen Metaphernfunktionen und Signalen und iii) einen nicht signifi-kanten Zusammenhang zwischen Produkttypen und Signalen. Dies liefert empirische Belege für stabile Strukturmerkmale innerhalb großer Metaphernstichproben.

## 1.    Introduction

In the age of digital advancements, videos have become a vital instrument for advertising. The rise of social media and mobile technology has established videos as the primary information source for many individuals. The HubSpot

Digital Consumer Trends Report[1] shows that over 50% of consumers prefer acquiring information about a brand or business through videos ads. The use of metaphors in ads has been demonstrated to enhance engagement, memorability, and entertainment, thereby significantly amplifying their persuasive power (Ang/Lim 2006; Burgers et al. 2015; Chang et al. 2018; Delbaere et al. 2011; Pérez-Sobrino et al. 2019). Nevertheless, the investigation of metaphors in video ads remains relatively limited compared with the print ads. This could be attributed to the inherent temporal and dynamic complexity of this genre (Pérez-Sobrino/Littlemore 2017; Pan/Tay 2021).

Current research on characteristics of metaphors in video ads primarily consists of qualitative analyses focusing on a limited number of cases (Forceville 2007, 2008; Guan/Forceville 2020; Pérez-Sobrino/Littlemore 2017; Urios-Aparisi 2009). These studies offer nuanced insights into the idiosyncratic nature of metaphorical interpretation within specific topics. However, a comprehensive understanding of the underlying structural traits is lacking due to the absence of systematic investigations on a large corpus. To fill this gap, a systematic exploration of these structural traits can substantiate postulations derived from case studies, providing empirical evidence for theory development and application.

Pioneering research on pictorial metaphors (Forceville 1996) serves as the foundation for exploring multimodal metaphors. Forceville (2008) analyzed nine Dutch TV ads and revealed distinct difference of metaphors in a service product ad. Unlike other visualizable products, the service ad does not necessarily tie the metaphor to the product or a competitor. Instead, the metaphor appears to establish connections with prospective consumers. While these analyses provide an overview of how metaphors are used in Dutch TV ads and highlight potential differences across product types, the descriptive nature and limited sample size hinder the confirmation of associations between metaphor usages and product types.

An important challenge in studying metaphor within multimodal discourse is the absence of explicit cues, such as *is* or *is like* in linguistic discourse, to signal metaphoric relations (Forceville 2009; Müller/Schmitt 2015; Pérez-Sobrino/ Littlemore 2017). Research on visual metaphor typically identifies metaphors

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[1] https://blog.hubspot.com/marketing/content-trends-global-preferences.

through visual incongruity (Phillips/McQuarrie 2004; Šorm/Steen 2018). Nevertheless, the possibility of creating metaphor without visual incongruity has also been explored (Forceville 1996, 2008, 2016). Overall, there are several typologies of visual metaphors in print ads (Forceville 2008; Gkiouzepas/Hogg 2011; Phillips/McQuarrie 2004). The techniques of creating these visual metaphors can potentially serve as important cues for metaphor signaling devices in video ads (Pan/Tay 2021). The empirical question of whether metaphor signals, metaphor functions, and product types exhibit systematic correspondences remains unresolved. Addressing this necessitates a systematic investigation into the manifestation and functions of metaphors in video ads. Quantitative analyses of a large sample size are essential to illuminate the underlying associations.

This paper will report a corpus-driven study on 197 metaphors identified from 66 Chinese metaphorical video ads. This study does not specifically investigate individual metaphors or conceptual metaphors. Instead, it focuses on analyzing the frequency of metaphors within real-world video ads and explores the relationships among metaphor signals, metaphor functions, and product types. The aim is to uncover stable structural associations across a large sample of metaphors. The subsequent section will review key issues related to researching metaphors in video ads, encompassing defining modes and multimodal metaphors, metaphor identification, metaphor signals, and metaphor functions. Following this, the method section will introduce details such as corpus building, metaphor identification procedure, coding schemes of signals and functions, and the statistical analyses performed. The results will be presented alongside discussions. The concluding section will summarize the paper by highlighting major findings and acknowledging limitations.

## 2.   Theoretical background

The following sections introduce a working definition of mode and multimodal metaphors, discuss the methodological challenge of identifying metaphors in multimodal discourse, and illustrate metaphor signals and functions through examples.

## 2.1   Defining mode and multimodal metaphor

Research on multimodal metaphors proceeds with debates surrounding the definition of the term *mode* in multimodality. The term *mode* has received varied definitions across different research paradigms. In social semiotics, a mode is often integrated with a specific meaning influenced by social and ideological factors. The combination of different modes in meaning-making is described as "the work of an overarching code whose rules and meanings provide the multimodal text with the logic of its integration" (Kress/Van Leeuwen 1996: 177). A cognitive semiotic approach also integrates semiotic systems (language, gesture, and depiction) with sensory modalities (Stampoulidis et al. 2019), assigning semiotic systems to sensory modalities based on their manifestation: written language (visual), speech (auditory), gesture (visual), and depiction (visual). Despite divergent views on what a mode is, we align with Forceville (2009: 23) that "it is at this stage impossible to give either a satisfactory definition of 'mode', or compile an exhaustive list of modes". In our study, we identify distinctive modes in contemporary Conceptual Metaphor Theory-inspired research on multimodal discourse as potential candidates for modes in video ads (EI Refaie 2003; Forceville 2017; Pérez-Sobrino 2017; Schilperoord 2018; Tay 2017): (1) visual images; (2) written language; (3) spoken language; (4) gestures; (5) sounds; (6) music.

A clear definition of multimodal metaphor is crucial for advancing our investigation. Cognitive linguists conceptualize metaphor as a cognitive process that involves mapping knowledge and experience from one domain (the source domain) onto another (the target domain) (Kövecses 2017: 328; Lakoff 1993: 206; Lakoff/Johnson 1980: 170). Typically, the target domain is more abstract and less familiar than the source domain. For instance, the sentences like *don't jump to conclusions* and *I'm letting my mind drift*, words associated with physical location, such as *jump* and *drift*, are used to describe mental activities. This illustrates the conceptual metaphor IDEAS ARE LOCATIONS at the domain level and the metaphor THINKING IS MOVING IN THE IDEASCAPE at the frame level, according to the levels of metaphor (Kövecses 2017). As a conceptual process, metaphor can manifest itself in any mode of communication, including verbal language, visual images, gestures, and sounds (Forceville/Urios-Aparisi 2009). When more than one mode contributes to creating a metaphor, it is termed as a multimodal metaphor. When a metaphor is formed with only one mode

contributing to both the target and the source, it is termed as a monomodal metaphor.
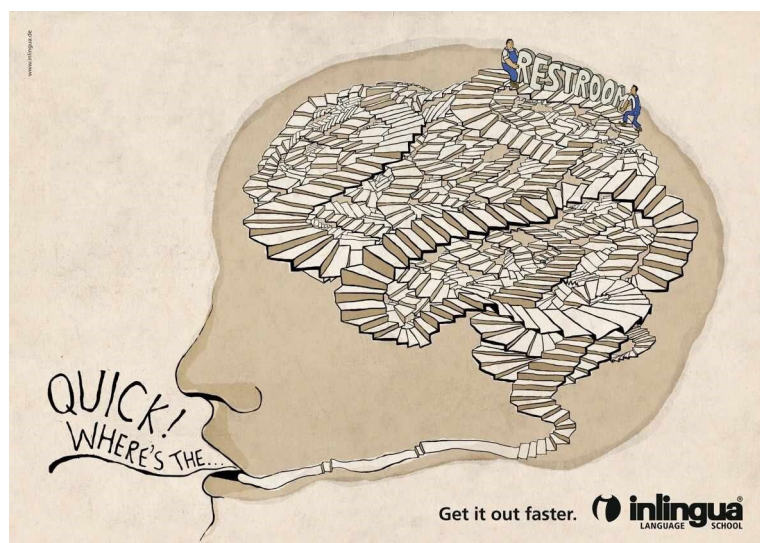


**Fig. 1:** Inlingua Language School: Restroom[2]

Figure 1 illustrates a multimodal manifestation of the conceptual metaphor IDEAS ARE LOCATIONS. This example is drawn from VisMet, wherein the multimodal metaphor is verbalized as MENTAL ACTIVITIES ARE PHYSICAL ACTIVITIES. While conveying a meaning akin to THINKING IS MOVING IN THE IDEASCAPE, the conceptual labels assigned by analysts differ. This highlights a distinction between metaphor in multimodal discourse and linguistic metaphor, emphasizing that the verbalization of the former may involve the interpretation of non-verbal language. Such interpretation may vary, showcasing diversity and creativity among analysts (Pan/Tay 2023; Pérez-Sobrino/Ford 2023). In this visual depiction, the brain structures are replaced by spiral stairs leading to the word *restroom*. The inception of the staircase is positioned beside the mouth, accompanied by the written text "Quick! Where's the…". This design suggests that the mind embarks on a journey, searching for the word *restroom*. The written text provides a cue for the targeted ideas/mental activities, collaborating with visuals to construct a multimodal metaphor.

