



**Visual metaphors in advertising: how fluency and  
comprehension affect aesthetic pleasure and interest  
at different complexity levels**

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## **Preface**

Before you lies the Master's thesis 'Visual metaphors in advertising: how fluency and comprehension affect aesthetic pleasure and interest at different complexity levels'. I wrote this thesis to bring my Master's program of Communication and Information Sciences at Tilburg University to completion. I have been working on this product from September 2016 to January 2017.

This current study was part of a collaboration with fellow students Aniek van den Reek and Steffie van der Horst. Mostly the first few months involved intensive collaboration coming up with a design that would fit all our individual research questions, creating stimuli, testing the stimuli and subsequently exhaustive debates about how to conduct the main experiment. As a logical result of collaborating with different research questions, several variables are included in the experiment that I have not used in my analyses to answer my research question. I would like to thank Aniek and Steffie for all their effort and teamwork past semester.

Moreover, I would also like to thank my supervisor dr. Renske van Enschoot for her excellent guidance, assistance and support during this process, especially for programming the experiment in E-prime. I would also like to thank Jacqueline Dake, Kiek Tates, Mariek vanden Abeele, Leonoor Oversteegen and Marjolijn Antheunis for offering their offices as examination rooms to conduct the experiment. In addition, I would like to thank Charlotte van Hooijdonk for welcoming me at VU Amsterdam and arranging extra participants for the experiment.

Last but certainly not least, my family and friends deserve a special note of thanks: your mental support and listening ear is much appreciated.

Thank you.

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### **Abstract**

The effect of visual metaphors in advertising on aesthetic pleasure is on the one hand claimed to follow a linear pattern reflecting a preference for less complex stimulus, which is in line with processing fluency theory. On the other hand it is claimed to follow the curvilinear pattern of an inverted U-curve representing a preference for more complex but not overly complex structures. Dual processing should explain these conflicting patterns as exposure time might be of influence on aesthetic pleasure and interest of metaphors varying in complexity. Previous studies introduced processing fluency and comprehension to be of possible influence. This paper reports an experiment to test the effect of processing fluency and comprehension on aesthetic pleasure and interest for metaphor structures of different complexity levels at 100ms and 5000ms. In a mixed design experiment (exposure time as between-subject), 164 participants evaluated ten different metaphors (in 10 advertisements for 10 different products) of five metaphor structures varying in complexity. Results did not show a linear relation of least complex structures yielding most aesthetic pleasure at 100ms. Results did show that at 5000ms aesthetic pleasure and interest showed an inverted U-curve. However, no suppression effect of fluency was found for the positive slope.

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## Introduction

Imagine, you are in the intercity train looking out of the window and suddenly you see a billboard (image 1) flashing by. Do you like the advertisement? What did you see and did you understand what you saw? Now imagine, instead of seeing the advertisement flashing by, you are in the intercity train standing still at the train station. You are looking out of the window and you see a billboard. Do you like the advertisement? Now, what did you see and did you understand what you saw? Was the advertisement more pleasurable or interesting when you had more time to look



Image 1. Advertisement for  
Tabasco

at it? Why? Is it maybe because you understood the advertisement or because it was easier to understand? These are all questions marketers and scholars deal with currently. Marketers' aim is to inform and persuade their audience. A way of achieving the latter is by facilitating the audience with a pleasurable experience, as people may link the pleasure experienced processing the advertisement to the advertised product (Meyers-Levy and Malaviya, 1999). Pleasure can be evoked in different ways, one of which is through visual rhetoric. Rhetoric is a commonly applied technique in advertising as marketers foresee positive effects. Many studies have been conducted to investigate the effects of rhetoric in advertising (e.g., Van Mulken, Van Hooft, & Nederstigt, 2014; Van Hooijdonk & Van Enschoot, 2016; Van Enschoot & Van Mulken, 2014). Most were directed at its effect on the appreciation of advertisements. Results repeatedly indicated that advertisements containing rhetoric were appreciated better than advertisements that did not incorporate rhetoric (e.g., Van Enschoot, 2006; Van Enschoot, Beckers, & Van Mulken, 2010; McQuarrie and Mick, 1999). However, what if advertisements with visual rhetoric are not experienced as pleasant because of a lack of processing fluency?

Not being able to understand the displayed rhetoric could endanger a marketer's aspired effect (see Van Mulken et al., 2014). Therefore, this study will focus on the effect of processing fluency and comprehension of visual rhetoric in advertising on aesthetic pleasure and interest.

Visual rhetoric in advertising can take different forms, which in turn may range in complexity. Nevertheless, a rhetorical figure is always an expression that artfully deviates in form, not in content, from the norm or expectation in which the artful deviation is not discounted as nonsensical or faulty as it relates to an identifiable template (McQuarrie and Mick, 1996). Present study will focus on visual metaphors as a form of visual rhetoric. In visual metaphors, two divergent objects are compared by which the characteristic(s) of one object, the source, are attributed to the other object, the target (Sopory and Dillard, 2002). The source domain and target domain require at least one attribute in common as the basis of the implied comparison, also referred to as ground (Van Mulken et al, 2014). A visual metaphor can thus be seen as a puzzle people need to resolve to understand the intended message. Solving a puzzle can be, again, a pleasant experience since it is discussed to flatter one's intellectuality as it reinforces that (s)he possesses over the needed knowledge and wisdom to come with a solution (Phillips, 1997).

Like puzzles, the complexity of visual metaphors can vary. To make a distinction in complexity, Phillips and McQuarrie (2004) introduced a framework of visual metaphors. The framework makes a distinction between three types of visual structures: Juxtaposition, Fusion and Replacement. Examples are depicted in image 2. Juxtaposition is applied when two images, the source and the target, are presented alongside. In the visual structure of Fusion, the two images are merged into one image. In case of Replacement, only the image of the source is present, pointing to the absent image (Phillips & McQuarrie, 2004). According to the model, the metaphorical figure Juxtaposition is less complex than Fusion. Subsequently, Fusion is less complex than Replacement. Phillips and McQuarrie (2004) assume that the

more complex the visual structure, the more processing demands are imposed. Their argumentation is that when two objects are juxtaposed, it should be fairly clear that there are two different objects but that their implied common identity should therefore be fairly apparent as well (Philips, & McQuarrie, 2004). Fusion, however, is somewhat more complex to resolve as the image needs to be disentangled into two separate objects. In this process uncertainty may prevail about the correct disentanglement and identification of the two elements (Philips, & McQuarrie, 2004). Most processing demand is imposed for visual Replacement because people need to detect that there is a missing object that is associated with the displayed object (Philips, & McQuarrie, 2004). Philips and McQuarrie (2004) argue that the latter process of detecting the missing object and identifying its relation to the displayed object is yet more complex than solely disentangling two present objects in case of Fusion. The argued order in complexity of the structures has been supported in several studies (e.g., Van Mulken, Le Pair, & Forceville, 2010; Van Mulken et. al, 2014).



*Image 2.* Examples of visual metaphor structures. From left to right: Juxtaposition, Fusion and Replacement

However, the question remains when and how visual metaphors as a form of persuasive communication evoke aesthetic pleasure and interest. Does the audience truly engage in resolving the metaphor? Moreover, do they understand it at all? If so, which level of complexity is most effective considering processing fluency?

**Processing fluency theory**

As mentioned, an argument to adopt visual metaphors in advertising is that they can facilitate aesthetic pleasure as a result of a fluent processing experience. The processing fluency theory by Reber, Schwarz and Winkielman (2004) confirms this argument. According to the processing fluency theory (Reber et al., 2004) the ease with which people process a particular stimulus determines the level of felt aesthetic pleasure from that stimulus. In view of the theory, the more fluently an object is processed, the more aesthetic pleasure is evoked (Reber et al., 2004). A preference for easy-to-process stimuli is thus posited. Support for the theory is found for numerous visual entities, such as simple patterns and objects (Reber, Winkielman, & Schwarz, 1998), visual properties including clarity or contrast (Reber, Wurz, & Zimmermann, 2004) and symmetry (Reber, 2002; Reber, Wurz, & Zimmermann, 2004), photographs (Tinio, Leder, & Strasser, 2011), art (Leder, 2003; Belke, Leder, Strobach, & Carbon, 2010) and brand logos (Nordhielm, 2002).

However, several scholars have shown a positive relation between novelty (e.g., Blijlevens, Carbon, Mugge, & Schoormans, 2012; Hekkert, Snelders, & Van Wieringen, 2003) and complexity (Landwehr, Labroo, & Herrmann, 2011; Martindale, Moore, & Borkum, 1990) on aesthetic liking; while in view of the processing fluency theory (Reber et al., 2004) both are considered to decrease processing fluency and thus decrease aesthetic liking. Next to that, studies focussing on the processing fluency theory in relation with rhetorical advertising have not found such evident support either. Results were even less positive inasmuch as no positive correlation between processing fluency and liking was found: more complex advertisements, though not overly complex, were generally appreciated more than less complex advertisements (Andrews, 2011; Van Enschoot & Van Mulken, 2014). These findings occurred not only in rhetorical advertising, several art-related studies also

found a preference for more complex art (e.g., Hare, 1974; Hekkert et al., 2003; Landwehr et al., 2011; Silvia, 2005).

### **The inverted U-curve**

#### **Berlyne.**

The findings contradicting Reber et al.'s processing fluency (2004) show a so called inverted U-curve to which Berlyne (e.g., 1966, 1971, 1974) offers more insight. Berlyne (1971) introduced a theory explaining the inverted U-curve. The theory centres different collative variables, which are hedonic structural features that are embodied in art, such as complexity, novelty, uncertainty and conflict. These collative variables have arousal potential; the ability to affect the magnitude of arousal; which thereupon influence aesthetic response. In this, Berlyne claims that moderate levels of arousal potential are preferred. Thus, pleasure would increase when the complexity of a visual metaphor does, while too complex visual metaphors would decrease liking. When looking at Phillips and McQuarrie's (2004) metaphor structures and their levels of complexity, it could thus be expected that increase of complexity of Juxtaposition to Fusion would account for the positive slope of the inverted U-curve; whereas the further increase in complexity of Replacement would account for the negative slope of the inverted U-curve, in which Fusion would be considered as the tipping point, the optimal peak, of the inverted U-curve (e.g., Van Mulken et al., 2014).

#### **Optimal Innovation Hypothesis.**

In line with Berlyne's perspective on the relationship between the collative variables and liking, Giora, Fein, Kronrod, Elnatan, Shuval, and Zur (2004) found similar results testing their Optimal Innovation Hypothesis. Giora et al. (2004) predicted that optimal innovative, thus moderately challenging, stimuli would be preferred over more salient stimuli as well as pure innovative stimuli. Optimal innovative stimuli involve stimuli that are both salient (i.e. familiar or (proto)typical) and novel (Giora et al., 2004). Multiple experiments confirmed that

optimally innovative stimuli were indeed more pleasing than purely innovative stimuli or stimuli of salient nature (Giora et al., 2004).

### **The MAYA principle.**

Likewise, in 2003 Hekkert et al. investigated the effect of Berlyne's (1974) collative variable novelty opposed to typicality on people's aesthetic liking of different product designs. Supporting Berlyne's (1974) U-curve and falsifying Reber et al.'s fluency theory (2004), Hekkert et al. (2003) found that people have a preference for designs that are novel as long as novelty does not affect typicality; meaning that a balanced design of novelty and typicality is preferred. With these findings, they reinforce their so called MAYA principle: Most advanced, yet acceptable (Hekkert et al., 2003); as the MAYA principle posits that typicality and novelty jointly influence aesthetic preference in which each variable suppresses each other's positive effect (Hekkert et al., 2003).

### **Appraisal theory.**

In contrast with Berlyne's stress on objective stimulus features, appraisal theories hold on to a more subjective view. Appraisal theories (see e.g., Silvia, 2005b) claim that a person's aesthetic response to a so-called objectively complex stimulus is affected by the extent to which that person subjectively appraises the stimulus as complex. Accordingly, appraisal theories see different emotional responses of different people in the same situation and the same person will respond with different emotions in similar situation at different moments (Silvia, 2005b). As argued by Silvia, appraisal theories assume that emotions are products of subjective appraisals of events and each emotion has its own appraisal structures. For example, in the case of interest resulting from visual metaphors, appraisal theories can foresee that the emotion interest will be evoked when people have made a novelty-complexity appraisal and a coping potential appraisal. The first appraisal, also the novelty check, refers to several variables that trigger disfluency in processing the metaphor; that is appraising it as

new, unfamiliar, complex or mysterious. This novelty check is, to a large extent, in line with Berlyne's (1971) collative variables. However, the second appraisal structure distinguishes appraisal theories from Berlyne's objective approach. The coping potential appraisal is a subjective structure referring to one's appraised ability to comprehend the appraised new, unfamiliar stimulus (Silvia, 2005b).

Silvia (2005b) has conducted different experiments to find support for the appraisal theory. Results of the studies showed that interest indeed depended on both perceived complexity and coping potential. It was found that interest increased when appraised ability to understand increased; meaning that the more people perceived themselves as being able to comprehend complex stimuli, the more highly complex stimuli were rated as most interesting. It may therefore be argued that when a stimulus is more complex, it is considered more interesting up to that point of deficient coping potential as the stimulus becomes too difficult to understand, resulting in a negative slope reinforcing an inverted U-shape (Van Der Lee, in preparation). The importance of comprehension and perceived ability to comprehend should thus be noted when looking at interest as response to visual rhetoric. For the emotion of enjoyment, however, coping potential appraisal was found not to be of influence (Silvia, 2005b). Also, another study found that appraised complexity could even negatively predict enjoyment (Turner Jr., Samuel, & Silvia, 2006).

### **Dual processing models**

In their discussion, Hekkert et al. (2003) introduce a possible explanation for the above illustrated paradox; a paradox of on the one hand an aesthetic preference for not complex and thus easy-to-process stimuli (high in typicality) (Reber et al., 2004), while on the other hand there is a preference for more complex or challenging stimuli (more atypical or novel) (e.g., Berlyne, 1974; Giora et al., 2004; Hekkert et al., 2003). These conflicting theories may be explained by a dual processing mechanism (Hekkert et al., 2003). The suggested

processing mechanism consists of two different manners of processing: an automatic and a controlled mechanism. The automatic processing mechanism requires no to little awareness or intention and should thus be more favourable for familiar, easy-to-classify or typical stimuli since it involves a more instinctual response (Hekkert et al., 2003). The opposing controlled mechanism, however, involves conscious and cognitively mediated processing, which facilitates processing of novel, atypical or incongruous stimuli (Hekkert et al., 2003).

In line with Hekkert et al.'s (2003) proposed dual processing mechanism, Graf and Landwehr (2015) also assume an existence of duality in processing for aesthetic preference and introduced the Pleasure-Interest model of Aesthetic Liking (PIA Model). Likewise, they posit the presence of a more unconscious or immediate automatic processing and a more conscious or elaborate controlled processing. These processing mechanisms occur in chronological order. When a stimulus is presented, automatic processing immediately takes place during which people evaluate the stimulus whole. Positive or negative affective feelings are elicited based on experienced (dis)fluency, resulting in either pleasure or displeasure. This is in line with Reber et al.'s (2004) processing fluency theory. Graf and Landwehr (2015) refer to this automatic process as stimulus-driven. After automatic processing, people have the option to engage in more elaborate processing by means of controlled processing or they have the option to stop at the point of pleasure or displeasure. Hence, controlled processing is perceiver-driven rather than stimulus-driven. People engage in controlled processing people have the desire to learn more about the stimulus or when they want to reduce experienced disfluency. People experience disfluency when they evaluated a stimulus as more difficult to process as they had expected it to be. For the latter objective to engage in controlled processing support was found by Van Der Lee (2016). Controlled processing results in either interest, confusion or boredom; feelings of pleasure or displeasure are overruled. According to Graf and Landwehr (2015), confusion is evoked when disfluency is not reduced, boredom is

evoked when people who initially experienced no to little disfluency wanted to learn more about the stimulus found out there was nothing more to learn from the stimulus and interest is elicited when feelings of disfluency are reduced or when fluency are increased. Whereas automatic processing is in line with processing fluency, controlled processing of the PIA Model can be linked to the inverted U-curve, taken that too complex (no disfluency reduction) or too simple (not more to learn) stimuli cause dislike: confusion or boredom. Suggesting that moderate complex stimuli would evoke interest.

### **Activation of dual processing by exposure time**

Hekkert et al. (2003) suggest that viewer's characteristics as well as the setting in which a stimulus is presented and available processing time are likely to influence which processing mechanism will be used. Hekkert et al. (2003) argue that particularly available time to process and evaluate a stimulus may affect which of the two opposing processing mechanisms will be employed. If the exposure time of a stimulus is short, the automatic mechanism is predicted to be dominant, preferring an easy-to-classify (non-ambiguous) stimulus (Hekkert et al., 2003). Contrary, at a long(er) exposure time of a stimulus, the cognitive mediated controlled mechanism is expected to be dominant and more novel or optimal innovative (ambiguous) stimulus would be preferred (Hekkert et al., 2003, in Van Enschot & Van Mulken, 2014, p. 193). As stipulated by Jakesch, Leder and Forster (2013), studies on fluency effects have indicated that stimuli were indeed processed more easily the longer stimuli were presented, hence an important main effect of exposure time was found for fluency (see Forster, Leder, & Ansorge, 2012; Reber et al., 1998). Jakesch et al. (2013) shed light on the possible existence of dual processing in their experiments to draw on different levels of fluency by manipulating presentation time. In the experiments, processing fluency was manipulated by exposure time (10ms, 50ms, 100ms, 500ms, 1000ms) to examine aesthetic appreciation of ambiguous versus non-ambiguous stimuli. Their findings partially

support the proposed influence of time for dual processing when ambiguous and non-ambiguous stimuli were presented. The results showed that ambiguous pictures of paintings were preferred over the non-ambiguous pictures at 500ms and 1000ms, as they were liked more, while no such difference was found at 10ms and 100ms (Jakesch et al., 2013). Ambiguous pictures were also evaluated as more interesting at 50ms and 1000ms. This latter is particularly fascinating considering claims made by the PIA Model (Graf, & Landwehr, 2015). Although non-ambiguous stimuli were not found to be liked more at shorter exposure times and ambiguous pictures were also found to be interesting in one of the shorter timeslots (50ms), Jakesch et al.'s (2013) study has raised the attention of other researchers in the area of advertising to further investigate the role of exposure time in the dual processing assumption.

Continuing the work by Jakesch et al. (2013), Van Enschoot and Van Mulken (2014) looked into the effect of exposure time on aesthetic response to familiar versus optimally innovative images in advertising. It was hypothesised that familiar images would be preferred over optimal innovations at a short exposure time (20ms), whereas optimal innovations would be preferred over familiar images at a longer exposure time (1000ms). It was found that aesthetic response was more positive for optimally innovative advertising images regardless of time, thus rejecting the expected interaction effect. However, it should be noted that even though optimally innovative advertisements images were processed less fluent in all conditions, felt fluency scores were still on the positive part of the scale (Van Enschoot & Van Mulken, 2014). This could indicate that the tipping point of the inverted U-curve (Berlyne, e.g., 1971; 1974) has not been reached by the used stimuli in Van Enschoot and Van Mulken (2014). This suggests a need for more levels of innovation to further investigate fluency theory and Hekkert et al.'s (2003) claims regarding dual processing.

**The role of fluency**

Van Hooijdonk and Van Enschoot (2016) investigated the influence of exposure time on processing fluency and aesthetic response to visual metaphors of different complexity levels in advertisements. Metaphor structures ranged in complexity based on Phillips and McQuarrie's (2004) taxonomy. The first study used two metaphor structures as advertising images: Juxtaposition and Fusion. Results showed that the aesthetic appreciation of Fusion, the more complex metaphor, was indeed higher than the simpler metaphor structure Juxtaposition at longer exposure times (1000ms and 5000ms). However, at 100ms, Juxtaposition and Fusion were equally appreciated. Also, felt fluency of Juxtaposition and Fusion did not differ at not one of the exposure times. Hence, felt fluency could not explain these findings. Nevertheless, at the longest exposure time of 5000ms artful deviation, the extent to which people evaluated the advertising image as creative, innovative and surprising, was found to mediate the higher aesthetic appreciation of Fusion. For both metaphor structures, felt fluency was still rather high. Therefore, a more complex visual metaphor structure was added in study two. Advertising images incorporating Replacement were used.