Given the abundant resources for creating metaphors in video ads, a genre driven by specific goals (i.e. selling the products) (Forceville 2016; Pérez-Sobrino 2017), our study defines metaphor as a noticeable and impressive phenomenon.

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2   http://www.vismet.org/VisMet/display.php#filter-Context-ctxt1.

It invites viewers to comprehend and experience one concept in terms of another, with the overarching goal of facilitating product promotion. While it is theoretically possible to encounter monomodal metaphors (such as purely verbal or visual metaphors) in video ads, they are infrequent in our corpus. Even though we refer to these phenomena as metaphors in the rest of the paper, their intrinsic nature is multimodal considering their construction. Our approach is rooted in Conceptual Metaphor Theory (Lakoff 1993) and research on multimodal metaphors (Forceville 1996; Forceville/Urios-Aparisi 2009), which diverges from a cognitive semiotic approach that

> goes to the opposite extreme of CMT, acknowledging as metaphorical only fully creative and non-conventional (iconic) processes, while metaphors in both language and depiction can be more or less conventionalized (sedimented) in the cultural knowledge of a given society (Stampoulidis et al. 2019: 6, emphasis in original).

In our study, both conventional and novel metaphors can be crafted as noticeable, with the potential for systematic mappings across domains. However, investigating mappings across domains is beyond the scope of this study.

## 2.2 Identifying multimodal metaphors from video ads

The identification of multimodal metaphorical phenomena faces methodological challenges owing to the inherent complexity of video discourse. Currently, three procedures are proposed for identifying metaphors in TV commercials: i) Filmic Metaphor Identification Procedure (FILMIP) (Bort-Mir 2021), ii) a three-step procedure developed by Bobrova (2015), and iii) Creative Metaphor Identification Procedure in Video Ads (C-MIPVA) (Pan/Tay 2021, 2023). All procedures address the challenge of identifying metaphors in the context of moving images within advertising genres. FILMIP, developed through the analysis of 11 TV commercials (Bort-Mir 2021), comprises seven steps. It begins with a comprehensive analysis of every element in a video (Steps 1 and 2), aiming to establish a general understanding of the ad. This involves drawing on theoretical frameworks related to films and multimodality, such as the Structured Annotation (Tam/Leung 2001). The procedure then progresses to detect incongruous filmic components (Step 3), compare meanings of concepts (Step 4), determine domains of concepts (Step 5), and establish mappings between concepts (Step 6). The final step involves marking the ad as

metaphorical if Steps 4, 5, and 6 yield positive results, or marking the ad as non-metaphorical if any of the preceding steps is negative. FILMIP offers metaphor analysts a detailed method for extracting metaphorical elements. However, its adoption for systematic large-scale studies faces challenges. First, its reliability necessitates rigorous examination through inter-rater reliability among annotators (Pan/Tay 2023). Second, the lack of criteria for verbalizing metaphors identified by FILMIP may influence coding consistency. Third, while FILMIP provides ample theoretical references for application, it is labor-intensive to analyze even a single ad, which may pose difficulties for large-scale corpus studies.

The three-step procedure developed by Bobrova (2015) exploits filmic techniques to identify metaphors in TV commercials. It begins by identifying potential metaphors through the consideration of filmic techniques (Step 1), including as compelling context, juxtaposition of objects, and transformation of an image. Subsequently, it focuses on identifying mapping features (Step 2). The final step involves pinpointing the source and target domains and formulating the verbal expression of cross-domain mapping (Step 3). This procedure addresses three questions for identifying metaphors in multimodal discourse, as outlined by Forceville (2002: 2):

1. Which are the two terms of the metaphor, and how do we know?

2. Which is the metaphor's target domain and which is the metaphor's source domain, and how do we know?

3. Which features can/should be mapped from the source domain to the target domain, and how is their selection decided upon?

The inter-rater reliability, however, has not been investigated. Given that each step involves interpretation, assessing its reliability becomes challenging. Informed by both this procedure and literature on metaphor analysis in linguistic discourse, Pan/Tay (2021, 2023) proposed C-MIPVA on a corpus comprising 20 metaphorical Chinese video ads. The proposed method, C-MIPVA with filmic techniques as metaphor signals, has had its reliability substantiated through statistical evidence (Pan/Tay 2021; Pan/Tay 2023). A distinguishing feature of this procedure, in contrast to the two aforementioned ones, lies in treating metaphor identification as the initial stage of metaphor analysis. In other words, instead of incorporating interpretation into metaphor

identification, C-MIPVA focuses solely on documenting responses to metaphor identification. For instance, annotators are only required to indicate with a "Yes" or "No" whether there is transfer of meaning between two concepts, rather than providing detailed explanations of the transferred meanings. This approach acknowledges the diversity of interpretation stemming from individual differences, cultural influences, and contextual factors. Consequently, reliability assessment is confined to determining whether a unit is metaphorical or not. The verbalization of it is in italics and small capitals, such as A IS B or DOING A IS DOING B. While verbalization may vary across individuals, achieving evaluation of agreement on whether the targets and the sources from different raters refer to the same concepts is still possible. To systematically investigate a large corpus, this study adopts C-MIPVA as the chosen procedure for identifying metaphors in video ads. This working procedure does not make any assumption about the cognitive processing of metaphors by viewers.

## 2.3 Metaphor signals and uses

The essence of C-MIPVA is to exploit concrete filmic techniques to identify metaphorical components and determine metaphors within the context. The term *filmic techniques* is employed broadly and encompasses various methods of editing and combining visuals, written texts, spoken language, sound and music to construct a multi-sensory experience in videos. These techniques are important in directing viewers' attention and shaping the information flow (Verstraten 2009). Previous research on metaphors in diverse contexts, including films (Müller/Schmitt 2015), political video ads (Iversen 2017), and video ads (Pan/Tay 2021), has underscored the importance of filmic techniques in signaling metaphors. Pan/Tay (2021) identified five filmic techniques as metaphor signals through the application of the three-step procedure developed by Bobrova (2015).

The five filmic techniques are: Transformation of Images, Depicting Non-Existing Gestalt, Replacement, Juxtaposition, and Simultaneous Cueing of Different Modes. To illustrate these visual effects, Pan provides several examples on the Open Science Framework.[3] Transformation of Images converts one or part of an entity into another (Bobrova 2015). This technique typically

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[3] https://osf.io/egrxh/?view_only=d5a5dcb734be42a09452d8fa91bfaeaa.

portrays the complete process of transforming A into B. For instance, Figure 2 depicts the progression wherein a projector transforms into the icon of *Baidu* Cloud.
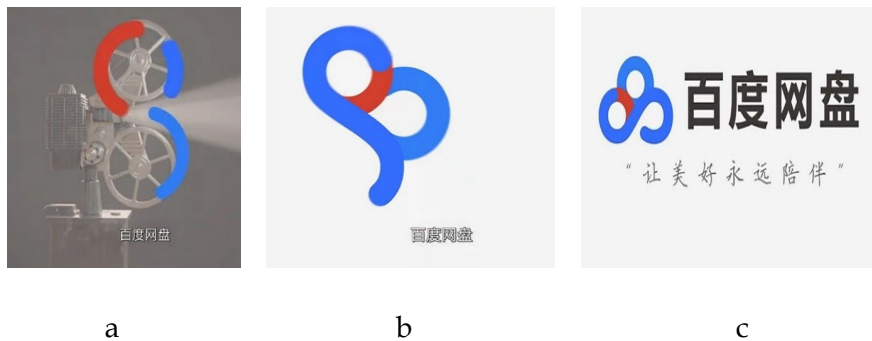


<div align="center">a        b        c</div>

**Fig. 2:** Screenshots from the Ad of Baidu Cloud[4]

Depicting Non-Existing Gestalt creates a visual gestalt that is 'impossible' in real life (Forceville 2008; Gkiouzepas/Hogg 2011). This impossible gestalt may consist of fanciful cartoon elements or a hybrid gestalt combining parts of two distinct focal objects. Figure 3 illustrates the visual effects of this technique. In Figure 3 (a), a shadow of a hand and arm is presented, while Figure 3 (b) shows a hybrid image merging a man with a cartoon depiction of an Automated Teller Machine (ATM).