In their second study Replacement was aesthetically appreciated more than both Fusion and Juxtaposition at 100ms. In addition, at 100ms felt fluency was higher for Replacement, the most complex metaphor structure, than for Fusion and Juxtaposition. Contrary to the expectations, aesthetic pleasure of Replacement was positively influenced by felt fluency. Possibly, perceived versus actual comprehension of the visual metaphor may explain this surprising finding. For instance for the advertisement image of a smartphone, the visual metaphor of a penknife was used as Replacement. At 100ms, only two out of nineteen actually understood the metaphor when Replacement was applied in the advertisement, others perceived the advertisement to be for a penknife thinking they comprehended the advertisement; explaining the felt fluency; but in fact not comprehending the visual metaphor.

When exposure time increased to 5000ms, actual comprehension of replacements was eight out of fourteen. Thus actual comprehension was higher, but felt fluency was significantly lower; indicating that the process of understanding the visual metaphor felt less fluent. This raises the question what this means for aesthetic pleasure and interest. For instance, does low processing fluency that led to understanding a complex metaphor structure evoke more aesthetic pleasure and interest than low fluency that did not lead to comprehension of the metaphor? Comprehension of visual metaphors may thus play a crucial role when it comes to aesthetic pleasure and interest.

Van Hooijdonk and Van Enschoot (2016) did find support for the MAYA principle (Hekkert et al., 2003) and Giora et al.'s (2004) Optimal Innovation Hypothesis as advertising images using Fusion had higher artful deviation scores than Juxtaposition and Replacement. Also, in study two Fusion scored significantly higher on interest than Juxtaposition and Replacement at long exposure time. This suggests that time is indeed able to activate processing mechanisms, giving the preference to more novel images. Relating to Silvia's (2005) appraisal theory, it is possible that more processing time has activated controlled processing which might facilitate higher coping potential resulting in greater interest. If so, taken together with the novelty check of artful deviation, high interest score of fusion at 5000ms can be explained. However, when looking at the PIA Model (Graf, & Landwehr, 2015) and Van Hooijdonk and Van Enschoot's (2016) results it could also be possible that if processing time indeed activated controlled processing, Juxtaposition and Replacement were more likely to bring about boredom or confusion than interest compared to Fusion. However, these aesthetic evaluations were not taken into account.

### **The role of comprehension**

As suggested above by Van Hooijdonk and Van Enschoot (2016), a crucial role of understanding the visual metaphor is implied. Van Mulken et al. (2014) found comprehension

to be of mediating influence on appreciation for different visual metaphor structures. In this, comprehension was measured by checking off the ground for the metaphor in a closed question. First, it was found that comprehension mediated the effect of visual metaphors compared to no visual metaphor in the advertisement. Second, it was found that comprehension suppressed the effect of Fusions on appreciation compared to Juxtaposition. This means that Fusions had a negative direct effect on comprehension as well as aesthetic appreciation, but the indirect effect via comprehension was positive. Thus, even though comprehension of Fusions were lower than Juxtaposition, they were appreciated more. Third, Van Mulken et al. (2014) found that comprehension also mediated the effect of Replacement in advertising images on appreciation. Replacements were often not comprehended, they were also appreciated less than Juxtapositions and fusions even when they were comprehended. In this, comprehension of Replacement negatively mediated the effect of Replacement on appreciation. Appreciation was thus lower because of comprehension. This raises the question whether there is more at stake than solely comprehension.

### **Research question**

So far it is found that both comprehension and fluency can affect aesthetic response to visual metaphors. Based on previous literature, it may be so that both constructs are related and affect aesthetic response together. However, it is not clear how comprehension and fluency relate to each other. Next to that, exposure time has been a successful way of manipulating the activation of dual processing, which offers insight and may explain how and why comprehension and fluency affect aesthetic response for different levels of complexity. The present study continues the work by, amongst others, Van Enschoot & Van Mulken (2014), Van Hooijdonk and Van Enschoot (2016) and Van Mulken et al. (2014) by investigating whether there is a relation between comprehension and fluency and how both,

solely or together, affect aesthetic response to visual metaphor structures at different exposure times. Therefore, the central research question of this study is:

RQ: What is the relationship between comprehension and processing fluency and their influence on aesthetic pleasure and interest to visual metaphorical structures of different levels of complexity at different exposure times?

### **New metaphor structures**

In order to investigate the research question, two new metaphor structures will be created and added to the so far researched Juxtaposition, Fusion and Replacement. The fact that, in for instance Van Hooijdonk and Van Enschoot (2016), people appeared to identify the source displayed in the advertisement as the target, suggests a need for more contextual cues to get a better impression of complexity's effect on aesthetic pleasure at short exposure times. This should to prevent people's impression of advertisements of Replacement as advertisements that solely display the advertised product. Also, the fact that no full support for the inverted U-curve of complexity on aesthetic response has been found could be because the optimum tipping point has not been reached yet (e.g., Van Hooijdonk & Van Enschoot, 2016; Van Mulken et al., 2014). The reason for this is likely to be due to a lack of differentiation of metaphor structures. Van Mulken et al. (2014) already suggested that a lack of contextual information in Replacement might be of influence on its appreciation. When more contextual cues would be added to Replacement, aesthetic could possible increase as its complexity would slightly decrease, which would be in line with theories favouring an inverted U-curve (e.g., Hekkert et al., 2003; Giora et al., 2004). Therefore, present study suggests to implement more contextual information or cues in the advertisements of Replacement. By doing so, new metaphor structures of Replacement would be developed. Another reason that still no full support has been found could be in the inconsistency of the stimuli. Metaphor structures have not been constructed in the same manner in different

studies, but also within studies, when looking at context for example. Van Mulken et al. (2014), for instance, have inconsistently applied context within the same visual metaphor structure as well as between visual metaphor structures. This confound could have affected complexity, perceived complexity and processing fluency, hence aesthetic response.



*Image 3. Example of a Target integration (left) and a Source integration (right)*

Nevertheless, context could be an important cue affecting aesthetic pleasure and interest. Therefore, two new metaphor structures of Replacement are proposed in which the depicted object is supported with contextual cues of the other domain. Hence, the object is integrated in context. This new metaphor structure Integration can take two forms: Target integration and Source integration. In the metaphor structure of Target integration the context rather than the product is replaced. In this, the actual product (the target) is integrated in the context of the source. An example of Target integration is an advertising image of a cup of coffee on a nightstand. Image 3 depicts this example of Target integration. Conversely, in the metaphor structure Source integration the replaced product is integrated in the context of the target; meaning that the depicted product (the source) has replaced the target object in the actual context of the target object. An example of Source integration would thus be an advertising image of an alarm clock on a saucer when reading a paper, which is also visualised in image 3. These proposed new visual metaphor structures can still be accounted as metaphors since a comparison can still be made of the two visual elements of different

domains as they, nevertheless, have something in common. Both elements of the image, the context and the object, share ground.

Real life advertisements commonly apply these structures. However, these have so far not been included in research on aesthetic response to metaphors in advertising. It is predicted that Target integration and Source integration are less complex than Replacement, since they contain more visual cues. Like the less complex Fusion and Juxtaposition they contain cues of both domains. This hint of this present other domain would make it less complex. It is harder to make a distinction in complexity between Fusion and the two new visual metaphors, since all three structures display both the target as the source domain. However, on the one hand, Target integration and Source integration depict the two domains in two elements as separate wholes; in which the context or the object offers supportive additional information; whereas fusions depict both domains only partially: neither the target nor the source are depicted as a whole. Thus, it can be suggested that Fusions contain fewer cues. On the other hand, the path of the metaphorical comparison of fusion is a rather simple one ( $A=B$ ), whereas the comparison of the two domains in Target integration and Source integration take a more complex path since it does not reflect a direct  $A=B$  comparison but rather an  $A=\text{context of } B$  or actually ‘context of  $A=\text{context of } B$ ’, thus  $A=B$ . Assuming this latter argument outweighs the first argument of partial versus complete depiction of the domains, it is predicted that dissolving the implied comparison of the target and the source in Target integration and Source integration is more complex than in Fusion. Hence, Target and Source integration would also be more complex than Juxtaposition even though all depict both domains as separate wholes. Next, in this study it is expected that Target integration is less complex than Source integration, as the actual advertised product is presented as the object in the advertising image, which is considered as more direct or obvious element.

## Hypotheses

Based on this new hierarchical division in complexity of visual metaphor structures including Target and Source integration the following hypotheses are developed. In line with the dual processing mechanism (Hekkert et al., 2003) and considering processing fluency theory (Reber et al., 2004) and the PIA Model (Graf & Landwehr, 2015) together with Van Hooijdonk and Van Enschoot's (2016) findings regarding Replacement, it is hypothesised that:

H1a: At 100ms aesthetic pleasure of most the complex metaphor structure, Replacement, is higher than all other metaphor structures.

H1b: The effect of Replacement on aesthetic pleasure is mediated by processing fluency.

For the remaining metaphor structures the role of comprehension was also included in the hypotheses. Again, the following hypotheses are based on Hekkert et al. (2003), who claim that at a short exposure time aesthetic pleasure should be highest for the least complex metaphor structure as it is most easy-to-process. The latter argument regarding fluency is in line with the PIA Model and the processing fluency theory, which formed a basis of fluency's expected mediating role.

H1c: For the remaining metaphor structures, at 100ms aesthetic pleasure of advertisements increases when complexity of the applied metaphor structure decreases.

H1d: Processing fluency mediates the effect of less complex metaphor structures on aesthetic pleasure compared to more complex structures.

H1e: Comprehension of the metaphor moderates the effect of fluency on aesthetic pleasure.

H1f: At 100ms comprehension of the metaphor moderates the effect of metaphor structure on aesthetic pleasure.

A conceptual model of the above set out relation of metaphor structure and aesthetic pleasure through processing fluency and comprehension is visualised in figure 2a. The left graph in Figure 1 shows the hypothesised relation between visual metaphor structure and aesthetic pleasure at exposure time of 100ms.

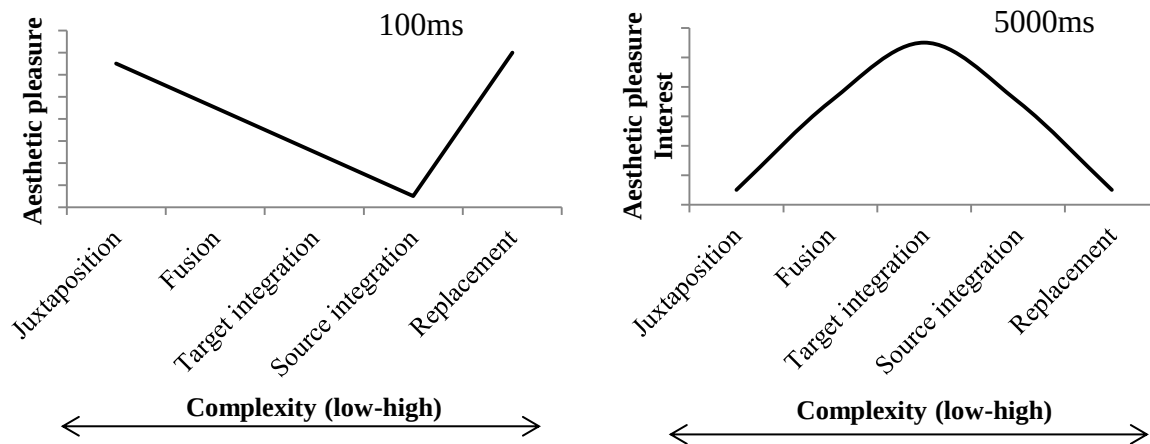


*Figure 1.* Hypothesised relation between visual metaphor structure and aesthetic pleasure at exposure time of 100ms (left graph) and aesthetic pleasure and interest at 5000ms (right graph).

Next, considering PIA Model's (Graf & Landwehr, 2015) claim that interest cannot be evoked after automatic processing and that this study expects that the exposure time of 100ms would activate such automatic processing, it is expected that interest will show different results than aesthetic pleasure at 100ms. When no interest cannot be evoked, then the advertising images would not be considered as interesting nor not interesting. Therefore, neutral scores should be elicited for all metaphor structures. It is thus hypothesised that:

H2a: At 100ms interest for the advertisement is neutral for all applied metaphor structures.

H2b: At 100ms interest levels for advertisements do not differ between applied metaphor structures.

In line with the dual processing mechanism (Hekkert et al., 2003) and based on their MAYA principle as well as the Optimal Innovation Hypothesis (Giora et al., 2004), aesthetic pleasure as well as interest are expected to take the form of an inverted U-curve at the longer exposure time of 5000ms. The PIA Model (Graf & Landwehr, 2015) as well as Silvia's (2005b) appraisal theory complemented this expectation for interest. The right graph in figure 1 shows the expected relation between visual metaphor structure and aesthetic pleasure and interest at 5000ms. This expectation results in the following hypothesis:

H3: At 5000ms advertisements containing a moderately complex metaphor yield more aesthetic pleasure and interest than advertisements with a more and less complex structure.

Based on, amongst others, Van Hooijdonk & Van Enschot's (2016) and Van Mulken et al.'s (2014) findings on processing fluency and comprehension, fluency and comprehension are expected to influence the above illustrated effect. In this, fluency is expected to be of mediating and suppressive influence, whereas comprehension is expected to moderate fluency's effect on aesthetic pleasure and interest. These effects are stated in the hypotheses below and visualised in the conceptual model in figure 2b.

H3a: Processing fluency suppresses the effect of moderately complex metaphor structures on aesthetic pleasure and interest compared to less complex metaphor structures.

H3b: This suppression effect is positively moderated by comprehension.

It is thus hypothesised that despite the fact fluency of moderately complex metaphor structures is lower, aesthetic pleasure and interest are higher, which is reinforced by comprehension of the metaphor.

H3c: Processing fluency mediates the effect of moderately complex metaphor structures on aesthetic pleasure and interest compared to more complex metaphor structures.

H3d: This mediation effect is negatively moderated by comprehension of the metaphor.

The latter hypothesis thus claims that even though fluency is higher for the moderately complex metaphor than for complex metaphor structures, aesthetic pleasure and interest are relatively lower when the metaphor is comprehended. Yet, aesthetic pleasure and interest is still higher.

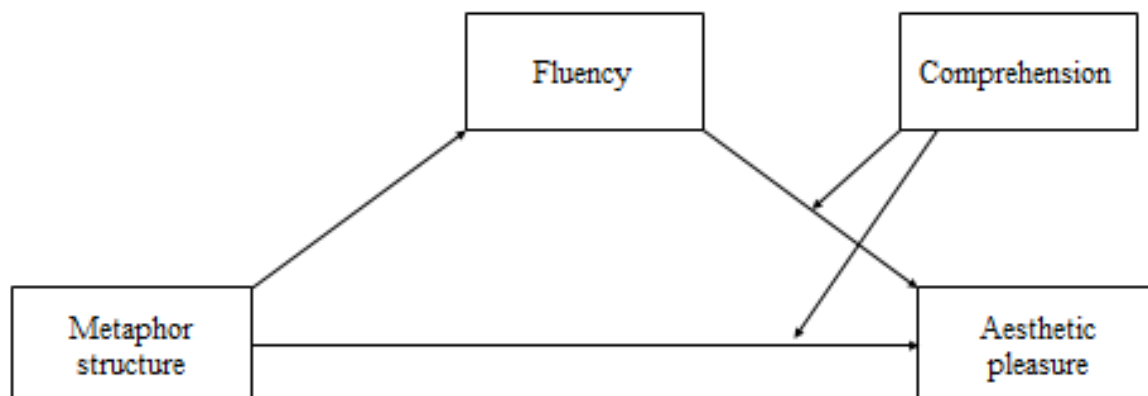


Figure 2a. Conceptual model of the expected moderated mediation of metaphor structure on aesthetic pleasure through comprehension via processing fluency at 100ms

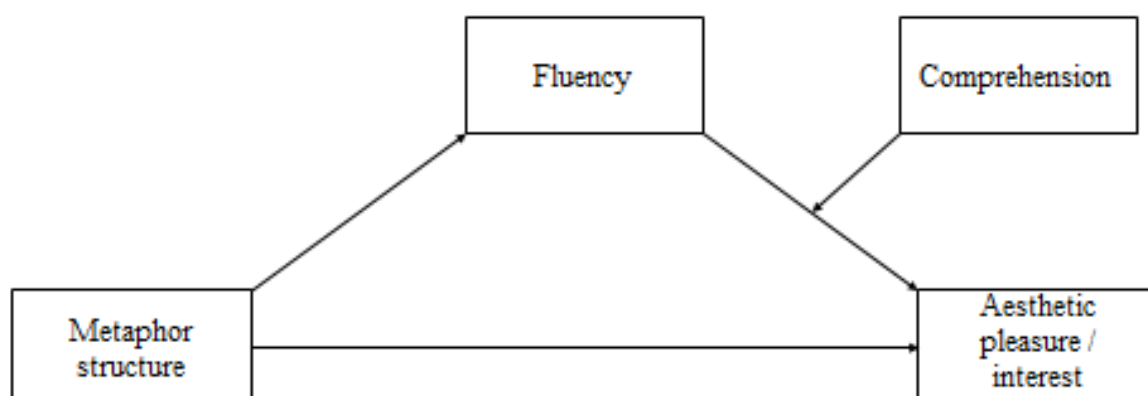


Figure 2b. Conceptual model of the expected moderated mediation of metaphor structure on aesthetic pleasure and interest through comprehension via processing fluency at 5000ms

## Method

### Pretest

Preceding the main experiment a pretest was conducted to select the materials used in the main experiment. The pretest was carried out as a manipulation check of the metaphor structures, the metaphor itself and the brand name applied in the advertisements. The pretest also contained questions to retrieve feedback on the advertisements so adjustments to the advertisements could be made if necessary. In this, manipulation checks for artful deviation of the metaphor structure, conventionality of the metaphor, comparability of the metaphor's target and source, complexity of the metaphor structure and comprehension of the metaphor were checked. Stimuli for the main experiment needed fall between average limits of conventionality and comparability. Comprehension of the metaphor needed approximately 75% or higher as low comprehension at the pretest could indicate that the visual metaphor structure is too complex and should therefore be dismissed from the stimuli pool. Complexity of the metaphor structure was checked to assess the two newly developed metaphor structure's complexity compared to the other structures.

The pretest was carried out via Qualtrics, an online survey tool. Participants were recruited from the researchers' personal network. Twenty sets of five advertisements applying different metaphor structures of the same metaphor were created, which were evaluated by 58 respondents (age:  $M = 24.5$ , range: 19-40, 29.31% male, 70.69% female, education: 50% HBO, 43.1% university, 6.9% secondary and primary school). The twenty sets were divided over three versions (6, 6 and 7 sets). All sets of advertisements per condition can be found in Appendix A. Respondents were randomly assigned to one of the versions (A:  $n=19$ , B:  $n=20$ , C:  $n=19$ ) in which the sets were also randomly presented. Hence, all five advertising images; metaphor structures, of the same metaphor were presented simultaneously.

First, artful deviation of each metaphor structure was measured by three 7-point semantic differentials following the statement ‘this advertising image is’: ‘straightforward-creative’, ‘innovative-familiar’ (reversed coded) and ‘predictable-original’, this was done for each advertisement. Items were based on Van Enschoot and Van Mulken (2014). Second, complexity of each metaphor structure was measured by one item using 7-point semantic differentials (easy to understand – difficult to understand) following the question to indicate how easy or difficult it was for the respondent to understand the image. This was done for each advertisement separately. Next, comprehension of the metaphor was checked to ensure the metaphor was actually comprehended. Comprehension of the metaphor was measured by means of a single open-ended question that referred to the five images together: ‘Briefly explain in your own words what the message of the advertisements is’. Inter-coder reliability was applied to assess correct comprehension of the metaphor. In this, two independent coders assessed the participant’s answer as correct (1) or incorrect (0). The product of the independent assessments determined whether the metaphor was comprehended (2) or not (0). When the coders disagreed, thus when the product of the scores was 1, a third independent coder assessed the answer blind, which formed the final decision. Assessment of the third coder was thus predominant.

Next, conventionality of the metaphor was measured by three 7-point semantic differentials for ‘novelty’, ‘unusualness’ and, based on Bowdle and Gentner (2005, in Van Mulken et al., 2014). The differentials followed the question ‘in the advertisements a comparison is made between two objects. [Product] is compared with [source]. The made comparison is’: ‘old-new’ (reversed coded), ‘unusual-usual’ and ‘logical-illogical’ (reversed coded). After the metaphor’s conventionality, comparability of the target and source was measured. Comparability was also measured by three 7-point semantic differentials. Participants were asked to fill in the extent to which they thought the product and source are

‘similar’ (similar-dissimilar, reversed coded), ‘different’ (different-indifferent) and ‘related’ (unrelated-related).

Representation of the metaphor in the metaphor structure was measured to check whether the metaphor was depicted evidently in the advertisement. This was mostly important for the newly developed metaphor structures. ‘In all five advertisements the same metaphor is applied. Is it evenly represented in the versions?’ introduced the questions to what extent the respondents thought the metaphor was present in the advertisement, which was measured by the 7-point semantic differentials ‘unclear-clear’. The question was followed by an open-ended question in which respondent had the opportunity to clarify. Next, the fit of the brand name was measured by the statement ‘the brand name [brand name] refers to [product]:’ using the 7-point semantic differentials ‘not clear–clear’. Finally, Respondents were asked what they would have done differently if they were the designer of the advertisements. Also, halfway the experiment, after comprehension’s open question, there was room for additional comments. The questionnaire can be found in Appendix B, which is in Dutch.

Based on the results of the pretest, ten sets of metaphors were selected for the main experiment, namely the metaphors for: a duster, condoms, deodorant, an energy bar, a Matrass, sport shoes, toothpaste, detergent and a toilet freshener. Comparability of the target and source was in all cases average (range: 3.02-4.44) and the conventionality of the comparison was in all cases a little above average (range: 3.56-5.56). Also, comprehension of the metaphor was always higher than 75% (range: 79-90). Results of the pretest analyses including alpha scores can be found in Appendix C. Results of the selected stimuli for the main experiment are in bold. Furthermore, results of indicated that the metaphor structures differed in complexity. Replacement ( $M = 4.77$ ,  $SD = 1.53$ ) was most complex followed by Target integration ( $M = 4.21$ ,  $SD = 1.12$ ), then Source integration ( $M = 3.81$ ,  $SD = 1.03$ ).

Finally Juxtaposition ( $M = 2.89$ ,  $SD = 1.30$ ) and Fusion ( $M = 2.96$ ,  $SD = 1.03$ ), which did not significantly differ.

## **Main experiment**

### **Design.**

The study was conducted by means of a 5 (visual metaphor structure) x 2 (exposure time) mixed design with exposure time as between-subjects variable and visual metaphor structure as within-subjects variable. Each participant was exposed to the metaphor structures Juxtaposition, Fusion, Source integration, Target integration and Replacement twice, either at the exposure time of 100ms or at 5000ms. The ten advertising images each participants saw were all unique versions of the visual metaphor structures; meaning that each advertisement was for a different product. Five lists were created in which advertised product was randomized over two sets of five advertisements. The order of the five metaphor structures in the set was randomly chosen. Each metaphor structure was presented once per set and the order of both sets were the same: Juxtaposition, Target integration, Replacement, Fusion and Source integration. Ten fillers were added to interfere with the fixed order and to distract participants. First, participants were randomly assigned to either the exposure time of 100ms or 5000ms. Next, participants were assigned to one of the five lists. The lists are displayed in Appendix D.

### **Participants.**

In total 164 people participated in the experiment whom of which 28% were male and 72% female. The mean age of the participants was 21.8 ( $SD = 3.29$ ) ranging from seventeen to 38 years old. Most participants were 25 or younger. The vast majority were students, since the experiment was essentially conducted in the research lab of Tilburg University. All participants were highly educated: 92.1 percent at university level and 7.9 at HBO level (university of applied science). Pearson Chi-Square test between gender and exposure time

indicated that there was a connection ( $\chi^2 (1) = 5.458, p = .019$ ). There were more male participants in the condition of 5000ms (30, n=83) than in the group of 100ms (16, n=81).

### **Materials.**

Participants were exposed to each of the five metaphor structures two times: twice to an advertisement applying Juxtaposition, twice to Fusion, etcetera. Each advertisement participants saw were of different products. Therefore, fifty unique advertisements were selected that had passed the pretest: ten products in five different metaphor structures. The advertised products involved everyday generic products since they have to be equally appealing and relevant for male and female participants, such as detergent, sport shoes and toothpaste. All advertising images included a fictitious target related brand name which was always followed by the product name. Examples of brand names that were used are 'Runsneakz Sports shoes', 'Laundrit Detergent' and 'Travsuit Suitcases'. Fictitious cliché brand names were created to indicate that the displayed object is not just a product representation but a deviant visual element (see Van Mulken et al., 2014). This should have prevented participants to assess the depicted object of for instance replacement as the advertised product. All brand names were in the same black font and were always depicted in the top right corner of the advertisement. Next to that, the background of the advertisements of Juxtaposition, Replacement and Fusion was always a bright colour that slowly merged into soft edged white circle in the centre of image where the metaphor structure was depicted. Different background colours were used between products. Background colours that suited the product best were applied. Hence, background of the metaphor structures Juxtaposition, Replacement and Fusion within each product category was always the same colour. The contexts of the two newly created metaphor structures were rather simple contexts containing not to many cues so the source or target object would still be recognised.

Next to the ten advertising images of the five metaphor structures, ten filler advertisements were randomly added to the stimuli lists. Fillers were used as distraction to prevent possible biases as well as to overcome discovering a pattern in advertisement type. Therefore, the filler advertisements did not contain a visual metaphor structure. The filler advertisements applied different other commonly used strategies, such as animals, expertise and celerity endorsement. The fictitious brand names of the fillers also referred to the advertised product and they were also shown in the top right corner of the advertisement. Next to that, the same background style was applied to the filler advertisements so they would not stand out from the experimental stimuli to limit suspicion.

In total, each participant saw see twenty advertisements: ten advertising images with a visual metaphor structure and ten filler advertisements. Measurements of all advertisements were equal: 1366x768 pixels, which is 36.14x20.32 in centimetres. This included two vertical black strokes of 2 centimetres on both sides of the advertisement so the advertisement would not be crooked when it was stretched to the screen of 1366x768 pixels. An overview of all advertisements of the main experiment can be found in Appendix E. It should be noted that based on the retrieved feedback of the pretest, few adjustments were made in some advertisements to improve the metaphor structure.

### **Instrumentation.**

The dependent variables that will be measured in the main experiment will be felt fluency, comprehension, aesthetic pleasure and aesthetic evaluation. The original, Dutch, questionnaire of the main experiment can be found in appendix F.

*Aesthetic pleasure* was be measured by five items on a 7-point semantic differentials. The five items followed one and the same statement, namely: ‘That was is depicted in the advertisement is: ‘ugly-beautiful’, ‘unattractive-attractive’, ‘unpleasant to look at-pleasant to look at’, ‘displeasing to see-pleasing to see’, ‘not nice to look at-nice to look at. Items are

based on Van Hooijdonk and Van Enschot (personal communication, November 21 2016). The internal consistency of the scales was excellent (Cronbach's  $\alpha = .94$ ).

*Aesthetic evaluation* was measured by five 7-point Likert scales as used by Van Der Lee (in preparation). The items that were measured are 'interest', 'pleasure', 'displeasure', 'boredom' and 'confusion'. The items followed the question: 'That what is depicted in the advertisement is:'. This current study will only look at interest.

*Felt fluency* was measured by two 7-point semantic differentials: 'That what is depicted in the advertisement does not take effort/takes effort to recognize' and 'It is easy/difficult to understand what is depicted' (cf. Jakesch et al., 2013; Van Enschot, & Van Mulken, 2014; Van Hooijdonk, & Van Enschot, 2016). The internal consistency of the scales was acceptable (Cronbach's  $\alpha = .75$ ).

*Comprehension* was be assessed by two open-ended questions. Product recognition was queried by the question 'which product was advertised' and comprehension of the metaphor was queried as it was in the pretest 'Briefly explain in your own words what the message of the advertisements is'. Another form of intercoder reliability was applied. The sample was divided in three parts. Three independent coders assessed two-thirds (coder A: 1,2; coder B: 2,3; coder C: 1,3) as correct (1) or incorrect (0). When for instance the coder A and B disagreed (1), coder C assessed the answer blind, which formed the final decision.

### **Procedure.**

The experiment was programmed in and performed with E-prime, which was installed on the three university laptops that were used to conduct the study. E-prime is a programme that accurately executes exposure time, so 100ms is actually 100ms and not 200ms. The experiment was conducted in the period between 19-11-2016 and 14-12-2016. Most experiments were conducted in the research lab and in the offices of staff of the faculty of humanities in Tilburg. Most participants were recruited from the University experimental

subject registry. Other participants were approached on campus, in university related social media groups, via personal relations and few were recruited at the University of Amsterdam. The participants that participated on campus had to register for a timeslot to do the experiment in the research lab at Tilburg university of in one of the offices. At arrival, participants were randomly assigned to one of the two time exposure times. The experiment started with a short introduction informing the participants what they can expect, what they have to do, how they needed to enter their answers and how long the experiment would approximately take. Also, it was be stressed that there are no wrong or right answers, anonymity is guaranteed and that the participant should remain focussed on the screen as the images would appear automatically. The researcher and the participant filled in the participant's name, age, gender and educational level together. Before the actual experiment started, participants completed a practise advertisement to get a good picture of what can be expected. For each advertising image the following trial, containing five steps, was run. The script of the trial was based on Jakesch et al. (2013) and started off with a fixation cross for 150ms, followed by a blank screen for 80ms. Next, the stimulus was be presented for either 100ms or 5000ms depending on the participant's condition. After the exposure time of the advertisement image, a blank screen reappeared for 80ms, followed by a 200ms random noise mask covering the entire screen. Following the mask, the questions to measure the dependent variables were presented, one question at the time. After twenty trials, nine fillers and ten metaphorical structures, participants were thanked for their participation, the actual goal of the experiment was revealed and they will be offered to register their e-mail address if they are interested in the findings of the study. As a symbol of thanks, participants received a treat. Next to that, students that participated via the University experimental subject registry received study credit for participating. On average, experiment sessions took about half an hour.

### **Data preparation and Analysis.**

Before conducting any analyses, the data file was prepared. In this, composite means for aesthetic pleasure and processing fluency were computed per metaphor structure. Next to that, two separate files per exposure time were created in order to conduct mediation analyses per exposure time. In order to answer the research question several analyses were conducted via SPSS 24. Two-way repeated measures ANOVAs for aesthetic pleasure, interest and felt fluency were conducted with metaphor structure as within-subject factor and exposure time as between-subject factor. Bonferroni adjustments were applied to determine which metaphor structures significantly differed from each other at 100ms and at 5000ms. Next to that, bootstrapping was performed to assess whether comprehension of the metaphor differed across metaphor structures and between 100 and 5000ms. Following, MANOVA analyses were conducted to investigate whether processing fluency, aesthetic pleasure and interest differed when the metaphor was comprehended than when it was not comprehended. Furthermore, mediation analyses were conducted for metaphor structure through felt fluency on aesthetic pleasure and interest. Mediation analyses were conducted with the statistical tool MEMORE (Montoya, & Hayes, in press).

## **Results**

### **Aesthetic pleasure**

To investigate whether the metaphor structures Juxtaposition, Fusion, Replacement, Source integration and Target integration yield different levels of aesthetic pleasure in general as well as at different exposure times a repeated measures ANOVA was conducted. In this, exposure time was the between-subject variable (100ms versus 5000ms) and metaphor structure the within-subject variable. First, assumptions of normal distribution and sphericity were checked, which can be found in Appendix G. Aesthetic pleasure was normally

distributed but sphericity was violated ( $\chi^2 (9) = 20.86, p = .013$ ), therefore the degrees of freedom were corrected with the Huynh-Feldt estimates for sphericity.

Table 1

*Mean scores and standard deviations for aesthetic pleasure, interest and felt fluency, and percentage of participants with correct comprehension of both advertisements of the metaphor structure*

|                  |                    | Aesthetic<br>pleasure<br>M (SD) | Interest<br>M (SD)         | Felt fluency<br>M (SD)     | Comprehension<br>% correct |
|------------------|--------------------|---------------------------------|----------------------------|----------------------------|----------------------------|
| 100ms<br>(n=81)  | Juxtaposition      | 3.79 (0.83) <sup>1,2</sup>      | 3.43 (1.06) <sup>1,2</sup> | 3.89 (1.27) <sup>2</sup>   | 19.00                      |
|                  | Fusion             | 3.57 (1.02) <sup>1</sup>        | 3.54 (1.38) <sup>1,2</sup> | 3.39 (1.29) <sup>1</sup>   | 8.60                       |
|                  | Source integration | 4.13 (0.90) <sup>2</sup>        | 3.83 (1.09) <sup>2</sup>   | 3.94 (1.20) <sup>2</sup>   | 8.60                       |
|                  | Target integration | 3.96 (1.00) <sup>1,2</sup>      | 3.68 (1.20) <sup>2</sup>   | 3.35 (1.33) <sup>1</sup>   | 6.20                       |
|                  | Replacement        | 3.91 (1.01) <sup>1,2</sup>      | 3.13 (1.19) <sup>1</sup>   | 4.59 (1.36) <sup>3</sup>   | 0.00                       |
|                  | Total              | 3.87 (0.59)                     | 3.52 (0.78)                | 3.83 (0.63)                |                            |
| 5000ms<br>(n=83) | Juxtaposition      | 3.71 (1.03) <sup>1</sup>        | 3.55 (1.14) <sup>2</sup>   | 4.97 (1.19) <sup>2,3</sup> | 78.30                      |
|                  | Fusion             | 4.15 (1.24) <sup>2</sup>        | 4.17 (1.21) <sup>3</sup>   | 5.32 (1.12) <sup>3</sup>   | 83.10                      |
|                  | Source integration | 3.92 (1.19) <sup>1,2</sup>      | 3.83 (1.17) <sup>2,3</sup> | 4.82 (1.30) <sup>2</sup>   | 69.9                       |
|                  | Target integration | 3.67 (1.10) <sup>1</sup>        | 3.58 (1.25) <sup>2</sup>   | 3.85 (1.38) <sup>1</sup>   | 27.7                       |
|                  | Replacement        | 3.52 (1.05) <sup>1</sup>        | 2.90 (1.18) <sup>1</sup>   | 3.56 (1.44) <sup>1</sup>   | 49.40                      |
|                  | Total              | 3.79 (0.81)                     | 3.60 (0.83)                | 4.50 (0.83)                |                            |
| Total<br>(N=164) | Juxtaposition      | 3.75 (0.94) <sup>1</sup>        | 3.49 (1.10) <sup>2</sup>   | 4.44 (1.34) <sup>2</sup>   | 49.40                      |
|                  | Fusion             | 3.86 (1.17) <sup>1,2</sup>      | 3.86 (1.33) <sup>3</sup>   | 4.36 (1.34) <sup>2</sup>   | 46.30                      |
|                  | Source integration | 4.02 (1.06) <sup>2</sup>        | 3.83 (1.13) <sup>3</sup>   | 4.38 (1.32) <sup>2</sup>   | 39.60                      |
|                  | Target integration | 3.81 (1.06) <sup>1,2</sup>      | 3.63 (1.22) <sup>2,3</sup> | 3.61 (1.37) <sup>1</sup>   | 17.10                      |
|                  | Replacement        | 3.71 (1.05) <sup>1</sup>        | 3.01 (1.19) <sup>1</sup>   | 4.07 (1.49) <sup>2</sup>   | 25.00                      |

*Notes.* Scores for aesthetic pleasure, interest and felt fluency ranged from 1-7 (1 = low, 7 = high); different superscripts indicate that means differ significantly, equal superscripts indicate that means do not significantly differ, superscripts are used per column

While no main effect was found for exposure time ( $F (1, 162) = 0.52, p = .471$ ), the repeated measures analysis did find a main effect for metaphor structure ( $F (3,88, 629.01) =$

3.22,  $p = .013$ ). Pairwise comparison using Bonferroni adjustments showed that aesthetic pleasure was significantly higher for Source integration ( $M = 4.02$ ,  $SD = 1.06$ ) than for Juxtaposition ( $M = 3.75$ ,  $SD = 0.94$ ) and Replacement ( $M = 3.71$ ,  $SD = 1.05$ ).

Next to that, an interaction effect was found between metaphor structure and exposure time ( $F(3,88, 629.01) = 8.33$ ,  $p < .001$ ). Pairwise comparison using Bonferroni adjustments showed that aesthetic pleasure for Source integration ( $M = 4.13$ ,  $SD = 0.90$ ) was significantly higher than for Fusion ( $M = 3.57$ ,  $SD = 1.02$ ) at 100ms. At 5000ms aesthetic pleasure for Fusion ( $M = 4.15$ ,  $SD = 1.24$ ) was significantly higher than for Juxtaposition ( $M = 3.71$ ,  $SD = 1.03$ ), Replacement ( $M = 3.52$ ,  $SD = 1.05$ ) and Target integration ( $M = 3.67$ ,  $SD = 1.10$ ). Furthermore, Fusion yielded significantly more aesthetic pleasure at 5000ms ( $M = 4.15$ ,  $SD = 1.24$ ) than at 100ms ( $M = 3.57$ ,  $SD = 1.02$ ), whereas aesthetic pleasure of Replacement showed the contrary ( $M = 3.52$ ,  $SD = 1.05$  at 5000ms, and  $M = 3.91$ ,  $SD = 1.01$  at 100ms). All means and standard deviations can be found in Table 1. Figure 3 displays the interaction between metaphor structure and exposure time for aesthetic pleasure.

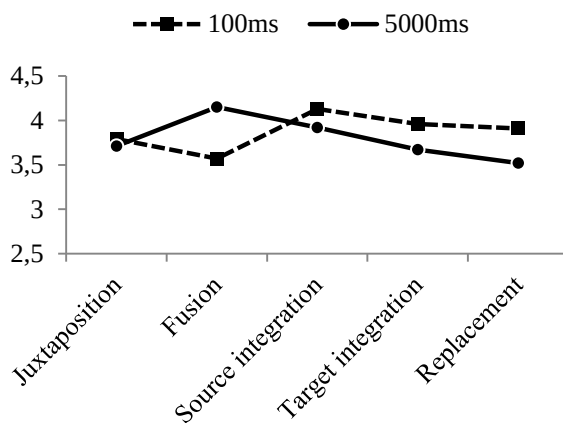


Figure 3. The effect of metaphor structure \* exposure time on aesthetic pleasure (1 = low, 7 = high).

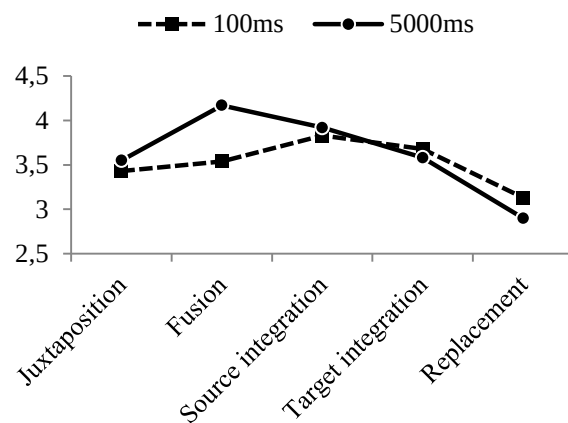


Figure 4. The effect of metaphor structure \* exposure time on interest (1 = low, 7 = high).

## Interest

To test whether interest also differs across the metaphor structures and exposure time another repeated measures analysis was conducted. For the assumptions, interest was normally distributed and sphericity was also upheld ( $\chi^2(9) = 14.91, p = .093$ ). See appendix G for all assumptions. Again, no significant main effect for exposure time was found ( $F(1, 162) = 0.43, p = .516$ ). There was a significant main effect for metaphor structure ( $F(4, 648) = 20.23, p < .001$ ). Pairwise comparison using Bonferroni adjustments showed that interest was significantly lower for the metaphor structure Replacement ( $M = 3.01, SD = 1.19$ ) than all other metaphor structures; Juxtaposition ( $M = 3.49, SD = 1.10$ ), Fusion ( $M = 3.86, SD = 1.33$ ), Source integration ( $M = 3.83, SD = 1.13$ ) and Target integration ( $M = 3.63, SD = 1.22$ ). Next to that, results showed that interest for Juxtaposition was significantly lower than for Fusion and Source integration. All means and standard deviations are displayed in table 1.

The found main effect is qualified by a significant interaction effect between metaphor structure and exposure time ( $F(4, 648) = 4.78, p = .001$ ). Pairwise comparison using Bonferroni adjustments indicated that at 100ms interest was significant lower for Replacement ( $M = 3.13, SD = 1.19$ ) than interest for Source integration ( $M = 3.86, SD = 1.09$ ) and Target integration ( $M = 3.68, SD = 1.20$ ). At 5000ms interest for Replacement ( $M = 2.90, SD = 1.18$ ) was not only significantly lower than Source integration ( $M = 3.83, SD = 1.17$ ) and Target integration ( $M = 3.58, SD = 1.25$ ), it was also lower than the two other metaphor structures Juxtaposition ( $M = 3.55, SD = 1.14$ ) and Fusion ( $M = 4.17, SD = 1.21$ ). Next to that, at 5000ms interest for Fusion was significantly higher than for Juxtaposition and Target integration. Finally, it was found that interest for Fusion was significantly higher at 5000ms ( $M = 4.17, SD = 1.21$ ) than at 100ms ( $M = 3.54, SD = 1.38$ ). Figure 4 shows the interaction between metaphor structure and exposure time for interest.