<div align="center">a        b</div>
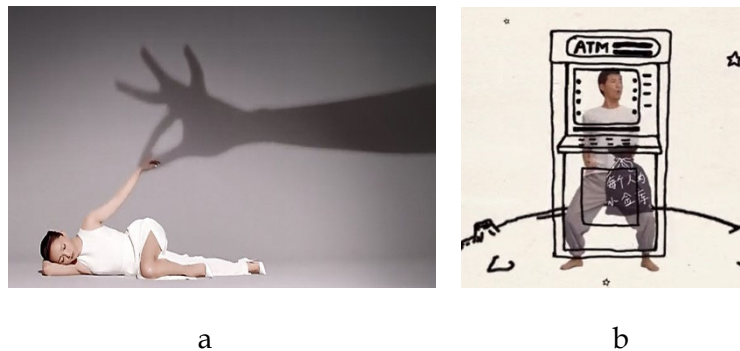
**Fig. 3:** Screenshots from the Ads
(a: *Wanmei* Eyecream[5]; b: *Jingdong* Finance Service[6])

Replacement is a common technique in print ads, where one object "has been replaced by an object foreign to the schema" (Gkiouzepas/Hogg 2011: 105). The

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[4]   https://www.digitaling.com/projects/24017.html.

[5]   https://v.qq.com/x/page/r0146rntgp7.html.

[6]   https://v.youku.com/v_show/id_XMTg3NTYxODc2MA==.html?spm=a2h0k.8191407. 0.0&from=s1.8-1-1.2.

visual effect is similar to the example shown by Figure 1, where something foreign to the context replaces the original item. Figure 1 showcases the use of replacement in print ad, and this technique is equally applicable in moving images. In contrast to Transformation of Images, which clearly portrays the transformation process between two entities presented in complete forms, replacement directly presents an element alien to the scenario. For example, Figure 4 depicts a stewardess is helping a package to fasten the seatbelt. The EMS packages replace the schema of passengers in the airplane, emphasizing the high quality of the postal service from EMS.
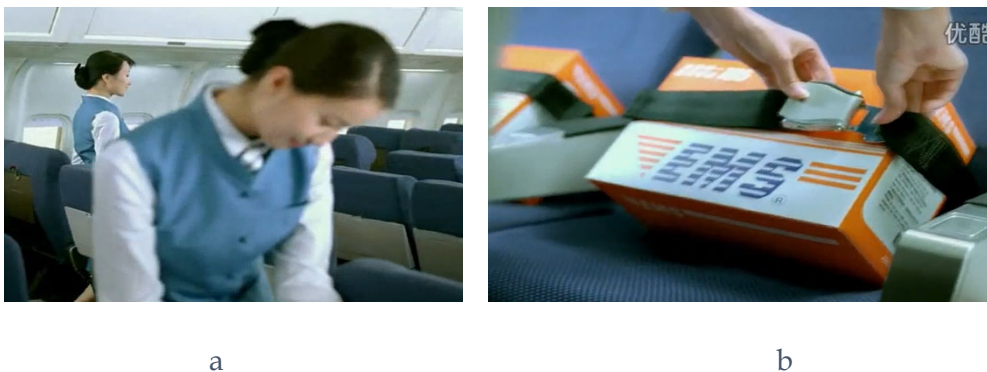


a                                                                                      b

**Fig. 4:** Screenshots from EMS[7]

Juxtaposition presents the alignments of one shot or sequence of shots, either horizontally or vertically (Bobrova 2015). Figure 5 shows this visual effect, where the product Tommee Tippee is juxtaposed with a guitar to emphasize the music function embedded within the product.



**Fig. 5:** A screenshot from the Ad of Tommee Tippee's Feeding Bottle[8]

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[7]   https://v.youku.com/v_show/id_XNzc0NzgwNDky.html?spm=a2h0k.8191407.0.0& from=s1.8-1-1.2.

[8]   http://www.tvcbook.com/showVideo.html?vid=70386&code=3af5MKotjdgM4uoyPB 4z_qESdgZGArMK4axYhYkgjeqhoA.

Simultaneous Cueing of Different Modes is only considered when there is no visual incongruity displayed by the aforementioned four techniques to differentiate these signals. This signal typically portrays one thing in a mode but presents another thing in a different mode simultaneously (Forceville 2009). In this manner, it guides the viewers into connecting the two different things together. Figure 6 illustrates such a situation where a coat is taken off from a girl, and the accompanying spoken language states "remove 98% grease off your body," inviting viewers to connect the concepts of the coat and grease.
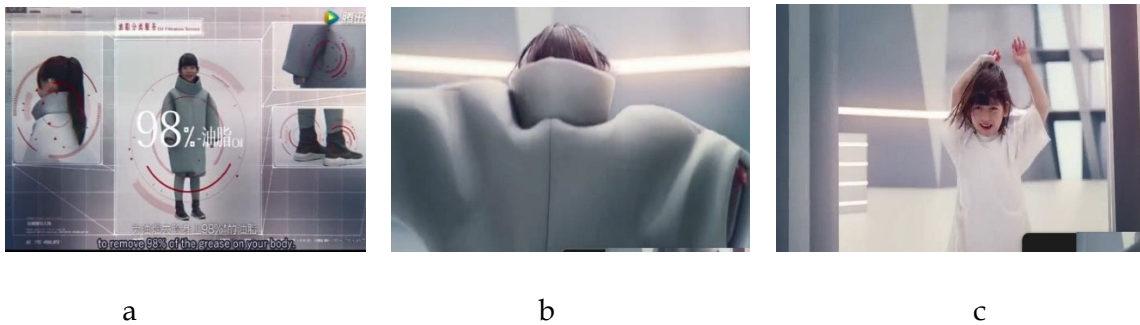


a                                                     b                                                     c

**Fig. 6:** A screenshot from the Ad of FOTILE Range Hood[9]

Research on metaphors in TV commercials indicates that metaphors can carry major claims about a product and has postulated that metaphors in service ads exhibit distinct characteristics compared to other types of ads (Forceville 2008). The examples discussed above highlight the variability in how metaphors function when applied to different products. For instance, the ad for Inlingua Language School (Figure 1) employs metaphors related to users, while the ad for Tommee Tippee's Feeding Bottle (Figure 5) metaphorically represents its own product. A study on personification metaphors in video ads proposes three primary metaphor functions: 1) Features-Highlighting metaphors, emphasizing the positive attributes of products and involving the product as the target of a metaphor; 2) Supporting metaphors, coexisting with Features-Highlighting metaphors and supporting the central metaphorical scenarios by providing additional relevant mappings; 3) Needs-Highlighting metaphors, creating scenarios that highlight problems or desirable outcomes for the intended audience, where the product is introduced as the solution or motivation to achieve the desirable result (Pan 2022). Applying this categorization, metaphor in the ad for Inlingua Language School (Figure 1) fall under Needs-highlighting

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[9]   https://v.qq.com/x/page/q0628rrjd6u.html.

metaphors, as it describes challenges faced by second language learners. The metaphors for the feeding Bottle (Figure 5) TOMMEE TIPPEE FEEDING BOTTLE IS A GUITAR and Baidu Cloud (Figure 2) BAIDU CLOUD IS A PROJECTOR are classified as Features-Highlighting metaphors, as they involve the products as the targets, promoting the attributes of products. The metaphor shown in Figure 6, GREASE IS COAT, serves as a Supporting metaphor, contributing to the creation of the central metaphorical scenario where the product is metaphorized as an airplane, and oil is metaphorized as passengers.