### **Felt fluency**

To investigate whether different levels of fluency are experienced when processing the different metaphor structures another repeated measures analysis was conducted. This time to examine the effect of metaphor structure and exposure time on felt fluency. First, the assumptions of normal distribution and sphericity were tested, which can be found in appendix G. Fluency was nearly normally distributed (skewness:  $z = 1.97$ , kurtosis:  $z = -0.76$ ). The assumption of sphericity was upheld ( $\chi^2(9) = 15.48, p = .078$ ). A main effect for metaphor structure was found ( $F(4, 648) = 13.91, p < .001$ ). Pairwise comparison using Bonferroni adjustments showed that felt fluency for Target integration ( $M = 3.61, SD = 1.37$ ) was significantly lower than the felt fluency for Juxtaposition ( $M = 4.44, SD = 1.34$ ), Fusion ( $M = 4.36, SD = 1.34$ ), Replacement ( $M = 4.07, SD = 1.49$ ) and Source integration ( $M = 4.38, SD = 1.32$ ). A main effect for exposure time was also found ( $F(1, 62) = 33.71, p < .001$ ). Results indicated that felt fluency was significantly lower at 100ms ( $M = 3.83, SD = 0.63$ ) than at 5000ms ( $M = 4.50, SD = 0.83$ ). Moreover, there was a significant interaction effect between metaphor structure and exposure time ( $F(4, 648) = 34.68, p < .001$ ).

Follow-up pairwise comparison using Bonferroni adjustments revealed that felt fluency for the metaphor structure Replacement was lower at 5000ms ( $M = 3.56, SD = 1.44$ ) than at 100ms ( $M = 4.59, SD = 1.36$ ), whereas for the other metaphor structures Juxtaposition ( $M = 4.97, SD = 1.19$ ), Fusion ( $M = 5.32, SD = 1.12$ ), Source integration ( $M = 4.82, SD = 1.30$ ) and Target integration ( $M = 3.85, SD = 1.38$ ) felt fluency was higher at 5000ms than at 100ms: Juxtaposition ( $M = 3.89, SD = 1.27$ ), Fusion ( $M = 3.39, SD = 1.29$ ), Source integration ( $M = 3.94, SD = 1.20$ ) and Target integration ( $M = 3.35, SD = 1.33$ ). Next to that, at 100ms felt fluency for both Target integration ( $M = 3.35, SD = 1.33$ ) and Fusion ( $M = 3.39, SD = 1.29$ ) were significantly lower than Juxtaposition ( $M = 3.89, SD = 1.27$ ), Replacement

( $M = 4.59$ ,  $SD = 1.36$ ) and Source integration ( $M = 3.94$ ,  $SD = 1.20$ ). In turn, Juxtaposition and Source integrations scored significantly lower than Replacement at 100ms.

At 5000ms felt fluency for both Target integration ( $M = 3.85$ ,  $SD = 1.38$ ) and Replacement ( $M = 3.56$ ,  $SD = 1.44$ ) were significantly lower than Juxtaposition ( $M = 4.97$ ,  $SD = 1.19$ ), Fusion ( $M = 5.32$ ,  $SD = 1.12$ ) and Source integration ( $M = 4.82$ ,  $SD = 1.30$ ). The latter was in turn found to be significantly lower than Fusion. Figure 7 shows the interaction between metaphor structure and exposure time for felt fluency. All means and standard deviations are displayed in table 1.

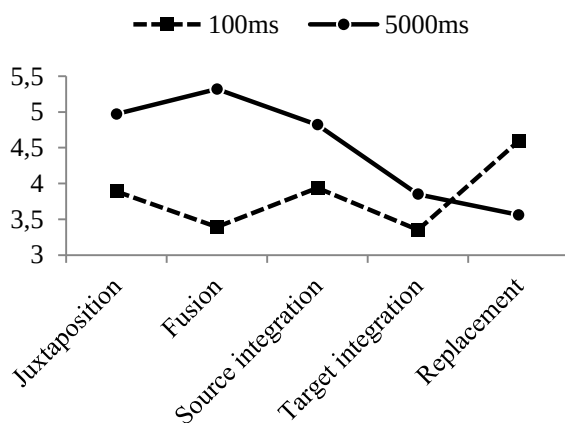


Figure 7. The effect of metaphor structure \* exposure time on felt fluency (1 = not fluent, 7 = fluent).

### Comprehension of the metaphor

To investigate whether comprehension of the metaphor differed across metaphor structures and whether they differed between 100ms and 5000ms, confidence intervals were calculated by means of Bootstrapping in SPSS using Frequencies. When two confidence intervals of 95% do not overlap, there is a 95 percent chance that the scores differ from each other, which is considered significant. Hence, scores do not differ by chance, since a future sample would be likely to also find different scores for the both constructs. When they do overlap, it is thus possible equal scores of both constructs occur in a new sample. Current

results showed that comprehension of the metaphor differs across metaphor structures as well as between exposure times. Comprehension of the metaphor was checked twice per metaphor structure, since two advertising images per structure ('Metaphor structure 1' and 'Metaphor structure 2') were applied in the study. When both were comprehended, for instance 'Fusion 1' and 'Fusion 2', than 'Fusion' was comprehended.

Table 2

*Percentages of correct comprehension of the metaphor and confidence intervals at 95% of all metaphor structures, per metaphor and when both metaphors of the metaphor structure were comprehended (1 + 2)*

|                          | <u>Total</u>      |              | <u>100ms</u>      |              | <u>5000ms</u>      |               |
|--------------------------|-------------------|--------------|-------------------|--------------|--------------------|---------------|
|                          | % correct         | 95% CI       | % correct         | 95% CI       | % correct          | 95% CI        |
| Juxtaposition 1          | 57.3              | [49.4, 65.2] | 29.6              | [19.8, 39.5] | 84.3               | [77.1, 91.6]  |
| Juxtaposition 2          | 72.0*             | [65.2, 78.7] | 49.4              | [38.8, 60.5] | 94.0               | [88.0, 89.8]  |
| Juxtaposition 1 + 2      | 49.4 <sup>b</sup> | [42.1, 56.7] | 19.0 <sup>b</sup> | [11.1, 28.4] | 78.3 <sup>bc</sup> | [69.9, 86.7]  |
| Fusion 1                 | 51.8              | [44.5, 59.1] | 16.0              | [8.6, 24.7]  | 86.7               | [79.5, ,94.0] |
| Fusion 2                 | 68.9*             | [61.1, 75.6] | 40.7*             | [29.6, 50.6] | 96.4               | [91.6, 100.0] |
| Fusion 1 + 2             | 46.3 <sup>b</sup> | [39.0, 54.3] | 8.6 <sup>b</sup>  | [2.5, 14.8]  | 83.1 <sup>bc</sup> | [74.7, 91.5]  |
| Source integration 1     | 50.6              | [43.3, 57.9] | 12.3              | [6.2, 19.8]  | 88.0               | [80.7, 94.0]  |
| Source integration 2     | 56.7              | [48.8, 64.4] | 33.3*             | [23.5, 44.4] | 79.5               | [71.1, 88.0]  |
| Source integration 1 + 2 | 39.6 <sup>b</sup> | [32.3, 47.6] | 8.6 <sup>b</sup>  | [3.7, 14.8]  | 69.9 <sup>b</sup>  | [59.0, 79.5]  |
| Target integration 1     | 34.8              | [28.0, 42.1] | 8.6               | [2.5, 14.8]  | 60.2               | [49.4, 71.1]  |
| Target integration 2     | 31.1              | [24.4, 38.4] | 16.0              | [8.6, 24.7]  | 45.8               | [35.0, 56.6]  |
| Target integration 1 + 2 | 17.1 <sup>a</sup> | [11.6, 23.3] | 6.2 <sup>b</sup>  | [1.2, 12.3]  | 27.7 <sup>a</sup>  | [18.1, 37.3]  |
| Replacement 1            | 29.9              | [23.2, 37.2] | 0.0               | [0.0, 0.0]   | 59.0               | [49.4, 69.9]  |
| Replacement 2            | 39.6              | [31.7, 47.0] | 0.0               | [0.0, 0.0]   | 78.3*              | [69.9, 86.7]  |
| Replacement 1 + 2        | 25.0 <sup>a</sup> | [19.8, 31.7] | 0.0 <sup>a</sup>  | [0.0, 0.0]   | 49.4 <sup>b</sup>  | [38.6, 60.2]  |

*Notes.* Comprehension of all metaphor structures was significantly higher at 5000ms than at 100ms. Different superscripts indicate that means differ significantly, equal superscripts indicate that means do not significantly differ, superscripts are used per column, \* = significantly higher than metaphor 1

A main finding of exposure time was found, meaning that in all cases comprehension for the metaphor structures 1 and 2 were significantly higher at 5000ms than at 100ms. Table 2 shows all scores and confidence intervals at 95% of all metaphor structures. Another finding these results showed is that comprehension of Replacement (95% CI = [19.8, 31.7], 25%), in which both Replacement 1 and 2 were correct, and Target integration (95% CI = [11.6, 23.3], 17.1%) were significantly lower than when metaphor 1 and 2 were correct for Juxtaposition (95% CI = [42.1, 56.7], 49.4%), Fusion (95% CI = [39.0, 54.3], 46.3%) and Source integration (95% CI = [32.3, 47.6], 39.6%).

At 100ms only comprehension of Replacement (95% CI = [0.0, 0.0], 0%) was significantly lower than all other metaphor structures: Juxtaposition (95% CI = [11.1, 28.4], 19%), Fusion (95% CI = [2.5, 14.8], 8.6%), Source integration (95% CI = [3.7, 14.8], 8.6%) and Target integration (95% CI = [1.2, 12.3], 6.2%). At 5000ms comprehension of Target integration (95% CI = [18.1, 37.3], 27.7%) was significantly lower than Juxtaposition (95% CI = [69.9, 86.7], 78.3%), Fusion (95% CI = [74.7, 91.5], 83.1%), Source integration (95% CI = [59.0, 79.5], 69.9%) and Replacement (95% CI = [38.6, 60.2], 49.4%). In turn, comprehension of Replacement was significantly lower than Juxtaposition and Fusion.

Next to comprehension of the metaphor, correct product recognition was tested. These findings are not reported in the results section, as they are not required to test the hypotheses. Table 7 in appendix G shows the scores and confidence intervals of product recognition, which were retrieved by means of Bootstrapping.

### **Interrelations of comprehension and felt fluency, aesthetic pleasure and interest.**

The results so far have indicated that both the evaluative variables aesthetic pleasure and interest as well as felt fluency and comprehension of the metaphor differ per metaphor structure per exposure time. To investigate whether these variables interrelate and possibly explain why particular metaphor structures were more aesthetically pleasurable or interesting

at certain exposure times several analyses were conducted. In this paragraph, the relations between comprehension and processing fluency, aesthetic pleasure and interest were investigated.

Multiple MANOVA analyses were conducted to investigate whether felt fluency, aesthetic pleasure and interest would be differ when the metaphor was comprehended than when it was not comprehended. This was done for the metaphors in general as well as per exposure time. The MANOVAs were conducted for every advertising image individually. It should be noted that few groups were not equal due to differences in comprehension. Hence, not all assumptions were met, for instance robustness could not be assumed in all cases. No steps were taken or adjustments were made. Therefore, results should be interpreted cautiously. The assumptions of multivariate normality and homogeneity of covariance matrices can be found in appendix G.

Pairwise comparisons using Bonferroni adjustments showed that felt fluency was indeed significantly higher when the metaphor was comprehended than when it was not comprehended, except for ‘Replacement 1’ and ‘Replacement 2’. ‘Replacement 1’ even showed the contrary effect. No significant difference was found for ‘Replacement 2’,  $F(1, 162) < 1$ . All effects and their means and standard deviations are displayed in table 3 in appendix H. Next to that, it was found that solely for ‘Fusion 1’ and ‘Fusion 2’ not only fluency but also aesthetic pleasure (1:  $F(1, 162) = 10.10, p = .002$ , 2:  $F(1, 162) = 5.01, p = .027$ ) and interest (1:  $F(1, 162) = 15.41, p < .001$ , 2:  $F(1, 162) = 6.23, p = .014$ ) were significantly higher when the metaphor was comprehended (aesthetic pleasure 1 ( $M = 4.31, SD = 1.45$ ), interest 1 ( $M = 4.48, SD = 1.51$ ), aesthetic pleasure 2 ( $M = 3.89, SD = 1.53$ ), interest 2 ( $M = 3.90, SD = 1.57$ )) than when it was not comprehended: aesthetic pleasure 1 ( $M = 3.67, SD = 1.12$ ), interest 1 ( $M = 3.45, SD = 1.55$ ), aesthetic pleasure 1 ( $M = 3.45, SD = 1.35$ ), and interest 1 ( $M = 3.24, SD = 1.62$ ). Furthermore, only interest for ‘Replacement 2’

was found to be significantly higher ( $M = 3.42$ ,  $SD = 1.51$ ) when the metaphor was not or wrongly comprehended than when it was comprehended ( $M = 2.95$ ,  $SD = 1.44$ ),  $F(1, 162) = 3.96$ ,  $p = .048$ .

At 100ms, fluency was found to be significantly higher when the metaphor of the advertising was comprehended than when it was not comprehended, with the exception of 'Source integration 1' and Replacement. 'Source integration 1' did not show significant different scores and no results were found for Replacement, since it was not comprehended at 100ms. All mean scores, standard deviations and effects are displayed in table 3 in appendix H. Also at 100ms, not once aesthetic pleasure was found to be significantly higher when the metaphor was comprehended than when it was not comprehended. Similarly, correct comprehension of the metaphor did not affect interest for the metaphor structure except for 'Target integration1'. Interest for 'Target integration1' was significantly higher when the metaphor was comprehend ( $M = 4.86$ ,  $SD = 1.35$ ) than when it was not comprehended ( $M = 3.69$ ,  $SD = 1.35$ ),  $F(1, 79) = 4.51$ ,  $p = .037$ . At 5000ms, only for one of the two metaphors of each metaphor structure fluency was significantly higher when the metaphor was comprehended: for 'Juxtaposition 1', 'Fusion 1', 'Source integration 1' and 'Target integration 2'.

In most cases, comprehension did not affect aesthetic pleasure and interest, neither in general nor per exposure time. Therefore, no further analyses were conducted to investigate comprehension as a direct moderator of aesthetic pleasure and interest. Since comprehension did affect felt fluency, moderated mediation of comprehension through fluency on aesthetic pleasure and interest is still possible. Unfortunately, thus far MEMORE (Montoya & Hayes, in press) does not enable moderated mediation analyses for within-subject designs. It also does not enable running analyses separately for comprehended and not comprehended by means of select cases. Next, two separate data files were created: one for comprehended and

one for not comprehended. Yet, due to too few samples MEMORE could still not be performed.

### **Fluency's relation with aesthetic pleasure and interest**

To further investigate whether the variables processing fluency, aesthetic pleasure and interest interrelate and possibly explain why particular metaphor structures were more aesthetically pleasurable or interesting at certain exposure times several analyses were conducted. First it was investigated whether there is a relation between processing fluency and aesthetic pleasure. Likewise, the expected relation between felt fluency and interest was investigated. Bivariate correlation analyses by means of a Pearson product-moment correlation coefficient were conducted. Results showed that there was a positive correlation between felt fluency and aesthetic pleasure in general ( $r(163) = .428, p < .001$ ) as well as at 100ms ( $r(80) = .303, p = .006$ ) and at 5000ms ( $r(82) = .602, p < .001$ ). Increases of felt fluency were correlated with increases of aesthetic pleasure. Results also showed that there was a positive correlation between felt fluency and interest in general ( $r(163) = .341, p < .001$ ) and at 5000ms ( $r(82) = .462, p < .001$ ). No significant correlation was found between felt fluency and interest at 100ms ( $r(80) = .303, p = .069$ ).

### **Mediation through processing fluency on aesthetic pleasure.**

To further investigate fluency's effect on aesthetic pleasure mediation analyses for repeated measures were conducted using MEMORE (Montoya & Hayes, in press) in SPSS. It was investigated whether different levels of aesthetic pleasure for the metaphor structures could be explained by felt fluency. Since fluency correlated with aesthetic pleasure at 100ms as well as at 5000ms, mediation analyses were conducted for both exposure time separately. Tables of all three mediation analyses can be found in appendix H. The tables display the effects of all paths. In figures 8, 9 and 10 examples of found mediations are visualised in a model.

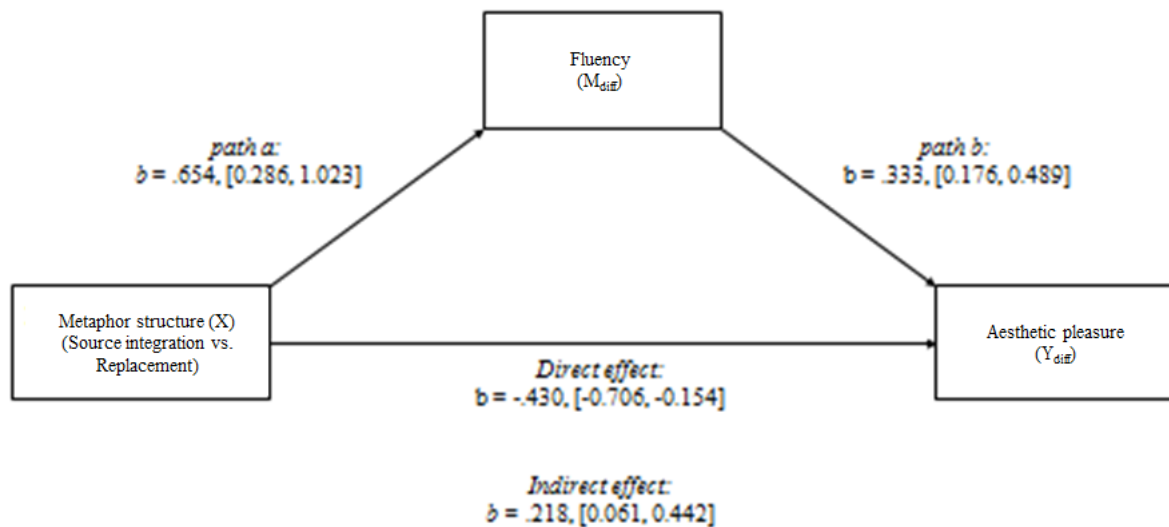


Figure 8. Mediator model for Source integration versus Replacement at 100ms

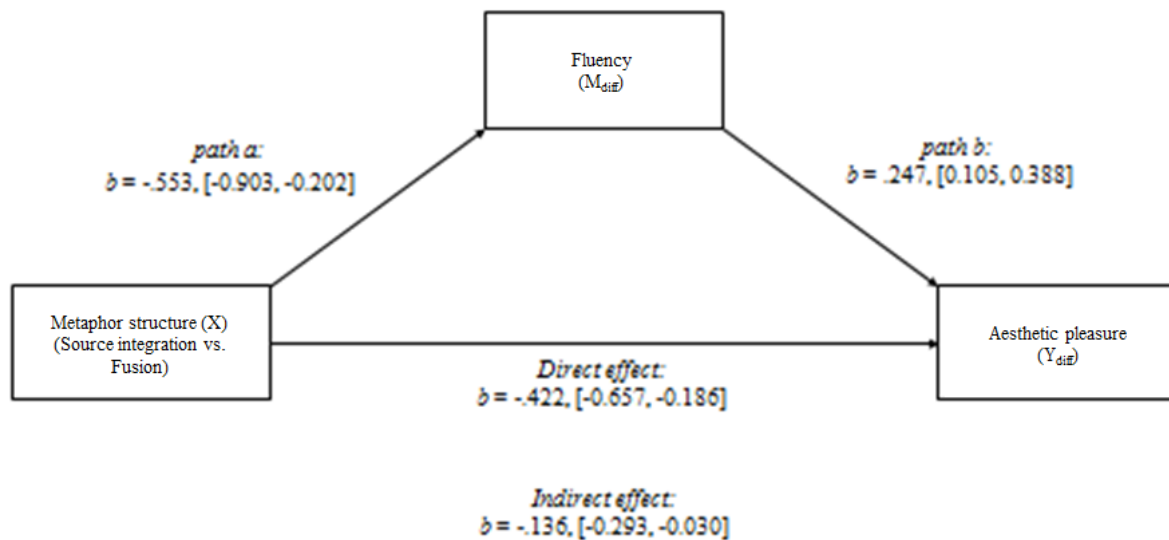


Figure 9. Mediator model for Source integration versus Fusion at 100ms

At 100ms, there was a significant indirect effect of metaphor structure (Replacement compared to Source integration) on aesthetic pleasure through felt fluency,  $b = .218$ , 95% CI [0.061, 0.442]. More aesthetic pleasure for Replacement than for Source integration can thus be explained by more fluent processing. A visualisation of this mediation including all paths is displayed in figure 8. Similarly, there were also significant indirect effects of Replacement on aesthetic pleasure through felt fluency compared to Target integration,  $b = .319$ , 95% CI [0.081, 0.567], and Juxtaposition,  $b = .193$ , 95% CI [0.359, 0.063]. Likewise, higher fluency

explained more aesthetic pleasure. Next to that, there was also a significant indirect effect of metaphor structure Fusion compared to Source integration on aesthetic pleasure through felt fluency,  $b = -.136$ , 95% CI  $[-0.293, -0.030]$ . The paths of the mediation showed that despite the fact that Fusion's processing fluency is lower than fluency of Source integration, aesthetic pleasure of Fusion was relatively higher, though aesthetic pleasure is still significantly lower. The difference in aesthetic pleasure is only smaller. Figure 9 displays the paths of the mediation. Lastly, There was a significant indirect effect of Source integration on aesthetic pleasure through felt fluency compared to Target integration,  $b = .089$ ,  $[0.009, 0.213]$ . Like the example in figure 8, aesthetic pleasure of Source integration was higher than aesthetic pleasure of Target integration because of more fluent processing of the metaphor structure. Table 4 in appendix H shows all paths of the mediation analyses. No other significant indirect effects of metaphor structure on aesthetic pleasure were found at 100ms.

At 5000ms, there was a significant indirect effect of metaphor structure Fusion (compared to Juxtaposition) on aesthetic pleasure through felt fluency,  $b = .131$ , 95% CI  $[0.277, 0.021]$ . More aesthetic pleasure for Fusion than for Juxtaposition was yielded because of more fluency in processing. However, the paths of the mediation showed that even though aesthetic pleasure of Fusion was higher than Juxtaposition because of more processing fluency, aesthetic pleasure of Fusion was relatively lower as the difference in aesthetic pleasure decreased. The mediation model of figure 9 can be applied as an example, only the plusses are minuses, vice versa. Processing fluency also mediated the effect of Fusion on aesthetic pleasure compared to Replacement,  $b = .769$ , 95% CI  $[0.429, 1.195]$ , Source integration,  $b = .148$ , 95% CI  $[0.048, 0.284]$ , and Target integration,  $b = .491$ , 95% CI  $[0.208, 0.803]$ . More aesthetic pleasure for Fusion than for Replacement, Source integration and Target integration can be explained by more processing fluency. Path a and b were both positive in all three mediations. Lastly, there was also a significant indirect effect of metaphor

structure Replacement (compared to Source integration) on aesthetic pleasure through felt fluency,  $b = -.339$ , 95% CI  $[-0.650, -0.096]$ . Lower aesthetic pleasure for Replacement than for Source integration can be explained by lower felt fluency. Table 5 in appendix H shows all paths of the mediation analyses. No other significant indirect effects of metaphor structure on aesthetic pleasure were found at 5000ms.

### Mediation through processing fluency on interest.

To further investigate fluency's effect on interest, again, mediation analyses for repeated measures were conducted using MEMORE (Montoya & Hayes, in press). Mediation analyses were only conducted for metaphor structures at 5000ms, since no correlation between processing fluency and interest was found at 100ms.

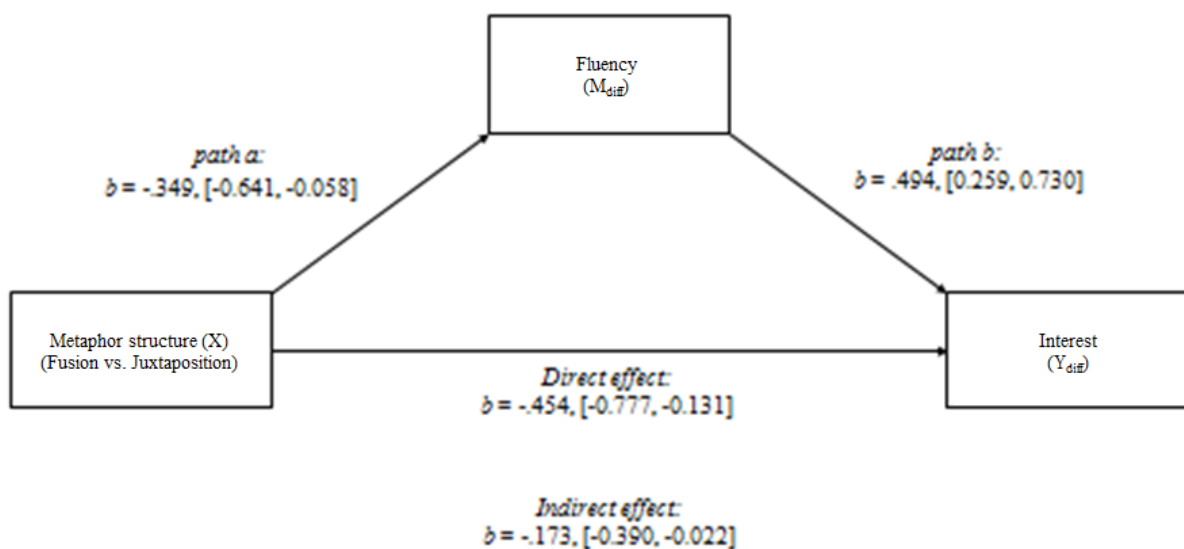


Figure 10. Mediator model for Fusion versus Juxtaposition at 5000ms

At 5000ms, Processing fluency mediated the effect of Fusion on interest compared to Replacement,  $b = .777$ , 95% CI  $[0.448, 1.172]$ , Target integration,  $b = .551$ , 95% CI  $[0.260, 0.866]$ , and Juxtaposition,  $b = .173$ , 95% CI  $[0.390, 0.022]$ . More interest for Fusion than for Replacement, Target integration and Juxtaposition is explained by more felt fluency. However, the paths of the latter mediation showed that even though interest of Fusion was higher than Juxtaposition because of more processing fluency, aesthetic pleasure of Fusion

was relatively lower than Juxtapositions' as the difference in aesthetic pleasure decreased. A model of this mediation is displayed in figure 10. Next to that, like in the example of figure 8, there were significant indirect effects of metaphor structure Juxtaposition on interest through felt fluency compared to Target integration,  $b = .458$ , 95% CI [0.195, 0.736]. More interest for Juxtaposition than for Target integration is explained by more felt fluency. There was also a significant indirect effect of metaphor structure Juxtaposition on interest through felt fluency compared Replacement,  $b = .267$ , 95% CI [0.024, 0.517]. More interest was yielded by Juxtaposition than by Replacement because of more fluency. Finally, there was a significant indirect effect of metaphor structure Replacement on interest compared to Source integration,  $b = -.287$ , [-0.571, -0.032]. Less interest for Replacement than for Source integration can be explained by less processing fluency. However, similar to the example in figure 8, the paths of the mediation showed that even though interest of Replacement was lower than Source integration because of less processing fluency, interest of Replacement was relatively higher as the difference in interest decreased. Table 6 in appendix H shows all paths of the mediation analyses. No other significant indirect effects of metaphor structure on interest were found at 5000ms.

### Conclusion

This study investigated how aesthetic pleasure and interest of advertisements containing visual metaphors varying in complexity are affected by comprehension and processing fluency at 100ms and 5000ms. Five metaphor structures of different complexity levels were applied in the advertisements to evoke different levels of processing fluency and differences in comprehension of the metaphor. This study can therefore be considered to expand the work by, amongst others, Van Enschoot and Van Mulken (2014), Van Hooijdonk and Van Enschoot (2016) and Van Mulken et al. (2014).

In general, comprehension did not directly affect aesthetic pleasure and interest at 100ms and 5000ms, dismissing comprehension as a possible moderator of metaphor structure (H1f). Comprehension did affect felt processing fluency, indicating that the hypothesised moderated mediation of comprehension through fluency on aesthetic pleasure and interest could still be present. Unfortunately hypotheses 1e, 3b and 3d remain unanswered because MEMORE (Montoya & Hayes, in press) does not, yet, enable moderated mediation analyses for within-subject designs.

Following Van Hooijdonk and Van Enschot's (2016) findings that felt fluency as well as aesthetic pleasure for Replacement were higher than for the less complex metaphor structures at 100ms, it was hypothesised (H1a) that - at 100ms - aesthetic pleasure of the most complex metaphor structure, Replacement, would be higher than all other metaphor structures, which is explained by processing fluency (H1b). That is because, in the study of Van Hooijdonk and Van Enschot, advertisements applying Replacement were generally interpreted as advertisements without metaphor; as simple product representations. Hypothesis 1a was not supported. However, in general, advertisements applying Replacement did evoke more aesthetic pleasure than less complex metaphor structures because of more fluent processing, partially supporting hypothesis 1b. Next, based on the dual processing mechanism of Hekkert et al. (2003), which claims that at a short exposure time aesthetic pleasure should be highest for the least complex metaphor structure as it is most easy-to-process, it was hypothesised (H1c) that at 100ms aesthetic pleasure of the remaining advertisements decreases when the complexity of the applied metaphor structure increases. Processing fluency was hypothesised to mediate this effect (H1d). Hypothesis 1c was rejected. Aesthetic pleasure did not decrease when the complexity of the advertisement increased. Results did show a positive relation between processing fluency and aesthetic pleasure, which supports the processing fluency theory of Reber et al. (2004) as well as the

top part of the PIA model (Graf & Landwehr, 2015) claiming more fluency would evoke more pleasure. Contrary to the hypothesis (1c), aesthetic pleasure of the moderately complex Source integration was higher than the less complex Fusion. Nevertheless, processing fluency affected aesthetic pleasure of Fusion more positively than aesthetic pleasure of Source integration, which decreased this positive difference in aesthetic pleasure. Hence, Source integration still yielded more aesthetic pleasure than Fusion, but the difference was smaller because of processing fluency. This makes towards the hypothesis 1d. Processing fluency also explained more aesthetic pleasure for Source integration than for the more complex Target integration even though the two metaphor structures did not differ in yielded aesthetic pleasure. Similar aesthetic pleasure for Source and Target integration was thus accounted for by relatively more fluent processing of Source integration. It might thus be possible that Source integration would yield more aesthetic pleasure than Target integration when fluency would be higher. In sum, hypothesis 1d was not fully supported.

Contrary to aesthetic pleasure, interest levels for the advertisements were hypothesised (H2b) not to differ between the metaphor structures at 100ms, as interest would not be evoked according to the PIA model (Graf & Landwehr, 2015). Interest levels were hypothesised (H2a) to be neutral for all applied metaphor structures, since advertisements would not be interesting nor not interesting. This was supported. Interest for all metaphor structures was on average. Hypothesis 2b was rejected because interest for advertisements using Source or Target integration was higher than interest for advertisements using Replacement.

For the exposure time of 5000ms, an inverted U-curve for aesthetic pleasure and interest were expected. This expectation and the following hypotheses were created based on the dual processing mechanism (Hekkert et al., 2003) keeping their MAYA principle in mind as well as the Optimal Innovation Hypothesis (Giora et al., 2004). It was investigated whether aesthetic pleasure and interest of advertisements applying increasingly complex metaphor

structures would indeed show an inverted U-curve and whether processing fluency mediates that effect. Both aesthetic pleasure and interest showed an inverted U-curve when the advertisement increased in complexity, supporting hypothesis 3. However, hypotheses 3a and 3c were not fully supported, because felt processing fluency could not wholly explain the effect of metaphor structure on aesthetic pleasure and interest, viz. the inverted U-curve. No suppression effect of fluency was even found, hence results did not show that moderately complex would be liked more despite lower processing fluency. Therefore, hypothesis 3a was rejected. An indication for this was already found when a positive relation between processing fluency and aesthetic pleasure and interest was found. In general, the advertisements applying the moderately complex metaphor structure Fusion evoked most interest and aesthetic pleasure compared to more complex and less complex metaphor structures because of more processing fluency. Next to that, also in support of hypothesis 3c, the moderately complex metaphor structure Source integration yielded more aesthetic pleasure and interest than the most complex metaphor structure, Replacement, because of more fluent processing of the advertisement. Remarkably, Juxtaposition, which is least complex, evoked more interest than Target integration (moderate to complex) because of more fluent processing, which contradicts the expected suppression effect of hypothesis 3a. Elaborating, results showed that interest of Juxtaposition and Target integration did not differ. Hence, advertisements applying Juxtaposition were just as interesting as Target integration because of fluent processing. Possibly, when fluency of Juxtaposition would be lower, then interest might be lower than Target integration. Finally, even though processing fluency of most complex structure Replacement was hypothesised to be lower than least complex Juxtaposition, no expectations were formed whether that could have influenced aesthetic pleasure and interest at 5000ms. Results did show that Juxtaposition yielded more aesthetic pleasure and interest because of more fluent processing than Replacement.

In conclusion, the dual processing mechanism (Hekkert et al., 2003) could not be fully supported, as aesthetic pleasure did not show the expected decrease at increased complexity of the applied metaphor structure at 100ms, whereas aesthetic pleasure and interest did show the expected inverted U-curve at 5000ms. However, aesthetic pleasure did increase when fluency did, which to certain extent is still in line with Hekkert et al. (2003) but most of all in line with the processing fluency theory (Reber et al., 2004). Lastly, overall, Source integration appeared to be effective at both exposure times, whereas Fusion is found to be most effective at 5000ms.

### **Discussion**

The most striking finding of this current study might be that even though previous research (e.g., Van Mulken et al., 2014) has shown that comprehension of the displayed metaphor played an important role in yielding aesthetic pleasure, the current study did not find such an effect. In general, comprehension of the metaphor did not yield more aesthetic pleasure than when the metaphor was not comprehended. A possible explanation is the way in which comprehension was measured and when in the experiment. Present study measured aesthetic pleasure before comprehension and by means of an open question, whereas in Van Mulken et al. (2014) comprehension was measured by a multiple-choice question in which participants had to check off the ground for the metaphor. Thus, they were presented with the solution of the ‘puzzle’. This, first of all, increases the chance of correct comprehension while otherwise the participant might not have given the right ground of the metaphor. Next to the fact that correct comprehension might be affected by this confound, presenting participants with the right answer might have offered implicit, subjective, confirmation whether they were on the right track. This potential prime or reinforcement of success - the awareness that they (possibly) have comprehended the metaphor - could have affected aesthetic pleasure, as aesthetic pleasure was measured after comprehension. It may thus be questioned whether this

awareness of possible comprehension could have led to more aesthetic pleasure instead of actual comprehension, in which this awareness resulting from the multiple-choice question could just as well involve perceived comprehension as it offers an indication of correct comprehension. If this would be accurate, a limitation of the current research is that the effect of perceived comprehension was not investigated. In this line of reasoning, future research could thus focus on the role of perceived comprehension instead of actual comprehension on aesthetic pleasure. Next to that, future research could also investigate whether this subjective confirmation of comprehension could have affected aesthetic pleasure, for instance by creating two conditions: one in which the multiple-choice question for comprehension is posed after aesthetic pleasure is measured and one in which the multiple-choice question for comprehension precedes aesthetic pleasure. Also, priming of success could be investigated in the future by showing half of the participants whether their answer for comprehension of the metaphor was correct.

When looking at the other expected and actually found findings, most noticeable is that despite the fact that the hypotheses were essentially based on the presence of dual processing mechanism (Hekkert et al., 2004), dual processing could not satisfactorily explain current findings. Only part of the model can be applied to explain current findings. First of all, the dual processing mechanism by Hekkert et al. (2003) claims that aesthetic pleasure should be highest for the least complex metaphor structure as it is most easy-to-process, conform Reber et al.'s fluency theory (2004). Findings from ten advertisements applying the five metaphor structures ranging in complexity did not support that. The fact that increases of complexity did not signify decreases of aesthetic pleasure raises two questions: either Hekkert et al.'s (2003) suggestion that increasing complexity exemplifies increasing fluency is not correct – hence, complexity is not sufficient as an objective, independent factor that evokes different levels of processing fluency when investigating aesthetic pleasure of visual

metaphors - or the accuracy of the proposed order in complexity by Phillips and McQuarrie (2004) may be questioned. The latter is highlighted by findings of the pretest showing that Juxtaposition and Fusion did not differ in complexity. Thus, either the distinction in complexity and its associated order in complexity should be investigated and adjusted or complexity does not echo processing fluency and is thus not an accurate factor in investing aesthetic pleasure of advertisements applying different visual metaphor structures. The latter argument is stressed by appraisal theories (e.g. Silvia, 2005b), which posit that objective complexity does not exist as complexity is considered as subjective to the agent. For instance, the one person could appraise the metaphor structure Fusion as simple due to experience with such rhetoric, while the other person could appraise it as complex because of a lack of experience. Another possible explanation might be due to a limitation of the study, which is that mean scores of aesthetic pleasure were calculated by combining both metaphors per metaphor structure neglecting that aesthetic pleasure of the metaphors applying Juxtaposition differed from each other just like the metaphors of Replacement differed from each other, both at 100ms. This difference was ignored as the majority of the metaphors did not differ from each other. For both Juxtaposition and Replacement, aesthetic pleasure for the second metaphor was equal to the aesthetic pleasure that was yielded by Fusion, which yielded the highest scores, at 100ms. This implies that when different stimuli are used in a similar future experiment, it could still be possible that aesthetic pleasure of the less complex metaphor structure Juxtaposition as well as Replacement are higher than Fusion at 100ms, which would then be in line with the dual processing mechanism of Hekkert et al. (2003).

Second, even though Hekkert et al.'s (2003) claimed relation between aesthetic pleasure and complexity was failed to be found, findings were in line with their dual processing mechanism to the extent that more processing fluency lead to more aesthetic pleasure. This latter finding of more aesthetic pleasure for more fluency is more exhaustively

supported by Reber et al.'s processing fluency theory (2004) as well as the PIA Model (Graf & Landwehr, 2015). Therefore, considering complexity's deficiency set out earlier, the automatic processing of the PIA Model can be considered as a more adequate model to make predictions for aesthetic pleasure based on felt fluency at 100ms than Hekkert et. al.'s (2003) suggested complexity.

Third, in line with Hekkert et al.'s (2003) claims on dual processing, aesthetic pleasure and interest showed an inverted U-curve at 5000ms. More aesthetic pleasure and interest for the moderately complex metaphor structures was found, which is in line with their MAYA principle (2003). According to Hekkert et al., when there is more time available to process a stimulus, the cognitive mediated controlled mechanism would be dominant and a more novel or optimal innovative stimulus would be preferred. This part of the model is in line with the Optimal Innovation Hypothesis (Giora et al., 2004), which says that optimal innovative stimulus, thus moderately complex, would be preferred over less and more complex stimuli. Support for the Optimal Innovation Hypothesis was thus found with Fusion's higher aesthetic pleasure as well as interest. Next to that, controlled processing suggested by the PIA Model of Graf and Landwehr (2015) could explain the inverted U-curve for interest, considering that too complex (no disfluency reduction, thus too low fluency) or too simple (not more to learn, thus too much fluency) metaphor structures cause dislike in the form of confusion and boredom. Interest would therefore be evoked for moderate structures because of moderate levels of fluency. Yet, considering similar results for interest and aesthetic pleasure at 5000ms, the PIA Model's accuracy can be challenged since the model claims aesthetic pleasure and interest cannot be evoked simultaneously. It may thus be questioned to what extend the model is good predictor of aesthetic evaluation of visual metaphors. Future research could explicitly test the model. More adequate insight of elicitation of interest at 5000ms may be offered by Silvia's appraisal theory (2005b).

Assuming Silvia's novelty checks of perceived complexity and coping potential together account for felt fluency in this current study, then the inverted U-curve for interest can also be explained by Silvia's appraisal theory. Appraisal theory argues that when a stimulus is more complex, it is considered more interesting up to that point of deficient coping potential as the stimulus becomes too difficult to understand, thus processing fluency would be too low, resulting in a negative slope reinforcing the inverted U-shape. It is therefore suggested to investigate appraisal theory's application in the field of visual metaphors in advertising. Accordingly, an inverted U-curve for aesthetic pleasure and interest of visual metaphors in advertisements is not only claimed and explained by multiple models, its presence was supported in the current study.