In summary, the current body of literature on metaphors in video ads has laid a solid theoretical foundation for exploring the interconnections among categorical variables, such as metaphor signals, metaphor functions, and product types. Qualitative case studies suggest that metaphors in video ads for different product types manifest distinct characteristics. However, empirical evidence to systematically examine the correlations among metaphor signals, metaphor functions, and product types is currently lacking. This study seeks to address this gap by investigating the following research questions:

1.  Are metaphors prevalent in Chinese public video ads?

2.  Is there any association among metaphor signals, metaphor functions, and product types in Chinese video ads? If yes, what are these associations?


## 3. Method

This study adopts a corpus-driven approach where the characteristics of metaphors have been explored through a bottom-up analysis. This section introduces the corpus, coding schemes for metaphor signals and their uses, and the statistical analysis performed.


## 3.1 Corpus building

The corpus comprises 66 metaphorical Chinese video ads, constructed through a systematic procedure. Initially, stratified random sampling was employed to form a comprehensive corpus of Chinese video ads, with the goal of ensuring representation across various product types and popular platforms in the Chinese mainland. Two distinct product types were identified based on the tangibility of product attributes within the realm of the Economics of Information (EOI) (Bloom 1989). Search products, such as tables and cups, possess

concrete and tangible attributes with predetermined manufacturing standards (Bloom/Reve 1990; Jiménez/Mendoza 2013). On the other hand, experience products, like haircuts and travel services, have abstract and intangible attributes, effective evaluation of which occurs only post-consumption. The strata were defined along these product types and popular online platforms affiliated with the BAT companies (Baidu, Alibaba, and Tencent), which dominated the Chinese digital market from 2016 to 2021, as reported by emarketer. The prevalence of these platforms among the BAT companies indicates their popularity among the Chinese audience, resulting in videos from these platforms have significant exposure to the general public. The keyword used for the search was '广告' ('Advertisements') and the research randomizer[7] was employed to generate random numbers for ad selection, excluding duplicate ads. To ensure feasibility in data analysis, 10 ads were randomly chosen from each stratum, amounting to a total collection of 100 Chinese video ads. Data collection was completed in June 2019, ensuring that the videos in this corpus remained active within the general public sphere at the time of collection.

Secondly, Pan/Tay applied Creative Metaphor Identification Procedure for Video Ads (C-MIPVA) (Pan/Tay 2021, 2023) (see Figure 7) to the corpus and identified 66 ads that contained at least one metaphor. Table 1 displays an overview of the corpus-building procedure. Inter-rater reliability (IRR) was conducted among six annotators, including three metaphor analysts and three novice annotators who did not research metaphor. The procedure involved calibrating their understanding using examples. Subsequently, the annotators independently coded 20% of the data to determine whether a unit was metaphorical. Finally, they engaged in discussions to resolve any disagreements. Fleiss Kappa was employed to measure the extent to which annotators agreed that a unit contained a metaphor. Percentage agreement was utilized to assess the level of agreement between annotators regarding the conceptual labels of the target and the source. The reliability of metaphor identification was supported by statistical evidence from Fleiss Kappa ($k$ = .72) in Step 5 of Figure 7 and a percentage agreement of 84% in Step 6. Further details on inter-rater reliability examinations can be retrieved from Pan/Tay (2023). It is important to notice that Fleiss Kappa indicates substantial agreement, signifying that although there is ambiguity in metaphor identification, the agreement on metaphorical units can reach a statistically supportive level. For percentage agreement, consensus was reached through discussions on whether the labels

of the target and source represented the same concept. A standardized term was adopted for the labels representing the same concept. This might compromise the diversity of conceptual labels from annotators. However, this study acknowledges the variety and diversity of conceptual labels in interpreting metaphors. Although statistical evidence for agreement is provided, the study refrains from claiming a unified interpretation of metaphors. Instead, it reveals that verbalizing metaphors involves interpretation, posing challenges for inter-rater reliability. The current methodological choice is a working procedure for metaphor verbalization. In addition, the focus of discussion is on assessing the extent to which the same concept is referred to rather than exploring the idiosyncratic aspects of interpretation.
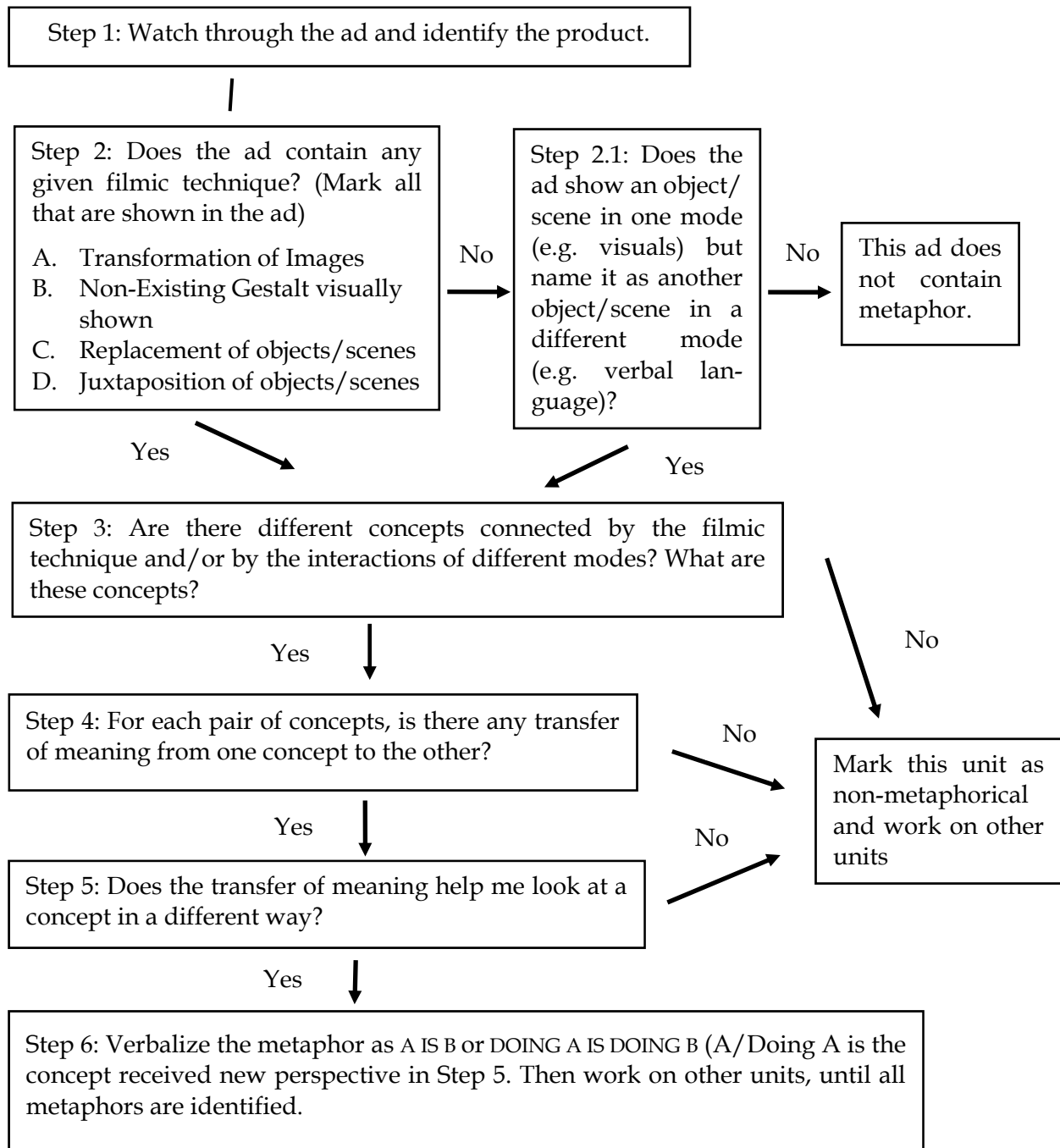
Step 1: Watch through the ad and identify the product.