However, lastly, at 5000ms the dual processing model of Hekkert et al. (2003) could again not correctly explain why exactly aesthetic pleasure and interest showed an inverted U-curve solely based on processing fluency. Generally, processing fluency did mediate the effect of metaphor structures on aesthetic pleasure and interest. However, fluency not only mediated the effect of moderately complex metaphor structures compared to more complex structures. Fluency also mediated the effect of metaphor structures on aesthetic pleasure and interest, while suppression should be present according to the model. The latter was not only not conform Hekkert et al.'s dual processing model and their MAYA principle, it was also not conform the Optimal Innovation Hypothesis (Giora et al., 2004) or the PIA model (Graf & Landwehr, 2015) for interest. At 5000ms more aesthetic pleasure and interest was thus always influenced by higher processing fluency levels. Since fluency was not found to be of mediating role in for all metaphor structures, future research could still investigate fluency as a mediator for advertisements applying visual metaphor structures of which complexity differences are more distinct.

Another interesting finding of the present study was the fact that at 100ms Source integration appeared to be fairly effective when looking at evoked aesthetic pleasure even though the metaphor structure is moderately complex. A possible explanation could be that the metaphor structure itself was already aesthetically more pleasurable than the other metaphor structures Juxtaposition, Fusion and Replacement. Findings indicated this was indeed accurate. This raises the question why. It might be because advertisements applying Source integration displays a more unified picture as it contains a dynamic background with contextual cues, whereas Juxtaposition, Fusion and Replacement only display an object(s) on a blank, neutral, static background. This could be correct, because generally Target integration was also already aesthetically more pleasurable. This may also explain why Source integration and Target integration evoked more interest than Replacement at 100ms. Noteworthy though, despite the fact that Target integration also contains a dynamic background with contextual cues to pick up on, Source integration did yield relatively more aesthetic pleasure than Target integration because of more fluency. Accordingly, results of the pretest did indicate that Target integration is a more complex metaphor structure than Source integration. It may be questioned what exactly made Target integration more complex than Source integration and whether this might be caused by reversed context and object of the target and source. If so, it may be wondered to what extent people can distinguish those two metaphor structures at a short exposure time of 100ms. Do people notice that the context in the advertisement of Source integration concerns the target of the advertisement? In this study, overall correct recognition of the advertised product did not differ between the two metaphor structures. However, product recognition did differ between the two advertisements of each metaphor structure. Next to that, product recognition for Source integration of the second advertisement was higher than first of the Target integration. This calls for further investigation using new

and/or more stimuli of these newly developed metaphor structures. All aspects set out above, could be addressed in future research when researching visual metaphors in advertisements.

To come to a conclusion, even though the dual processing mechanism (Hekkert et al., 2003) and its claims was not fully supported in this study, findings of the current study did attribute to the literature in the domain of visual metaphors in advertising. An inverted U-curve was found having the visual metaphor structure Fusion as its tipping point. Whether this is the optimal tipping point is challenged. Future research is recommended to further search for the optimal tipping point. Next to that, a crucial role of felt processing fluency was found in evoking aesthetic pleasure and interest of advertisements using visual metaphors. Nevertheless theory can thus far not explain fluency's effect in this present study. More research and elaboration of literature is required to do so. Next to these theoretical implications, practical implications for, for instance, marketers are also provided. All in all, the most clear question marketers can now answer is why the Tabasco advertisement, which applied Fusion, was more pleasurable at the train station than when it flashed by en route. That was because it yielded most aesthetic pleasure and interest because of an optimal level of processing fluency. When a marketer aims to be successful in both situations, then it would be most effective to create an advertisement in which the advertised product is replaced by the metaphorical object in the context of the advertised product, as this type of visual metaphor appeared to be effective at both short and longer exposure time. It may thus be considered as robust structure for advertising.

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## Appendices

### Appendix A: Stimuli of the pretest

#### Version A



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5

## Version B



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



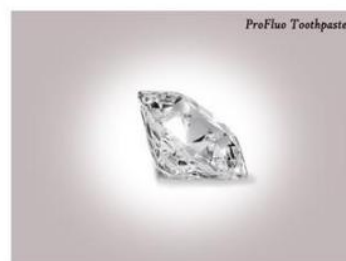
Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



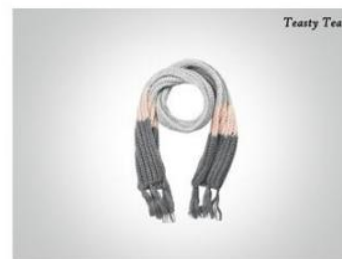
Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



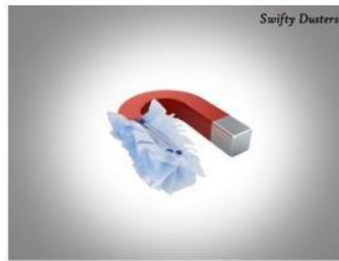
Afbeelding 4



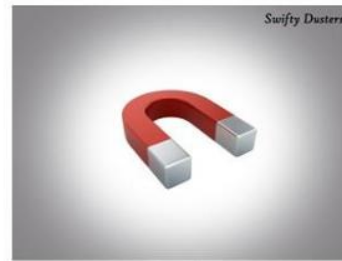
Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3

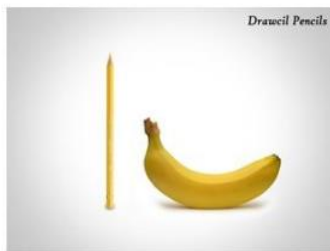


Afbeelding 4



Afbeelding 5

## Version C



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



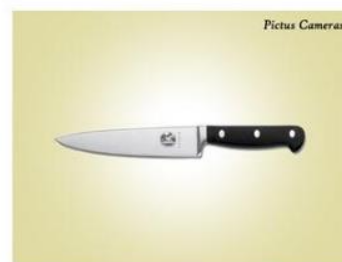
Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5

**Appendix B: Questionnaire of the pretest in Dutch****Stap 1** (elke stap is een nieuwe pagina)

Allereerst alvast bedankt voor je deelname!

De enquête die je zo gaat invullen is onderdeel van onze masterscriptie en deze zal ongeveer 20 minuten duren. Je krijgt zometeen een aantal advertenties te zien waarin gebruik wordt gemaakt van visuele vergelijkingen/metaforen. We zouden je willen vragen om hierover een aantal vragen te beantwoorden. Er zijn hierbij geen goede of foute antwoorden en je deelname is anoniem.

We willen je nogmaals bedanken voor je tijd en mening waar we erg veel aan hebben.

Groet,

Aniek van den Reek

Evelyn Gaarman

Steffie van der Horst

**Stap 2**

Bekijk de volgende advertenties en beantwoord de onderstaande vragen per advertentie.



**Afbeelding 1**



**Afbeelding 2**



**Afbeelding 3**



**Afbeelding 4**



**Afbeelding 5**

Afbeelding 1 is:

0 0 0 0 0 0 0

Rechttoe-rechtaan Creatief

0 0 0 0 0 0 0

Innovatief Ouderwets

0 0 0 0 0 0 0

Voorspelbaar Verrassend

Afbeelding 2 is:

0 0 0 0 0 0 0

Rechttoe-rechtaan Creatief

0 0 0 0 0 0 0

Innovatief Ouderwets

0 0 0 0 0 0 0

Voorspelbaar Verrassend

Afbeelding 3 is:

0 0 0 0 0 0 0

Rechttoe-rechtaan Creatief

0 0 0 0 0 0 0

Innovatief Ouderwets

0 0 0 0 0 0 0

Voorspelbaar Verrassend

Afbeelding 4 is:

0 0 0 0 0 0 0

Rechttoe-rechtaan Creatief

0 0 0 0 0 0 0

Innovatief

Ouderwets

0 0 0 0 0 0 0

Voorspelbaar

Verrassend

Afbeelding 5 is:

0 0 0 0 0 0 0

Rechttoe-rechtaan

Creatief

0 0 0 0 0 0 0

Innovatief

Ouderwets

0 0 0 0 0 0 0

Voorspelbaar

Verrassend

Stap 3

Geef in de volgende vragen aan hoe makkelijk of moeilijk je de afbeelding te begrijpen vindt.



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5

Afbeelding 1 is:

0 0 0 0 0 0 0

Makkelijk te begrijpen

Moeilijk te begrijpen

Afbeelding 2 is:

0                      0                      0                      0                      0                      0                      0

Makkelijk te begrijpen

Moeilijk te begrijpen

Afbeelding 3 is:

0                      0                      0                      0                      0                      0                      0

Makkelijk te begrijpen

Moeilijk te begrijpen

Afbeelding 4 is:

0                      0                      0                      0                      0                      0                      0

Makkelijk te begrijpen

Moeilijk te begrijpen

Afbeelding 5 is:

0                      0                      0                      0                      0                      0                      0

Makkelijk te begrijpen

Moeilijk te begrijpen

### Stap 5

Bekijk nogmaals de onderstaande advertenties. Geef vervolgens antwoord op de onderstaande vragen, maar nu over de vijf advertenties gezamenlijk.



**Afbeelding 1**



**Afbeelding 2**



**Afbeelding 3**



**Afbeelding 4**



**Afbeelding 5**



Stap 7

In alle vijf advertenties wordt dezelfde metafoor toegepast. Komt deze in alle versies even goed naar voren?



Afbeelding 1



Afbeelding 2



Afbeelding 3



Afbeelding 4



Afbeelding 5

In afbeelding 1 komt de metafoor:

Onduidelijk naar voren

0                      0                      0                      0                      0                      0                      0

Duidelijk naar voren

In afbeelding 2 komt de metafoor:

Onduidelijk naar voren

0                      0                      0                      0                      0                      0                      0

Duidelijk naar voren

In afbeelding 3 komt de metafoor:

Onduidelijk naar voren

0                      0                      0                      0                      0                      0                      0

Duidelijk naar voren

In afbeelding 4 komt de metafoor:

Onduidelijk naar voren

0                      0                      0                      0                      0                      0                      0

Duidelijk naar voren

In afbeelding 5 komt de metafoor:

Onduidelijk naar voren

Duidelijk naar voren

0                      0                      0                      0                      0                      0                      0

Q30: Wanneer je vindt dat de metafoor in één of meer advertenties minder goed naar voren komt, waar ligt dit volgens jou dan aan? Geef dit kort aan per afbeeldingsnummer(s). Noteer anders “n.v.t.” om verder te gaan.

.....

Q31: De merknaam Il’Gusta Coffee verwijst naar koffie.

0                      0                      0                      0                      0                      0                      0

Onduidelijk

Duidelijk

Q32: Als jij de ontwerper van de advertenties zou zijn, wat zou jij dan anders doen?

.....

Nieuw blok bestaande uit stap 2 t/m 7 voor de andere metaforen.

Laatste stap

Je bent bijna klaar! Graag willen we alleen nog wat basis achtergrondinformatie.

Geslacht:      0 Man                      0 Vrouw

Leeftijd: \_\_\_\_\_

Hoogst genoten opleiding:

- ☐ Basisschool
- ☐ Middelbaar onderwijs
- ☐ MBO
- ☐ HBO
- ☐ WO
- ☐ Anders

**Appendix C: Results pretest**

Table 10

*Artful deviation of the metaphor structures*

|               | M    | SD   | CI 95% |       |
|---------------|------|------|--------|-------|
|               |      |      | Lower  | Upper |
| Afbeelding 1* | 2.71 | 0.94 | 2.48   | 2.95  |
| Afbeelding 2  | 4.62 | 0.98 | 4.38   | 4.87  |
| Afbeelding 3* | 2.38 | 1.11 | 2.12   | 2.65  |
| Afbeelding 4  | 4.76 | 0.87 | 4.54   | 5.00  |
| Afbeelding 5  | 5.02 | 0.84 | 4.82   | 5.25  |

\*Significant lager dan 2, 4 en 5

Table 11

*Conventionality of the metaphor*

|                               | $\alpha$    | Variance    | Item                     | $\alpha$ if item deleted | M           | SD           |
|-------------------------------|-------------|-------------|--------------------------|--------------------------|-------------|--------------|
| Coffee-alarm clock            | .833        | .283        | New-old                  | .631                     | 4.42        | 1.981        |
|                               |             |             | Unusual-usual            | .569                     | 4.47        | 1.926        |
|                               |             |             | Illogical-logical        | .966                     | 5.37        | 1.499        |
| <b>Detergent-perfume</b>      | <b>.647</b> | <b>.012</b> | <b>New-old</b>           | <b>.501</b>              | <b>5.37</b> | <b>1.571</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.199</b>              | <b>5.53</b> | <b>1.504</b> |
|                               |             |             | <b>Illogical-logical</b> | <b>.816</b>              | <b>5.32</b> | <b>1.529</b> |
| <b>Suitcase-wardrobe</b>      | <b>.615</b> | <b>.483</b> | <b>New-old</b>           | <b>.651</b>              | <b>3.47</b> | <b>1.307</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.204</b>              | <b>3.95</b> | <b>1.682</b> |
|                               |             |             | <b>Illogical-logical</b> | <b>.599</b>              | <b>4.84</b> | <b>1.893</b> |
| Sunglasses-curtains           | .639        | .433        | New-old                  | .836                     | 2.63        | 1.165        |
|                               |             |             | Unusual-usual            | -.053                    | 2.79        | 1.653        |
|                               |             |             | Illogical-logical        | .602                     | 3.84        | 1.834        |
| <b>Toilet freshener-roses</b> | <b>.648</b> | <b>.012</b> | <b>New-old</b>           | <b>.469</b>              | <b>6.00</b> | <b>1.054</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.253</b>              | <b>5.84</b> | <b>1.344</b> |
|                               |             |             | <b>Illogical-logical</b> | <b>.840</b>              | <b>5.79</b> | <b>1.398</b> |
| <b>Matrass-clouds</b>         | <b>.710</b> | <b>.095</b> | <b>New-old</b>           | <b>.884</b>              | <b>5.21</b> | <b>1.813</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.347</b>              | <b>5.79</b> | <b>1.437</b> |
|                               |             |             | <b>Illogical-logical</b> | <b>.656</b>              | <b>5.68</b> | <b>1.635</b> |
| <b>Sports shoes-race car</b>  | <b>.644</b> | <b>.303</b> | <b>New-old</b>           | <b>.520</b>              | <b>3.85</b> | <b>1.631</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.183</b>              | <b>4.85</b> | <b>1.531</b> |
|                               |             |             | <b>Illogical-logical</b> | <b>.827</b>              | <b>4.75</b> | <b>1.682</b> |
| <b>Toothpaste-diamond</b>     | <b>.852</b> | <b>.031</b> | <b>New-old</b>           | <b>.870</b>              | <b>4.95</b> | <b>1.538</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.638</b>              | <b>4.80</b> | <b>1.824</b> |
|                               |             |             | <b>Illogical-logical</b> | <b>.836</b>              | <b>4.60</b> | <b>1.957</b> |
| Tissues-pillow                | .849        | .098        | New-old                  | .876                     | 3.80        | 1.765        |
|                               |             |             | Unusual-usual            | .668                     | 4.25        | 1.650        |
|                               |             |             | Illogical-logical        | .611                     | 4.40        | 1.635        |
| Tea-scarf                     | .665        | .106        | New-old                  | .821                     | 2.70        | 1.780        |
|                               |             |             | Unusual-usual            | .412                     | 2.40        | 1.667        |
|                               |             |             | Illogical-logical        | .360                     | 3.05        | 2.064        |
| <b>Duster-magnet</b>          | <b>.922</b> | <b>.063</b> | <b>New-old</b>           | <b>.944</b>              | <b>5.10</b> | <b>1.944</b> |
|                               |             |             | <b>Unusual-usual</b>     | <b>.795</b>              | <b>5.35</b> | <b>1.814</b> |

|                    |             |             |                          |             |             |              |
|--------------------|-------------|-------------|--------------------------|-------------|-------------|--------------|
|                    |             |             | <b>Illogical-logical</b> | <b>.912</b> | <b>5.60</b> | <b>1.603</b> |
| <b>Smartphone-</b> |             |             | <b>New-old</b>           | <b>.745</b> | <b>2.60</b> | <b>1.492</b> |
| penknife           | .653        | .333        | Unusual-usual            | .150        | 2.35        | 1.496        |
|                    |             |             | Illogical-logical        | .677        | 3.45        | 1.986        |
| Pencil-            |             |             | New-old                  | .960        | 2.95        | 1.682        |
| banana             | .937        | .086        | Unusual-usual            | .881        | 2.73        | 1.862        |
|                    |             |             | Illogical-logical        | .867        | 2.58        | 2.143        |
| Cameras            |             |             | New-old                  | .798        | 2.21        | 1.357        |
| knife              | .783        | .810        | Unusual-usual            | .481        | 2.37        | 1.832        |
|                    |             |             | Illogical-logical        | .790        | 3.84        | 2.167        |
| Lollipop-          |             |             | New-old                  | .821        | 5.05        | 1.471        |
| cherry             | .868        | .034        | Unusual-usual            | .847        | 5.21        | 1.475        |
|                    |             |             | Illogical-logical        | .777        | 5.42        | 1.305        |
| <b>Condom-</b>     |             |             | <b>New-old</b>           | <b>.736</b> | <b>2.84</b> | <b>1.834</b> |
| <b>lifebuoy</b>    | <b>.745</b> | <b>.754</b> | <b>Unusual-usual</b>     | <b>.361</b> | <b>3.32</b> | <b>2.029</b> |
|                    |             |             | <b>Illogical-logical</b> | <b>.790</b> | <b>4.53</b> | <b>1.867</b> |
| <b>Deodorant-</b>  |             |             | <b>New-old</b>           | <b>.923</b> | <b>4.21</b> | <b>1.653</b> |
| <b>shower</b>      | <b>.923</b> | <b>.306</b> | <b>Unusual-usual</b>     | <b>.810</b> | <b>4.79</b> | <b>1.813</b> |
|                    |             |             | <b>Illogical-logical</b> | <b>.917</b> | <b>5.32</b> | <b>1.565</b> |
| <b>Energy bar-</b> |             |             | <b>New-old</b>           | <b>.672</b> | <b>4.95</b> | <b>1.715</b> |
| <b>battery</b>     | <b>.793</b> | <b>.343</b> | <b>Unusual-usual</b>     | <b>.532</b> | <b>5.37</b> | <b>1.674</b> |
|                    |             |             | <b>Illogical-logical</b> | <b>.839</b> | <b>6.11</b> | <b>0.875</b> |
| Blonde beer-       |             |             | New-old                  | .856        | 2.26        | 1.327        |
| light bulb         | .836        | .036        | Unusual-usual            | .657        | 1.89        | 0.937        |
|                    |             |             | Illogical-logical        | .821        | 2.16        | 1.302        |

Notes. Advertisements that were selected for the main experiment are in bold.

Table 12

*Conventionality of the metaphor when means were combined into one score*

|                   | <i>M</i>    | <i>SD</i>   | 95% CI      |             |
|-------------------|-------------|-------------|-------------|-------------|
|                   |             |             | Lower       | Upper       |
| Coffee            | 4.75        | 1.57        | 4.04        | 5.39        |
| <b>Matrass</b>    | <b>5.56</b> | <b>1.30</b> | <b>4.91</b> | <b>6.09</b> |
| <b>Duster</b>     | <b>5.35</b> | <b>1.67</b> | <b>4.67</b> | <b>6.00</b> |
| <b>Toothpaste</b> | <b>4.78</b> | <b>1.56</b> | <b>4.10</b> | <b>5.42</b> |
| Tissue            | 4.15        | 1.48        | 3.52        | 4.80        |
| Pencil            | 2.63        | 1.79        | 1.91        | 3.40        |
| Camera            | 2.81        | 1.52        | 2.18        | 3.46        |
| Lollipop          | 5.23        | 1.26        | 4.68        | 5.75        |
| <b>Condom</b>     | <b>3.56</b> | <b>1.56</b> | <b>2.88</b> | <b>4.30</b> |
| <b>Deodorant</b>  | <b>4.77</b> | <b>1.56</b> | <b>4.05</b> | <b>5.44</b> |
| <b>Energy bar</b> | <b>5.47</b> | <b>1.24</b> | <b>4.91</b> | <b>6.02</b> |
| Blonde beer       | 2.11        | 1.04        | 1.68        | 2.58        |

Notes. Advertisements that were selected for the main experiment are in bold.

Table 13

*Comparability of the target and source of the metaphor*

|                               | $\alpha$    | Variance    | Item                 | $\alpha$ if item deleted | <i>M</i>    | <i>SD</i>    |
|-------------------------------|-------------|-------------|----------------------|--------------------------|-------------|--------------|
| Coffee-alarm clock            | .617        | .777        | Similar              | -.130                    | 3.37        | 1.640        |
|                               |             |             | Not different        | .462                     | 3.37        | 1.571        |
|                               |             |             | Related              | .837                     | 4.89        | 1.286        |
| <b>Detergent-parfum</b>       | <b>.748</b> | <b>.433</b> | <b>Similar</b>       | <b>.648</b>              | <b>3.79</b> | <b>1.619</b> |
|                               |             |             | <b>Not different</b> | <b>.448</b>              | <b>3.95</b> | <b>1.939</b> |
|                               |             |             | <b>Related</b>       | <b>.841</b>              | <b>5.00</b> | <b>1.414</b> |
| <b>Suitcase-wardrobe</b>      | <b>.919</b> | <b>.281</b> | <b>Similar</b>       | <b>.834</b>              | <b>4.21</b> | <b>1.512</b> |
|                               |             |             | <b>Not different</b> | <b>.899</b>              | <b>3.79</b> | <b>1.475</b> |
|                               |             |             | <b>Related</b>       | <b>.915</b>              | <b>4.84</b> | <b>1.642</b> |
| Sunglasses-curtains           | .852        | .557        | Similar              | .640                     | 3.26        | 1.821        |
|                               |             |             | Not different        | .747                     | 2.95        | 1.900        |
|                               |             |             | Related              | .949                     | 4.37        | 1.950        |
| <b>Toilet freshener-roses</b> | <b>.812</b> | <b>.250</b> | <b>Similar</b>       | <b>.564</b>              | <b>4.11</b> | <b>1.853</b> |
|                               |             |             | <b>Not different</b> | <b>.616</b>              | <b>3.63</b> | <b>1.802</b> |
|                               |             |             | <b>Related</b>       | <b>.935</b>              | <b>4.63</b> | <b>1.499</b> |
| <b>Matrass-clouds</b>         | <b>.895</b> | <b>.485</b> | <b>Similar</b>       | <b>.804</b>              | <b>3.68</b> | <b>1.765</b> |
|                               |             |             | <b>Not different</b> | <b>.802</b>              | <b>3.42</b> | <b>1.742</b> |
|                               |             |             | <b>Related</b>       | <b>.934</b>              | <b>4.74</b> | <b>1.759</b> |
| <b>Sports shoes-raceauto</b>  | <b>.873</b> | <b>.061</b> | <b>Similar</b>       | <b>.764</b>              | <b>3.85</b> | <b>1.663</b> |
|                               |             |             | <b>Not different</b> | <b>.794</b>              | <b>3.45</b> | <b>1.572</b> |
|                               |             |             | <b>Related</b>       | <b>.896</b>              | <b>3.90</b> | <b>1.619</b> |
| <b>Toothpaste-diamond</b>     | <b>.907</b> | <b>.076</b> | <b>Similar</b>       | <b>.854</b>              | <b>3.00</b> | <b>1.806</b> |
|                               |             |             | <b>Not different</b> | <b>.819</b>              | <b>2.75</b> | <b>1.618</b> |
|                               |             |             | <b>Related</b>       | <b>.924</b>              | <b>3.30</b> | <b>1.720</b> |
| Tissues-pillow                | .901        | .103        | Similar              | .848                     | 4.00        | 1.717        |
|                               |             |             | Not different        | .821                     | 3.40        | 1.118        |
|                               |             |             | Related              | .902                     | 3.50        | 1.318        |
| Tea-scarf                     | .901        | .006        | Similar              | .780                     | 2.70        | 1.922        |
|                               |             |             | Not different        | .968                     | 2.80        | 1.963        |
|                               |             |             | Related              | .810                     | 2.65        | 1.954        |
| <b>Duster-magnet</b>          | <b>.914</b> | <b>.106</b> | <b>Similar</b>       | <b>.946</b>              | <b>4.40</b> | <b>1.603</b> |
|                               |             |             | <b>Not different</b> | <b>.808</b>              | <b>3.75</b> | <b>1.743</b> |
|                               |             |             | <b>Related</b>       | <b>.858</b>              | <b>4.10</b> | <b>1.832</b> |
| Smartphone-penknife           | .909        | .011        | Similar              | .816                     | 2.60        | 1.759        |
|                               |             |             | Not different        | .933                     | 2.55        | 1.761        |
|                               |             |             | Related              | .849                     | 2.75        | 1.970        |
| Pencil-banana                 | .944        | .019        | Similar              | .926                     | 1.95        | 1.545        |
|                               |             |             | Not different        | .643                     | 2.00        | 1.374        |
|                               |             |             | Related              | .876                     | 2.21        | 1.619        |
| Camera-knife                  | .887        | .444        | Similar              | .797                     | 2.79        | 2.043        |
|                               |             |             | Not different        | .815                     | 2.32        | 1.668        |
|                               |             |             | Related              | .910                     | 3.63        | 2.114        |
| Lollipop-cherry               | .891        | .310        | Similar              | .822                     | 3.37        | 1.383        |
|                               |             |             | Not different        | .795                     | 3.16        | 1.740        |
|                               |             |             | Related              | .920                     | 4.21        | 1.843        |
| <b>Condom-lifebuoy</b>        | <b>.900</b> | <b>.317</b> | <b>Similar</b>       | <b>.801</b>              | <b>4.68</b> | <b>1.701</b> |
|                               |             |             | <b>Not different</b> | <b>.867</b>              | <b>3.58</b> | <b>1.539</b> |
|                               |             |             | <b>Related</b>       | <b>.896</b>              | <b>3.95</b> | <b>1.649</b> |

|                        |      |      |               |       |      |       |
|------------------------|------|------|---------------|-------|------|-------|
| Deodorant-shower       | .517 | .084 | Similar       | -.085 | 5.00 | 1.000 |
|                        |      |      | Not different | .413  | 4.95 | .848  |
|                        |      |      | Related       | .682  | 5.47 | .841  |
| Energy bar-battery     | .768 | .256 | Similar       | .504  | 4.53 | 1.712 |
|                        |      |      | Not different | .838  | 3.89 | 1.792 |
|                        |      |      | Related       | .689  | 4.89 | 1.524 |
| Blonde beer-light bulb | .879 | .026 | Similar       | .772  | 2.21 | 1.398 |
|                        |      |      | Not different | .770  | 1.89 | 0.937 |
|                        |      |      | Related       | .914  | 2.00 | 0.943 |

Table 14

*Comparability of the metaphor when means were combined into one score*

|                               | <i>M</i>    | <i>SD</i>   | 95% CI      |             |
|-------------------------------|-------------|-------------|-------------|-------------|
|                               |             |             | Lower       | Upper       |
| <b>Detergent</b>              | <b>4.25</b> | <b>1.21</b> | <b>3.70</b> | <b>4.77</b> |
| <b>Suitcase</b>               | <b>4.28</b> | <b>1.43</b> | <b>3.65</b> | <b>4.88</b> |
| Sunglasses                    | 3.53        | 1.66        | 2.84        | 4.25        |
| <b>Toilet freshener</b>       | <b>4.12</b> | <b>1.47</b> | <b>3.49</b> | <b>4.79</b> |
| <b>Matrass</b>                | <b>3.95</b> | <b>1.60</b> | <b>3.25</b> | <b>4.61</b> |
| <b>Sports shoes</b>           | <b>3.73</b> | <b>1.45</b> | <b>3.15</b> | <b>4.32</b> |
| <b>Toothpaste<sup>a</sup></b> | <b>3.02</b> | <b>1.58</b> | <b>2.37</b> | <b>3.70</b> |
| Tissues                       | 3.63        | 1.30        | 3.03        | 4.18        |
| Tea <sup>c</sup>              | 2.71        | 1.78        | 1.98        | 3.47        |
| <b>Duster</b>                 | <b>4.08</b> | <b>1.60</b> | <b>3.43</b> | <b>4.73</b> |
| Smartphone <sup>d</sup>       | 2.63        | 1.69        | 1.95        | 3.38        |
| Pencil <sup>e</sup>           | 2.05        | 1.44        | 1.53        | 2.72        |
| Camera <sup>b</sup>           | 2.91        | 1.76        | 2.19        | 3.65        |
| Lollipop                      | 3.58        | 1.51        | 2.93        | 4.21        |
| <b>Condom</b>                 | <b>4.07</b> | <b>1.49</b> | <b>3.44</b> | <b>4.74</b> |
| <b>Energy bar</b>             | <b>4.44</b> | <b>1.39</b> | <b>3.79</b> | <b>5.02</b> |
| Blonde beer                   | 2.04        | 1.00        | 1.58        | 2.49        |

Notes Advertisements that were selected for the main experiment are in bold.

<sup>a</sup> = significant lager dan detergent en Energy bar, <sup>b</sup> = <sup>a</sup> + suitcase, <sup>c</sup> = <sup>ab</sup> + toilet freshener, <sup>d</sup> = <sup>abc</sup> + duster en condom, <sup>e</sup> = <sup>abcd</sup> + sunglasses, matrass, sports shoes, tissues en lollipop

Table 15

*Correct comprehension of the metaphor in percentages*

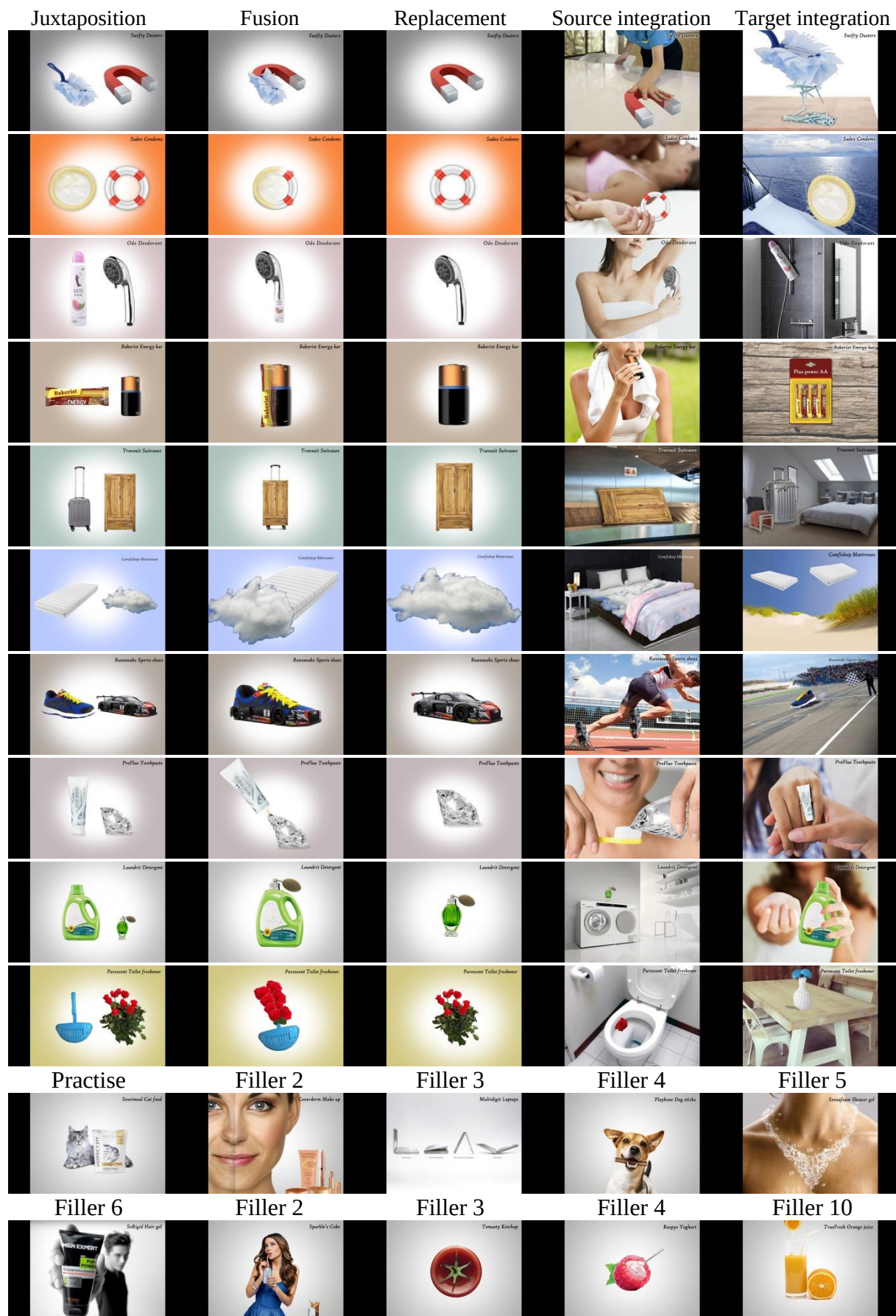
|                         | Percentage correct |
|-------------------------|--------------------|
| Coffee                  | 63                 |
| <b>Detergent</b>        | <b>89</b>          |
| <b>Suitcase</b>         | <b>89</b>          |
| Sunglasses              | 73                 |
| <b>Toilet freshener</b> | <b>89</b>          |
| <b>Matrass</b>          | <b>84</b>          |
| <b>Sports shoes</b>     | <b>85</b>          |
| <b>Toothpaste</b>       | <b>90</b>          |
| Tissues                 | 75                 |
| Tea                     | 45                 |
| <b>Duster</b>           | <b>90</b>          |
| Smartphone              | 55                 |
| Pencil                  | 37                 |
| Camera                  | 73                 |
| Lollipop                | 42                 |
| <b>Condom</b>           | <b>79</b>          |
| <b>Deodorant</b>        | <b>84</b>          |
| <b>Energy bar</b>       | <b>79</b>          |
| Blonde beer             | 26                 |

**Appendix D: Stimuli lists for experiment design**

| <b>List 1</b>       | <b>List 2</b>       | <b>List 3</b>       | <b>List 4</b>       | <b>List 5</b>       |
|---------------------|---------------------|---------------------|---------------------|---------------------|
| Filler_1 / practice | Filler_1 / practice | Filler_1 / practice | Filler_1 / practice | Filler_1 / practice |
| Filler_2            | Filler_2            | Filler_2            | Filler_2            | Filler_2            |
| Duster_J            | Condom_J            | Deodorant_J         | Energybar_J         | Suitcase_J          |
| Suitcase_TI         | Duster_TI           | Condom_TI           | Deodorant_TI        | Energybar_TI        |
| Energybar_R         | Suitcase_R          | Duster_R            | Condom_R            | Deodorant_R         |
| Filler_3            | Filler_3            | Filler_3            | Filler_3            | Filler_3            |
| Deodorant_F         | Energybar_F         | Suitcase_F          | Duster_F            | Condom_F            |
| Filler_4            | Filler_4            | Filler_4            | Filler_4            | Filler_4            |
| Condom_SI           | Deodorant_SI        | Energybar_SI        | Suitcase_SI         | Duster_SI           |
| Filler_5            | Filler_5            | Filler_5            | Filler_5            | Filler_5            |
| Matrass_J           | Sportsshoe_J        | Toothpaste_J        | Detergent_J         | Wc_J                |
| Wc_TI               | Matrass_TI          | Sportsshoe_TI       | Toothpaste_TI       | Detergent_TI        |
| Filler_6            | Filler_6            | Filler_6            | Filler_6            | Filler_6            |
| Filler_7            | Filler_7            | Filler_7            | Filler_7            | Filler_7            |
| Detergent_R         | Wc_R                | Matrass_R           | Sportsshoe_R        | Toothpaste_R        |
| Filler_8            | Filler_8            | Filler_8            | Filler_8            | Filler_8            |
| Toothpaste_F        | Detergent_F         | Wc_F                | Matrass_F           | Sportsshoe_F        |
| Filler_9            | Filler_9            | Filler_9            | Filler_9            | Filler_9            |
| Sportsshoe_SI       | Toothpaste_SI       | Detergent_SI        | Wc_SI               | Matrass_SI          |
| Filler_10           | Filler_10           | Filler_10           | Filler_10           | Filler_10           |

*Notes.* SI = Source integration, TI = Target integration

## Appendix E: Stimuli and fillers main experiment



**Appendix F: Questionnaire of the main experiment in Dutch**

Naam: .....

Leeftijd: .....

Geslacht:

- ☐ Man
- ☐ Vrouw

Hoogst genoten / huidige opleiding:

- ☐ VMBO
- ☐ MAVO
- ☐ HAVO
- ☐ VWO
- ☐ MBO/MBS
- ☐ HBO/HBS
- ☐ WO

Ik vind het afgebeelde in de advertentie:

Lelijk                                      1—2—3—4—5—6—7                                      Mooi

Ik vind het afgebeelde in de advertentie:

Onaantrekkelijk                                      1—2—3—4—5—6—7                                      Aantrekkelijk

Ik vind het afgebeelde in de advertentie:

Vervelend om naar te kijken    1—2—3—4—5—6—7                                      Aangenaam om naar te kijken

Ik vind het afgebeelde in de advertentie:

Niet prettig om te zien                      1—2—3—4—5—6—7                                      Prettig om te zien

Ik vind het afgebeelde in de advertentie:

Niet fijn om naar te kijken    1—2—3—4—5—6—7                                      Fijn om naar te kijken

Ik vind het afgebeelde in de advertentie saai.

Helemaal mee oneens                      1—2—3—4—5—6—7                                      Helemaal mee eens

Ik vind het afgebeelde in de advertentie plezierig.

|                     |               |                   |
|---------------------|---------------|-------------------|
| Helemaal mee oneens | 1—2—3—4—5—6—7 | Helemaal mee eens |
|---------------------|---------------|-------------------|

Ik vind het afgebeelde in de advertentie interessant.

|                     |               |                   |
|---------------------|---------------|-------------------|
| Helemaal mee oneens | 1—2—3—4—5—6—7 | Helemaal mee eens |
|---------------------|---------------|-------------------|

Ik vind het afgebeelde in de advertentie onplezierig.

|                     |               |                   |
|---------------------|---------------|-------------------|
| Helemaal mee oneens | 1—2—3—4—5—6—7 | Helemaal mee eens |
|---------------------|---------------|-------------------|

Ik vind het afgebeelde in de advertentie verwarrend.

|                     |               |                   |
|---------------------|---------------|-------------------|
| Helemaal mee oneens | 1—2—3—4—5—6—7 | Helemaal mee eens |
|---------------------|---------------|-------------------|

Ik vind het afgebeelde in de advertentie:

|                   |               |                 |
|-------------------|---------------|-----------------|
| Slecht herkenbaar | 1—2—3—4—5—6—7 | Goed herkenbaar |
|-------------------|---------------|-----------------|

|                       |               |                        |
|-----------------------|---------------|------------------------|
| Moeilijk te begrijpen | 1—2—3—4—5—6—7 | Makkelijk te begrijpen |
|-----------------------|---------------|------------------------|

Voor welk product was deze advertentie?

.....

Leg kort in je eigen woorden uit wat de advertentie over dit product wil zeggen.

.....