Step 2: Does the ad contain any given filmic technique? (Mark all that are shown in the ad)

A. Transformation of Images
B. Non-Existing Gestalt visually shown
C. Replacement of objects/scenes
D. Juxtaposition of objects/scenes

No →

Step 2.1: Does the ad show an object/scene in one mode (e.g. visuals) but name it as another object/scene in a different mode (e.g. verbal language)?

No →

This ad does not contain metaphor.

Yes

Yes

Step 3: Are there different concepts connected by the filmic technique and/or by the interactions of different modes? What are these concepts?

Yes

No

Step 4: For each pair of concepts, is there any transfer of meaning from one concept to the other?

No

Yes

Step 5: Does the transfer of meaning help me look at a concept in a different way?

No

Mark this unit as non-metaphorical and work on other units

Yes

Step 6: Verbalize the metaphor as A IS B or DOING A IS DOING B (A/Doing A is the concept received new perspective in Step 5. Then work on other units, until all metaphors are identified.

**Fig. 7:** An overview of the six-step procedure in C-MIPVA (Pan/Tay 2021: 222)

C-MIPVA

100 Chinese Video Ads

34 Non-Metaphorical Video Ads

66 Metaphorical Video Ads

**Tab. 1:** An overview of corpus building

## 3.2 Coding metaphor signals and functions

In C-MIPVA, Step 2 involves the segmentation of the video by identifying segments containing filmic techniques with the potential to construct a metaphor. These filmic techniques are considered metaphor signals in video ads (Pan/Tay 2021). A video may contain more than one metaphorical segment. The coding of metaphor signals and functions was conducted for each segment determined to be metaphorical. There was a total of 197 metaphors identified in the corpus.

### 3.2.1 Identifying metaphor signals

The five filmic techniques were derived from existing literature on multimodal metaphor and analysis of 15 Chinese video ads randomly selected from the corpus. The use of the term *filmic technique* is broad, encompassing various methods of conveying multisensory information. The analysis process is iterative, involving the application of theoretically interested filmic techniques (Bobrova 2015) and refinements with reference to the data. Eventually, we identified four filmic techniques that create visual incongruity, a prominent cue for multimodal metaphor (Šorm/Steen 2018), and one filmic technique that does not create visual incongruity. While it is also theoretically possible to have a monomodal visual metaphor without any verbal or technical cue or incongruity to prompt metaphorical thinking, such cases were not found in our data. This absence may be attributed to the genre of commercial advertising, which has a clear goal of selling a product/service within a limited time frame but with a substantial budget to convey information (Forceville 2016; Pérez-Sobrino 2017; Pérez-Sobrino/Littlemore/Ford 2021). Therefore, we chose to focus on the

prevalent ways of signaling metaphors in our corpus. Pan/Tay developed a scheme to code each filmic technique (see Table 2). Another annotator, a native Chinese speaker, underwent the inter-rater reliability process together with Pan/Tay. The IRR process involved two raters going through a process of calibrating their understanding of the scheme, independent coding, and discussions to resolve disagreements (Cameron/Maslen 2010). The two raters independently annotated 20 video ads, accounting for 20% of the entire corpus. Results from Krippendorff's Alpha ($a$ = .78) indicated substantial agreement (Krippendorff 2004).

| Phase 1 | Watch through the entire ad |
|---|---|
| Phase 2 | Scrutinise the ad and mark down every segment that contains any of the five filmic techniques and the timespan for each, according to the following descriptions. |
| A. Transformation of Images | The timespan starts with visuals of the first entity or feature and ends at visuals of the entire new entity or feature. The segment involves the old and new entities and the process of transformation. |
| B. Depicting Non-Existing Gestalt | The timespan starts with visuals that the non-existing gestalt shows and ends at the scene where this gestalt disappears. The segment clearly shows the whole entity of this gestalt and its show-time in the scene(s). If it shows more than once, record each segment containing it. |
| C. Replacement | The timespan starts when the visuals of replacement show and ends with their disappearance. The segment clearly shows the whole duration of this replacement. |
| D. Juxtaposition | If the juxtaposition shows in one shot, record the timespan of this shot. If not, the timespan starts with the beginning of the first shot and ends at the end of the second shot. It might be possible to have shots that are not placed together. In this case, each timespan for the shots that build up juxtaposition is recorded. The segment clearly shows the shots that are juxtaposed either in one shot or several shots. When there is more than one juxtaposition, the cohesion of the ad is helpful to do the segmentation. |
| E. Simultaneous Cueing of Different Modes | If a video contains more than one mode, consider this possibility by providing a separate segment that marks the entire ad. |

**Tab. 2:** A scheme to detect the five filmic techniques (Pan/Tay 2021: 224)

### 3.2.2 Identifying metaphor functions

Each metaphor was further coded for its function, following the scheme outlined in Table 3 (Pan 2022: 177-178). Fourteen video ads, containing a total of 65 metaphors and accounting for 36% of the overall metaphors, underwent an inter-rater reliability examination procedure. Pan, working with a doctoral student who is a native Chinese speaker, independently coded the functions of these 65 metaphors and discussed ambiguous cases after calculating the agreement. Results from Cohen's Kappa ($k$ = .74) indicated a substantial agreement (Cohen 1968; Pan 2022).

| Steps | Descriptions |
|---|---|
| Step 1 | Watch the whole ad and get to know the context of each metaphor. For each metaphor, |
| Step 2 | Judge whether the metaphor's target or source is the product. If yes, mark it as Features-Highlighting Metaphor. If no, go to step 3. |
| Step 3 | Judge the relationship between the claim of this metaphor (conveyed by two terms and mapping) and the ad's claim for the product. |
| | A. If the ad contains a central metaphor, consider whether this metaphor provides sub-mappings to support the metaphorical scenario lead by the Features-Highlighting Metaphor. |
| | B. If yes, mark it as Supporting Metaphor. If no, consider the following possibilities. |
| | C. The metaphor's claim is in alignment with the ad's claim for the product. It provides more details of the product's traits. Mark it as Supporting Metaphor. |
| | D. The metaphor contributes to a problematic scenario, which needs a solution. The product can be a solution to the problem. Mark it as Needs-Highlighting Metaphor (D). |
| | E. The metaphor contributes to a beneficial scenario where the product can be a platform/motive to achieve the benefits. Mark it as Needs-Highlighting Metaphor (E). |
| | F. There is no clear relationship between the metaphor and the product. But the metaphor is eye-catching/entertaining/fancy. Mark it as Needs-Highlighting Metaphor (F). |

**Tab. 3:** A coding scheme for metaphor function (Pan 2022: 177–178)

## 3.3 Analysis

Statistical analyses were carried out to address research questions. First, to compare the frequency of metaphorical ads and literal ads, a Chi-Square Goodness of Fit was performed (Tay 2017). Then, a set of categorical data analytics, including Log-Linear Analysis with Chi-Squared Decomposition and Multiple Correspondence Analysis (MCA), was performed to uncover latent patterns in the associations between metaphor signals, functions, and types of products. Log-Linear Analysis provides statistical evidence for associations among more than two categorical variables by examining the extent to which these variables fit a linear model (Christensen 1990; Pan 2022; Tay 2018). MCA involves visualizing the associations between more than two categorical variables as geometrical distance, illustrating how each category contributed to the overall variance (Le Roux/Rouanet 2010; Pan 2022; Tay 2020). This study will use MCA as a visual aid to present associations among variables, providing viewers with a general picture. The statistical details of associations were further illustrated by the Chi-square Test of Independence (Pan 2022; Tay 2017). These statistical tests were performed with R.[10] Programming codes are provided in the appendix.

## 4.    Results and discussion

This section presents the general findings regarding the frequency of metaphorical video ads in the corpus. Subsequently, it delves into the associations between metaphor signals, functions, and product types from overall relationships to binary associations. The latent patterns underlying the unstructured multimodal data were revealed through statistical analyses, which included Log-Linear Analysis with Chi-Squared decomposition and MCA.

## 4.1 Frequency of metaphorical ads

We employed the Chi-Square Goodness of Fit Test using the chisq.test() function to compare the frequency of metaphorical videos ($N = 66$) with the non-metaphorical video ($N = 34$) in contemporary mass media. The results show a significant difference in the adoption of metaphors within the initial corpus of

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[10]  https://www.r-project.org/.

100 ads, $X^2(1, 34) = 10.24$, $p = 0.001$, indicating a notable prevalence of metaphors in general video ads. This addresses the first research question.

## 4.2 Overall associations

The overall associations among three categorical variables, i.e. metaphor signals (S), metaphor functions (U), and product types (PT) was first explored by Log-Linear Analysis. The analyses used the LOGLINEAR function in the Crosstabs.Loglinear package[11]. The Log-Linear analysis identifies significant associations among three variables through a process of 'backward elimination'. Initially, all variables are assumed to be associated, and non-significant associations are eliminated in a stepwise fashion until a final list of surviving associations is obtained which best captures the relationships in the data. The analysis begins with Step 0, which examines the three-way interaction among PRODUCT TYPE * FUNCTIONS * SIGNALS. The results indicate that this three-way interaction is not significant ($p = .07$), suggesting that removing it does not significantly affect the fit between observed frequencies and the re-maining effects. Moving on to Step 1, the analysis explores the impact of de-leting bivariate associations. The results show significant bivariate interactions PRODUCT TYPE * FUNCTIONS ($p < .001$), PRODUCT TYPE * SIGNALS ($p = .003$), and USES * SIGNALS ($p < .001$). These findings suggest that the bivariate associations play a significant role in the model fit. The absence of a three-way interaction suggests that the associations between two variables remain consistent regardless of the third variable (Field 2018). The likelihood ratio showed a good fit of this model, $X^2 (8) = 14.08$, $p = .08$. Table 4 shows the crosstabulation for the three variables. Table 5 shows backward elimination statistics.

| PRODUCT TYPE (PT) | FUNC-TIONS (U) | SIGNALS | | | | |
|---|---|---|---|---|---|---|
| | | Transfor-mation | Replace-ment | Juxta-position | Simul-taneous Cueing | Non-Existing Gestalt |
| Experience | Features-U | 7 | 2 | 5 | 5 | 1 |
| | Supporting | 3 | 9 | 5 | 8 | 0 |
| | Needs-U | 0 | 0 | 14 | 12 | 13 |

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[11] https://oconnor-psych.ok.ubc.ca/loglinear/LOGLINEAR_vignettes.html.

| Search | Features-U | 1 | 9 | 21 | 9 | 5 |
|--------|------------|---|----|----|----|----|
|        | Supporting | 1 | 7 | 4 | 11 | 4 |
|        | Needs-U | 0 | 12 | 6 | 8 | 11 |

**Tab. 4:** Crosstabulation for PRODUCT TYPE, FUNCTION and SIGNALS

| Step[a] | GenDel | Effects | LR_Chi_Square | df | p |
|---------|--------|---------|---------------|-----|---|
| 0 | Generating Class | Product Types: Functions: Signals | 0 | 0 | 1 |
|   | Deleted Effect | Product Types: Functions: Signals | 14.082 | 8 | 0.07965 |
| 1 | Generating Class | All of these terms: | 14.082 | 8 | 0.07965 |
|   |  | Product Types |  |  |  |
|   |  | Functions |  |  |  |
|   |  | Signals |  |  |  |
|   |  | Product Types: Functions |  |  |  |
|   |  | Product Types: Signals |  |  |  |
|   |  | Functions: Signals |  |  |  |
|   | Deleted Effect Test | Product Types: Functions | 16.708 | 2 | 0.00024 |
|   | Deleted Effect Test | Product Types: Signals | 15.67 | 4 | 0.0035 |
|   | Deleted Effect Test | Functions: Signals | 50.036 | 8 | 0 |
|   | Deleted On This Step | None deleted |  |  |  |

**Tab. 5:** Backward Elimination Statistics

a. The hierarchical backward elimination procedure begins with all possible terms in the model and then removes, one at a time, terms that do not satisfy the criteria for remaining in the model. A term is dropped only when it is determined that removing the term does not result in a reduction in model fit AND if the term is not involved in any higher order interaction. On each step above, the focus is on the term that results in the least-significant change in the likelihood ratio chi-square if removed. If the change is not significant, then the term is removed.

MCA is helpful in visualizing the underlying structure of overall associations between more than two categorical variables, even in the absence of a three-way interaction. The purpose of conducting MCA in this study is to capture a general

picture of the associations before delving into the interpretation of statistical results. Plots from MCA visualize associations as geometrical distance. MCA describes patterns by locating each analytical unit as a point in a low-dimensional space and grouping variable categories based on their distribution (Le Roux/Rouanet 2010). Figure 8 is the MCA plot generated by packages of FactoMineR and factoextra (Husson et al. 2017). The Figure displays the overall associations between metaphor functions, signals and product types. The first two dimensions typically reveal the most important underlying dimensions that best capture the variance in the data (Tay 2020). In this case, the first dimension accounts for 19.5% of the variance and the second dimension accounts for 18.6%, capturing a total variance of 38.1%.
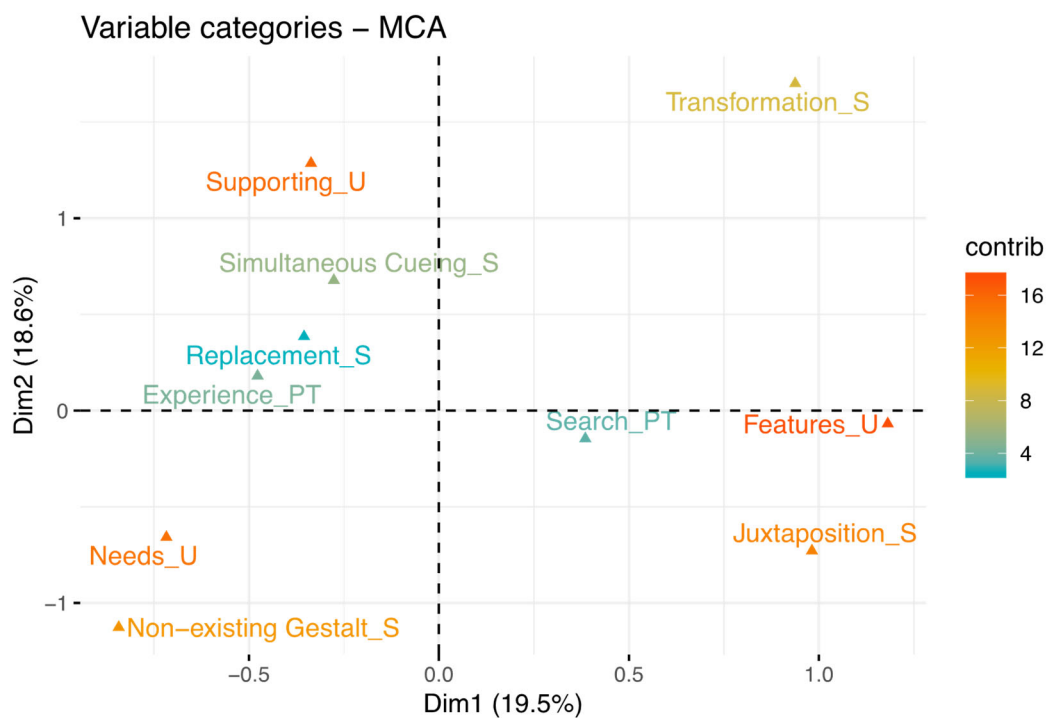
**Fig. 8:** MCA Map for Variable Categories

Exploring relations between categorical variables involves considering the degree of closeness, angles from the origin, and locations in quadrant (Higgs 1991). In Figure 8, Search Product is clustered with Features-Highlighting use and the signal of Juxtaposition, whereas Experience Product is closer to signals of Replacement and Simultaneous Cueing. A far distance from the origin suggests a big deviation from the expected proportions (Nenadic/Greenacre 2007). To further assist in result interpretation, Figure 8's map visualizes the

variable contributions through color. The lesser the contribution of a variable is, the colder the color. Likewise, a warm color of a variable indicates a strong contribution to the variance. Notably, metaphor signals of Juxtaposition, Transformation, and Non-Existing Gestalt are represented in warm colors and their distinctive positioning in the quadrants sets them apart from other variables. This suggests that they make substantial contributions to underlying associations. Metaphor function variables also exhibit warm colors and are positioned far from dimension 1, suggesting a potential strong contribution to associations. In contrast, both types of products (Search Products and Experience Products) are depicted in colder colors and located close to the origin, signaling a limited contribution of product type to the underlying associations.

## 4.3 Bivariate associations

While MCA produced a reader-friendly visualization of overall associations, a closer examination of bivariate associations requires the application of the Chi-Square Test of Independence. The absence of a three-way interaction in the results of the Log-Linear Analysis indicates that bivariate associations remain consistent regardless of changes in another variable (Tay 2018). The bivariate associations were examined by Chi-Square decomposition, using the package lsr (Navarro 2015).

### 4.3.1 The relationship between metaphor signals and functions

A Chi-Square Test of Independence was performed to compare the frequency of five metaphor signals across three metaphor functions. The results show a significant association between these two variables, $X^2 = (8, N = 197) = 38.59$, $p < .001$, Cramer's $V = .31$, indicating that the occurrence of signals for different functions was unlikely to be random. In addition to the $p$ value, interpreting effect size (Cohen 1988) is crucial. Effect size measures the magnitude of an observed difference or relationship, providing a standardized measure of practical significance regardless of sample size. In this case, the effect size indicates a medium to large association (Cohen 1988).

Table 6 presents the counts and the adjusted residual for each variable. The adjusted residual indicates the extent to which the occurrences deviated from expectations. When the absolute value of the adjusted residual is above 2, the

frequency contributes to significance. Green cells indicate pairs showing more frequency than expected at a statistical level. Red cells show the opposite condition. It can be observed that the signal Transformation of Images was used more frequently than expected for Features-Highlighting metaphors but were less frequently to signal Needs-Highlighting metaphors. Juxtaposition tends to signal Features-Highlighting metaphors but not Supporting metaphors. Simultaneous Cueing of Different Modes occurs more frequently to signal Supporting metaphors. Depicting Non-Existing Gestalt tends to signal Needs-Highlighting metaphors but is avoided when signaling Features-Highlighting metaphors. There is no strong tendency to exploit the signal Replacement for different metaphor functions.

| | | | Signals | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Trans-forma-tion | Replace-ment | Juxta-position | Non-Existing Gestalt | Simulta-neous Cueing | Total |
| Func-tions | Features-U | Count | 8 | 11 | 26 | 6 | 14 | 65 |
| | | Adjusted Residual | ***2.6 | -1.7 | ***3.3 | ***-2.1 | -1.2 | |
| | Supporting | Count | 4 | 16 | 4 | 4 | 19 | 47 |
| | | Adjusted Residual | .8 | 1.8 | ***-3.0 | -1.8 | ***2.4 | |
| | Needs-U | Count | 0 | 21 | 20 | 24 | 20 | 85 |
| | | Adjusted Residual | ***-3.1 | .1 | -.5 | ***3.6 | -.9 | |
| | Total | Count | 12 | 48 | 50 | 34 | 53 | 197 |

**Tab. 6:** Signals * Functions Crosstabulation

The raw frequencies show that Simultaneous Cueing of Different Modes has the highest counts, whereas Transformation of Images has the fewest occurrences. These differences reach statistical significance, as confirmed by the Chi-Square Goodness of Fit test, $X^2(4, 197) = 29.22$, $p < .001$. The discrepancy may be attributed to the inherent difficulty in creating such effects. Simultaneous Cueing of Different Modes does not display visual incongruity, enhancing scene coherence and naturalness. For instance, in the ad for FOTILE Range Hood,[12] a

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[12] https://v.qq.com/x/page/q0628rrjd6u.html.

popular kitchen hood brand in China, visuals depict airport passengers waiting for boarding. The spoken language states that these passengers are cooking fumes and their luggage and coats are oil and grease. Without the spoken language, the ad would be challenging to comprehend. The simultaneous cueing of visuals and spoken language creates many Supporting metaphors, such as COOKING FUMES ARE PASSENGERS, GREASE IS A COAT. These Supporting metaphors guide the viewers in making sense of the final Features-Highlighting metaphor FOTILE RANGE HOOD IS AN AIRPLANE. The target and source of a Supporting metaphor, like *cooking fumes* and *passengers* are respectively related to the target and source of the Features-Highlighting metaphor, i.e. *FOTILE Range Hood* and *an airplane*. This function of metaphor may be less prevalent and less salient in print ads due to space limitations. While visual incongruity aids in detecting metaphors in multimodal discourse (Šorm/Steen 2018), especially in static contexts like print ads and street art, in the case of video ads, the flexible interactions among visuals, written text, spoken language, and music increase the opportunities for metaphor creation without visual incongruity. Our analyses not only showed the high frequency of such metaphors in video ads, but also pointed out that they are likely to be employed to support a metaphorical plot for the product.

Juxtaposition and Replacement were employed with similar frequency. No strong tendency has been found for Replacement, suggesting that this technique is utilized to create metaphors for different functions with an equal chance. The signal Juxtaposition is frequently used to convey Features-Highlighting metaphors but is avoided for Supporting metaphors. Juxtaposition presents two entities in alignment, either within a single shot or across sequences, encouraging viewers to compare these two things and draw connections between them. Features-Highlighting metaphors typically involve products as targets, conveying central claims about the product and seeking salience and attention from the intended audience to prevent oversight. For instance, the juxtaposition of a guitar and a feeding bottle in Figure 5 serves to highlight the similarities between the guitar and the product, emphasizing its function of playing music. The visual effects achieved through Juxtaposition contribute to explicitly displaying metaphors about the product, whereas supporting metaphors may lean towards natural and coherent visual effects to construct a cohesive scenario.

It was observed that the signal Depicting Non-Existing Gestalt captures viewers' attention through its elaborate visual effects. This signal was frequently employed to convey Needs-highlighting metaphors, either by accentuating issues faced by viewers or by introducing entertaining elements. In the realm of print ads, a hybrid gestalt might be portrayed (Van Mulken et al. 2010; Gkiouzepas/Hogg 2011). In video ads, the availability of more sophisticated filmic techniques allows for a dynamic presentation of non-existing gestalts. Our corpus analysis showed that elaborate cartoon effects were commonly utilized under this signal, as exemplified in Figure 9.
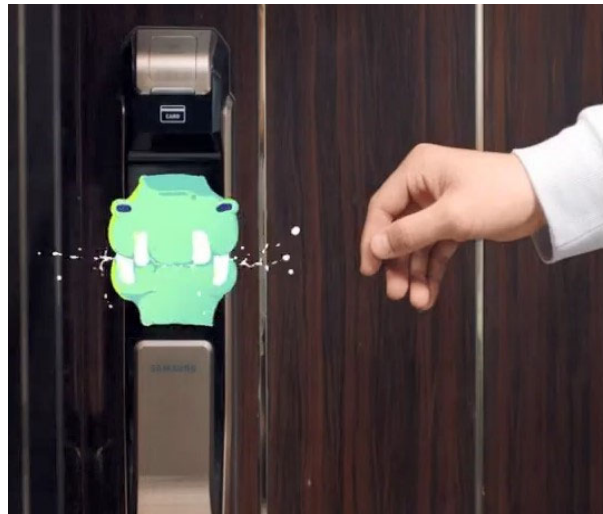


**Fig. 9:** A screenshot from the Ad Eleme[13]

The Transformation of Images occurred with the least frequency, likely attributed to the high level of difficulty in achieving this effect. The visuals typically depict the entire process wherein one entity (A) undergoes a transformation into a different one (B). It was found that this signal usually is used to convey Features-Highlighting metaphors, presenting the target and another entity visually. In this context, entity (A) often serves as the source in the central metaphor, while the product is designed as the target, entity (B). The punchline usually follows this technique, bring the metaphor to its culmination. For instance, Figure 2 illustrates how the central element in the metaphorical scenario (the projector) undergoes a transformation into the product, *Baidu* Cloud. Subsequently, the ad reaches its conclusion.

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[13]  https://www.digitaling.com/projects/27286.html.

### 4.3.2 The relationship between product types and metaphor functions

A Chi-Square Test of Independence shows a significant association between product types and metaphor functions, $X^2 = (2, N = 197) = 9.96$, $p = .007$, Cramer's $V = .23$. The effect size, as indicated by Cohen (1988), demonstrates a moderate tendency. In Table 7, it is evident that Needs-Highlighting metaphors occur more frequent than expectation in ads for Experience products, while they display less frequency in ads for Search products. This suggests that ads for Experience products tend to leverage metaphors to create problematic scenarios or employ fancy appeals to entertain viewers. On the other hand, ads for Search products use metaphors comparatively less for these purposes. Features-Highlighting metaphors are frequently shown in ads for Search products but are avoided in ads for Experience products. This implies that ads for Search products tend to design metaphors that involve the product as targets to highlight product attributes, whereas ads for Experience products avoid to present products in this way. No strong tendency is observed for Supporting metaphors, indicating no preference for supporting metaphors in either type of products. Our discussion, supported by ad examples, highlights that both types of products utilize metaphors for all three functions. The statistical evidence confirms latent associations, such as the occurrence of Features-Highlighting metaphors being more frequent in ads for search products and Needs-Highlighting metaphors being more frequent in ads for experience products. These trends might not be easily discerned by qualitative analysis of a few cases.

| | | | Functions | | | |
| | | | Features-U | Supporting | Needs-U | Total |
|---|---|---|---|---|---|---|
| Product Type | Experience | Count | 20 | 20 | 48 | 88 |
| | | Adjusted Residual | **-2.7 | -.3 | **2.9 | |
| | Search | Count | 45 | 27 | 37 | 109 |
| | | Adjusted Residual | **2.7 | .3 | **-2.9 | |
| Total | | Count | 65 | 47 | 85 | 197 |

**Tab. 7:** Product Type * Functions Crosstabulation

### 4.3.3 The relationship between metaphor signals and product types

A Chi-Square Test of Independence was conducted to examine the occurrence of five metaphor signals in ads for Experience Products and Search Products. The results indicate no statistically significant difference at the .05 significant level, $X^2 = (4, N = 197) = 8.63$, $p = .07$ Cramer's $V = .21$. Since the $p$ value achieves the marginal significant level ($p < .1$), associations between pairs are discernible through Table 8. Notably, the Transformation of Images signal exhibits a tendency to occur more frequently in ads for experience products, while its occurrence is notably lacking in ads for search products, as indicated by an adjusted residual exceeding the absolute value of 2.0. No obvious trend is observed for the other metaphor signals. The associations between the signal Transformation of Images and the two types of products contributed to the overall findings. However, these associations lacked robust support from statistical evidence, suggesting that the design of metaphor signals is unlikely to be influenced by the types of products. This aligns with the temporal and dynamic nature of video ads, where metaphors have ample opportunities to be utilized for various purposes.

| | | | Signals | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Trans-for-mation | Re-place-ment | Juxtapo-sition | Non-Existing Gestalt | Simultaneous Cueing | Total |
| Product Type | Experience | Count | 10 | 20 | 19 | 14 | 25 | 88 |
| | | Adjusted Residual | *2.8 | -.5 | -1.1 | -.5 | .4 | |
| | Search | Count | 2 | 28 | 31 | 20 | 28 | 109 |
| | | Adjusted Residual | *-2.8 | .5 | 1.1 | .5 | -.4 | |
| | Total | Count | 12 | 48 | 50 | 34 | 53 | 197 |

**Tab. 8:** Product Type * Signals Crosstabulation

## 5. Conclusion

This study conducted a corpus-driven investigation into the structural traits of multimodal metaphors in 66 metaphorical video ads. It employed systematic methods to identify metaphors, signals, and functions, supported by inter-rater reliability examinations. Categorical data analytics techniques, including Log-Linear Analysis with Chi-Squared Decomposition, uncovered the latent associations among product types, metaphor functions, and metaphor signals. Multiple Correspondence Analysis visualized the associations in a reader-friendly map. The response to the first research question indicates a significant prevalence of metaphors in Chinese video ads. Regarding the second research question, significant associations were observed between metaphor signals and metaphor functions, product types and metaphor functions, but not between product types and metaphor signals.

The analysis shows that the signal Simultaneous Cueing of Different Modes has the highest raw frequency and is likely to convey Supporting metaphors. This may be attributed to the absence of visual incongruity displayed by this signal, making it an easily exploitable technique. Transformation of Images and Juxtaposition tend to convey Features-Highlighting metaphors, while Depicting Non-Existing Gestalt occurs more frequently when convey Needs-Highlighting metaphors. Additionally, it was observed that search products are more inclined to design Features-Highlighting metaphors, whereas experience products tend to design Needs-Highlighting metaphors. This correlation may be linked to the tangibility of products, where search products are visually representable, while experience products are inherently abstract. However, different types of products do not exhibit a preference for a specific metaphor signal, possibly due to the ample resources and opportunities to craft a metaphor in videos. This also aligns with our finding that the Supporting metaphor, important for constructing metaphorical scenarios in ad plot, does not exhibit a strong tendency for either type of product.

These findings make a valuable contribution to the manifestation and characteristics of multimodal metaphor in video ads from an empirical perspective. The study demonstrates how multimodal metaphors in video ads can be systematically analyzed from a quantitative perspective, addressing methodological challenges highlighted in previous works (Bateman/Hiippala 2020; Pérez-Sobrino 2017). Utilizing concrete filmic techniques as metaphor

signals, the study showcases how these signals, in conjunction with associated metaphor functions, convey key messages about the products. The identified design patterns, emerging from this analysis, serve as a practical reference for video ad designers in crafting multimodal metaphors for video ads. However, the effectiveness of these design patterns in persuasion remains a subject for further empirical examination. Additionally, the study's findings offer statistical evidence that aligns with earlier postulations from case studies, confirming that metaphors for service products 'behave' differently (Forceville 2008). Specifically, products with abstract attributes are shown to exploit metaphors in different functions compared to those with concrete attributes.

The limitations of this study are recognized. Given that the development of C-MIPVA and the analyses were conducted exclusively on Chinese video ads, it is important to note that metaphor signals and the findings may not be applicable to video ads in other countries. Culture, recognized as an important factor, can exert a substantial influence on the design of metaphors and ads (Forceville 2017; Pérez Sobrino/Littlemore/Samantha 2021). Future studies could further explore this issue by studying a large corpus of video ads in a different language.

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## 7. Sources

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## Appendix: Programming codes in R

```
Library (readxl)
#Bring in data
t <- read_excel("y.xlsx")
View(t)

#Codes for Log-Linear Analysis
library(Crosstabs.Loglinear)
LOGLINEAR(data = t,
      data_type = 'counts',
      variables=c('Products', 'Uses', 'Signals'),
      Freq = NULL )
```

```
#Codes for Chi-Square Test of Independence
install.packages("lsr")
library(gmodels)
library(lsr)
#Make a contingency table of two variables
pb = table (p$Products, p$Uses)
#chi-square test of independence
chisq.test(pb)
#effect size
cramersV(pb)
#View the adjusted residuals
CrossTable(p$Products,p$Uses, asresid = TRUE, format = "SPSS")

#Codes for MCA
install.packages(c("FactoMineR", "factoextra"))
library("FactoMineR")
library("factoextra")
res.mca <- MCA(p, graph = FALSE)
print(res.mca)
get_eigenvalue(res.mca)
fviz_mca_var(res.mca, col.var = "contrib",
        gradient.cols = c("#00AFBB", "#E7B800", "#FC4E07"),
        repel = TRUE, # avoid text overlapping (slow)
        ggtheme = theme_minimal())
```