Nadenken over wat ik heb gezien vond ik:

|           |               |      |
|-----------|---------------|------|
| Niet leuk | 1—2—3—4—5—6—7 | Leuk |
|-----------|---------------|------|

Proberen de boodschap van de advertentie te achterhalen vond ik:

|           |               |      |
|-----------|---------------|------|
| Niet leuk | 1—2—3—4—5—6—7 | Leuk |
|-----------|---------------|------|

## Appendix G: Assumptions

### Assumptions repeated measures ANOVA.

Table 16

*Z-scores of Skewness and Kurtosis and the Kolmogorov-Smirnov test for normality for*

*Repeated measures ANOVA*

|                    | Z-score Skewness | Z-score Kurtosis | K-S test |     |          |
|--------------------|------------------|------------------|----------|-----|----------|
|                    |                  |                  | <i>D</i> | DF  | <i>p</i> |
| Aesthetic pleasure | 0.31             | 0.51             | .071     | 164 | .045     |
| Interest           | 0.39             | 0.51             | .056     | 164 | .200     |
| Fluency            | 1.97             | 0.76             | .075     | 164 | .026     |

*Notes.* Lilliefors significance correction was applied

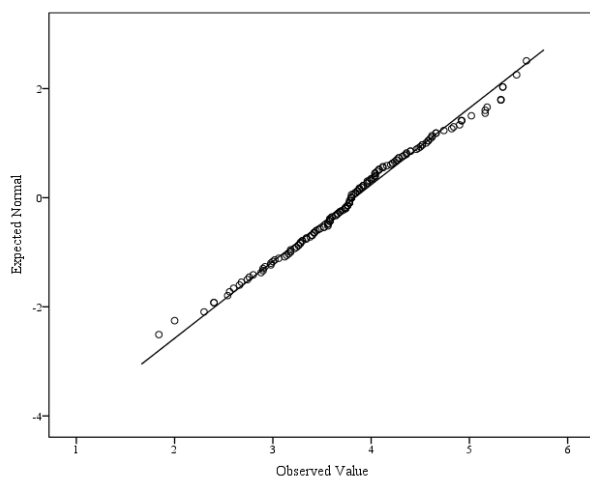


Figure 11. Q-Q plot for aesthetic pleasure

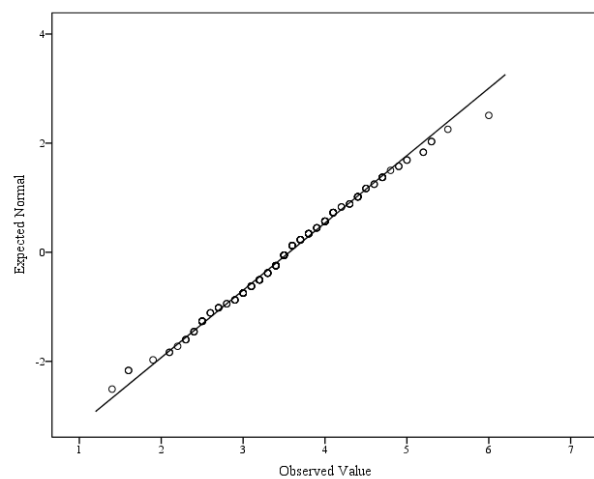


Figure 12. Q-Q plot for interest

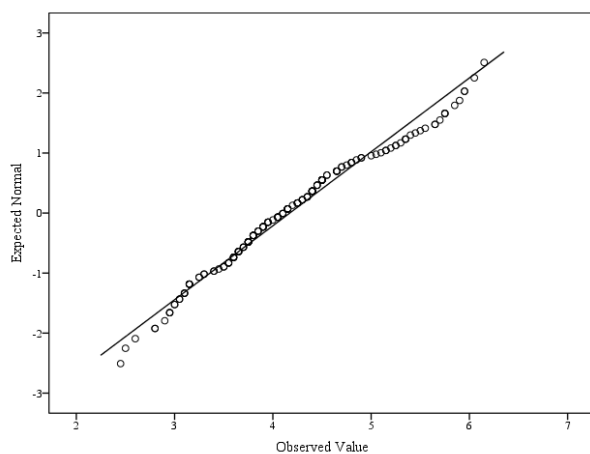


Figure 13. Q-Q plot for processing fluency

Table 17

*Assumption of homogeneity: Levene's test of equality of error variances – Repeated measures ANOVA*

|                    |                    | F value | Degrees of freedom | Significance |
|--------------------|--------------------|---------|--------------------|--------------|
| Aesthetic pleasure | Juxtaposition      | 2.902   | 1, 162             | .090         |
|                    | Fusion             | 3.389   | 1, 162             | .067         |
|                    | Source integration | 5.935   | 1, 162             | .016         |
|                    | Target integration | 0.402   | 1, 162             | .527         |
|                    | Replacement        | 0.386   | 1, 162             | .535         |
| Interest           | Juxtaposition      | 0.641   | 1, 162             | .425         |
|                    | Fusion             | 1.159   | 1, 162             | .283         |
|                    | Source integration | 0.001   | 1, 162             | .981         |
|                    | Target integration | 0.343   | 1, 162             | .559         |
|                    | Replacement        | 0.214   | 1, 162             | .644         |
| Fluency            | Juxtaposition      | 0.260   | 1, 162             | .611         |
|                    | Fusion             | 0.731   | 1, 162             | .394         |
|                    | Source integration | 2.037   | 1, 162             | .155         |
|                    | Target integration | 0.059   | 1, 162             | .808         |
|                    | Replacement        | 0.003   | 1, 162             | .958         |

**Assumptions MANOVA.**

Table 18

*Assumption of homogeneity of covariance matrices for MANOVA: Box's test of equality of covariance matrices – significances*

|                      | Total | 100ms | 5000ms |
|----------------------|-------|-------|--------|
| Juxtaposition 1      | .008  | .010  | .495   |
| Juxtaposition 2      | .239  | .304  | .860   |
| Fusion 1             | .009  | .463  | .232   |
| Fusion 2             | .436  | .959  | -      |
| Source integration 1 | .041  | .079  | .179   |
| Source integration 2 | .011  | .248  | .112   |
| Target integration 1 | .080  | .888  | .014   |
| Target integration 2 | .171  | .460  | .347   |
| Replacement 1        | .258  | -     | .832   |
| Replacement 2        | .993  | -     | .259   |

*Notes.* - = fewer than two nonsingular cell covariance matrices (all incorrect at 100ms for Replacement, 3 incorrect at 5000ms for Fusion 2)

Table 19

*Univariate tests of equality of variances between groups using Levene's test as a preliminary check for the Box's test of equality of covariance matrices: Levene's significances plus F-value at violation*

|                      |                    | Total                   | 100ms                | 5000ms               |
|----------------------|--------------------|-------------------------|----------------------|----------------------|
| Juxtaposition 1      | Aesthetic pleasure | .479                    | .775                 | .047 ( $F = 4.080$ ) |
|                      | Interest           | .470                    | .924                 | .458                 |
|                      | Fluency            | .271                    | .017 ( $F = 5.946$ ) | .418                 |
| Juxtaposition 2      | Aesthetic pleasure | .218                    | .756                 | .463                 |
|                      | Interest           | .532                    | .999                 | .628                 |
|                      | Fluency            | .066                    | .241                 | .110                 |
| Fusion 1             | Aesthetic pleasure | .001 ( $F = 11.370$ )   | .122                 | .883                 |
|                      | Interest           | .888                    | .605                 | .259                 |
|                      | Fluency            | .057                    | .938                 | .014 ( $F = 6.259$ ) |
| Fusion 2             | Aesthetic pleasure | .161                    | .946                 | .428                 |
|                      | Interest           | .633                    | .552                 | .636                 |
|                      | Fluency            | .614                    | .489                 | .136                 |
| Source integration 1 | Aesthetic pleasure | .481                    | .079                 | .145                 |
|                      | Interest           | .313.                   | .220                 | .212                 |
|                      | Fluency            | .150                    | .127                 | .042 ( $F = 4.271$ ) |
| Source integration 2 | Aesthetic pleasure | .120                    | .776                 | .399                 |
|                      | Interest           | .555                    | .448                 | .446                 |
|                      | Fluency            | < .001 ( $F = 24.132$ ) | .004 ( $F = 8.590$ ) | .005 ( $F = 8.180$ ) |
| Target integration 1 | Aesthetic pleasure | .480                    | .777                 | .318                 |
|                      | Interest           | .829                    | .628                 | .741                 |
|                      | Fluency            | .563                    | .097                 | .427                 |
| Target integration 2 | Aesthetic pleasure | .911                    | .849                 | .598                 |
|                      | Interest           | .915                    | .550                 | .687                 |
|                      | Fluency            | .185                    | .076                 | .575                 |
| Replacement 1        | Aesthetic pleasure | .668                    | -                    | .375                 |
|                      | Interest           | .975                    | -                    | .794                 |
|                      | Fluency            | .069                    | -                    | .301                 |
| Replacement 2        | Aesthetic pleasure | .827                    | -                    | .883                 |
|                      | Interest           | .484                    | -                    | .436                 |
|                      | Fluency            | .565                    | -                    | .846                 |

Notes. - = less than two nonempty groups

Table 20

*Univariate normality for each dependent variable in turn for the assumption of multivariate normality for MANOVA: Kolmogorov-Smirnov test in which Lilliefors significance correction is applied*

|              |           | Total    |     |          | 100ms    |    |          | 5000ms   |    |          |
|--------------|-----------|----------|-----|----------|----------|----|----------|----------|----|----------|
|              |           | <i>D</i> | df  | <i>p</i> | <i>D</i> | df | <i>p</i> | <i>D</i> | df | <i>p</i> |
| J1 Interest  | Incorrect | .184     | 70  | <.001    | .199     | 57 | <.001    | .189     | 13 | .200     |
|              | Correct   | .162     | 94  | <.001    | .182     | 24 | .038     | .170     | 70 | <.001    |
| J1 AP        | Incorrect | .123     | 70  | .011     | .121     | 57 | .038     | .127     | 13 | .200     |
|              | Correct   | .081     | 94  | .152     | .144     | 24 | .200     | .088     | 70 | .200     |
| J1 Fluency   | Incorrect | .140     | 70  | .002     | .126     | 57 | .025     | .180     | 13 | .200     |
|              | Correct   | .140     | 94  | <.001    | .193     | 24 | .021     | .124     | 70 | .009     |
| J2 Interest  | Incorrect | .146     | 46  | .016     | .149     | 41 | .023     | .141     | 5  | .200     |
|              | Correct   | .223     | 118 | <.001    | .222     | 40 | <.001    | .225     | 78 | <.001    |
| J2 AP        | Incorrect | .181     | 46  | .001     | .182     | 41 | .002     | .377     | 5  | .019     |
|              | Correct   | .068     | 118 | .200     | .084     | 40 | .200     | .075     | 78 | .200     |
| J2 Fluency   | Incorrect | .142     | 46  | .021     | .130     | 41 | .081     | .331     | 5  | .076     |
|              | Correct   | .185     | 118 | <.001    | .201     | 40 | <.001    | .176     | 78 | <.001    |
| F1 Interest  | Incorrect | .144     | 79  | <.001    | .132     | 68 | .005     | .203     | 11 | .200     |
|              | Correct   | .199     | 85  | <.001    | .190     | 13 | .200     | .198     | 72 | <.001    |
| F1 AP        | Incorrect | .129     | 79  | .002     | .126     | 68 | .009     | .169     | 11 | .200     |
|              | Correct   | .107     | 85  | .018     | .110     | 13 | .200     | .123     | 72 | .009     |
| F1 Fluency   | Incorrect | .119     | 79  | .007     | .126     | 68 | .009     | .239     | 11 | .079     |
|              | Correct   | .125     | 85  | .002     | .165     | 13 | .200     | .115     | 72 | .019     |
| F2 Interest  | Incorrect | .189     | 51  | <.001    | .190     | 48 | <.001    | .235     | 3  | -        |
|              | Correct   | .160     | 113 | <.001    | .219     | 33 | <.001    | .193     | 80 | <.001    |
| F2 AP        | Incorrect | .116     | 51  | .086     | .120     | 48 | .083     | .385     | 3  | -        |
|              | Correct   | .067     | 113 | .200     | .094     | 33 | .200     | .084     | 80 | .200     |
| F2 Fluency   | Incorrect | .158     | 51  | .003     | .165     | 48 | .002     | .175     | 3  | -        |
|              | Correct   | .161     | 113 | <.001    | .111     | 33 | .200     | .151     | 80 | <.001    |
| SI1 Interest | Incorrect | .185     | 81  | <.001    | .204     | 71 | <.001    | .210     | 10 | .200     |
|              | Correct   | .189     | 83  | <.001    | .329     | 10 | .003     | .174     | 73 | <.001    |
| SI1 AP       | Incorrect | .096     | 81  | .064     | .092     | 71 | .200     | .236     | 10 | .123     |
|              | Correct   | .096     | 83  | .057     | .146     | 10 | .200     | .105     | 73 | .046     |
| SI1 Fluency  | Incorrect | .165     | 81  | <.001    | .142     | 71 | .001     | .324     | 10 | .004     |
|              | Correct   | .122     | 83  | .004     | .214     | 10 | .200     | .139     | 73 | .001     |
| SI2 Interest | Incorrect | .192     | 71  | <.001    | .173     | 54 | <.001    | .246     | 17 | .008     |
|              | Correct   | .155     | 93  | <.001    | .275     | 27 | <.001    | .168     | 66 | <.001    |
| SI2 AP       | Incorrect | .089     | 71  | .200     | .074     | 54 | .200     | .170     | 17 | .200     |
|              | Correct   | .061     | 93  | .200     | .100     | 27 | .200     | .073     | 66 | .200     |
| SI2 Fluency  | Incorrect | .151     | 71  | <.001    | .155     | 54 | .002     | .187     | 17 | .117     |
|              | Correct   | .171     | 93  | <.001    | .236     | 27 | <.001    | .173     | 66 | <.001    |
| TI1 Interest | Incorrect | .155     | 107 | <.001    | .162     | 74 | <.001    | .148     | 33 | .063     |
|              | Correct   | .179     | 57  | <.001    | .172     | 7  | .200     | .185     | 50 | <.001    |
| TI1 AP       | Incorrect | .091     | 107 | .028     | .078     | 74 | .200     | .190     | 33 | .004     |
|              | Correct   | .077     | 57  | .200     | .272     | 7  | .126     | .093     | 50 | .200     |
| TI1 Fluency  | Incorrect | .153     | 107 | <.001    | .138     | 74 | .001     | .206     | 33 | .001     |
|              | Correct   | .173     | 57  | <.001    | .229     | 7  | .200     | .163     | 50 | .002     |
| TI2 Interest | Incorrect | .201     | 113 | <.001    | .161     | 68 | <.001    | .260     | 45 | <.001    |
|              | Correct   | .177     | 51  | <.001    | .296     | 13 | .003     | .142     | 38 | .050     |

|             |           |      |     |       |      |    |       |      |    |       |
|-------------|-----------|------|-----|-------|------|----|-------|------|----|-------|
| TI2 AP      | Incorrect | .061 | 113 | .200  | .082 | 68 | .200  | .083 | 45 | .200  |
|             | Correct   | .108 | 51  | .196  | .211 | 13 | .119  | .110 | 38 | .200  |
| TI2 Fluency | Incorrect | .165 | 113 | <.001 | .152 | 68 | <.001 | .183 | 45 | .001  |
|             | Correct   | .116 | 51  | .086  | .194 | 13 | .196  | .137 | 38 | .068  |
| R1 Interest | Incorrect | .201 | 115 | <.001 | .204 | 81 | <.001 | .190 | 34 | .003  |
|             | Correct   | .165 | 49  | .002  | -    | -  | -     | .165 | 49 | .002  |
| R1 AP       | Incorrect | .098 | 115 | .009  | .107 | 81 | .022  | .105 | 34 | .200  |
|             | Correct   | .089 | 49  | .200  | -    | -  | -     | .089 | 49 | .200  |
| R1 Fluency  | Incorrect | .121 | 115 | <.001 | .138 | 81 | .001  | .146 | 34 | .063  |
|             | Correct   | .147 | 49  | .010  | -    | -  | -     | .147 | 49 | .010  |
| R2 Interest | Incorrect | .144 | 99  | <.001 | .153 | 81 | <.001 | .195 | 18 | .068  |
|             | Correct   | .208 | 65  | <.001 | -    | -  | -     | .208 | 65 | <.001 |
| R2 AP       | Incorrect | .086 | 99  | .068  | .090 | 81 | .157  | .220 | 18 | .021  |
|             | Correct   | .084 | 65  | .200  | -    | -  | -     | .084 | 65 | .200  |
| R2 Fluency  | Incorrect | .136 | 99  | <.001 | .160 | 81 | <.001 | .171 | 18 | .176  |
|             | Correct   | .126 | 65  | .012  | -    | -  | -     | .126 | 65 | .012  |

*Notes.* J = Juxtaposition, F = Fusion, SI = Source integration, TI = Target integration, R = Replacement, AP = Aesthetic pleasure, values in grey involve lower bound of the true significance

**Appendix H: Tables and figures of the main experiment**

Table 3

*Means and standard deviations of total felt fluency and felt fluency per exposure time for each metaphor*

|                      | Not<br>comprehended | Comprehended | Effect                        |
|----------------------|---------------------|--------------|-------------------------------|
| Juxtaposition 1      | 3.28 (1.62)         | 4.50 (1.78)  | $F(1, 162) = 20.56, p < .001$ |
| At 100ms             | 3.04 (1.47)         | 4.50 (1.76)  | $F(1, 79) = 13.43, p < .001$  |
| At 5000ms            | 4.31 (1.91)         | 4.49 (1.72)  | $F(1, 79) < 1$                |
| Juxtaposition 2      | 3.38 (1.47)         | 5.49 (1.24)  | $F(1, 162) = 85.82, p < .001$ |
| At 100ms             | 3.38 (1.45)         | 5.25 (1.25)  | $F(1, 79) = 38.68, p < .001$  |
| At 5000ms            | 3.40 (1.78)         | 5.61 (1.23)  | $F(1, 79) = 14.39, p < .001$  |
| Fusion 1             | 3.41 (1.74)         | 5.18 (1.38)  | $F(1, 162) = 52.58, p < .001$ |
| At 100ms             | 3.16 (1.55)         | 4.77 (1.59)  | $F(1, 79) = 11.66, p = .001$  |
| At 5000ms            | 4.91 (2.15)         | 5.25 (1.34)  | $F(1, 79) < 1$                |
| Fusion 2             | 2.82 (1.66)         | 5.12 (1.61)  | $F(1, 162) = 70.35, p < .001$ |
| At 100ms             | 2.78 (1.70)         | 4.18 (1.84)  | $F(1, 79) = 12.40, p = .001$  |
| At 5000ms            | 3.50 (0.50)         | 5.51 (1.33)  | $F(1, 79) = 6.75, p = .011$   |
| Source integration 1 | 3.09 (1.87)         | 4.75 (1.68)  | $F(1, 162) = 35.69, p < .001$ |
| At 100ms             | 3.05 (1.80)         | 3.30 (1.75)  | $F(1, 79) < 1$                |
| At 5000ms            | 3.40 (2.35)         | 4.95 (1.62)  | $F(1, 79) = 7.10, p = .009$   |
| Source integration 2 | 4.22 (1.92)         | 5.31 (1.31)  | $F(1, 162) = 18.57, p < .001$ |
| At 100ms             | 4.44 (1.85)         | 5.50 (1.27)  | $F(1, 79) = 7.09, p = .009$   |
| At 5000ms            | 3.50 (2.00)         | 5.23 (1.33)  | $F(1, 79) = 18.19, p < .001$  |
| Target integration 1 | 2.99 (1.73)         | 4.14 (1.50)  | $F(1, 162) = 18.10, p < .001$ |
| At 100ms             | 2.84 (1.68)         | 5.07 (1.06)  | $F(1, 79) = 11.79, p = .001$  |
| At 5000ms            | 3.32 (1.81)         | 4.01 (1.52)  | $F(1, 79) = 3.54, p = .063$   |
| Target integration 2 | 3.45 (1.77)         | 4.66 (1.58)  | $F(1, 162) = 17.60, p < .001$ |
| At 100ms             | 3.47 (1.75)         | 4.73 (1.36)  | $F(1, 79) = 6.01, p = .016$   |
| At 5000ms            | 3.41 (1.81)         | 4.63 (1.66)  | $F(1, 79) = 10.13, p = .002$  |
| Replacement 1        | 4.40 (1.90)         | 3.23 (1.59)  | $F(1, 162) = 14.23, p < .001$ |
| At 100ms             | 4.86 (1.75)         | -            | -                             |
| At 5000ms            | 3.32 (1.84)         | 3.23 (1.59)  | $F(1, 79) < 1$                |
| Replacement 2        | 4.17 (1.98)         | 3.95 (1.89)  | $F(1, 79) < 1$                |
| At 100ms             | 4.33 (1.97)         | -            | -                             |
| At 5000ms            | 3.47 (1.89)         | 3.95 (1.89)  | $F(1, 79) < 1$                |

*Notes.* Nonsignificant effects are in grey

Table 4.

*Mediation analysis for felt fluency on aesthetic pleasure at 100ms*

|                 | Indirect           | Path a             | Path b            | Direct             | Total              |
|-----------------|--------------------|--------------------|-------------------|--------------------|--------------------|
| Fusion          | $b = .023,$        | $b = .503,$        | $b = .046,$       | $b = .200,$        | $b = .224,$        |
| - Juxtaposition | $[-0.065, 0.146]$  | $[0.136, 0.870]$   | $[-0.104, 0.197]$ | $[-0.059, 0.460]$  | $[-0.023, 0.470]$  |
| Replacement     | $b = -.193,$       | $b = -.704,$       | $b = .274,$       | $b = .071,$        | $b = -.122,$       |
| - Juxtaposition | $[-0.359, -0.063]$ | $[-1.152, -0.256]$ | $[0.145, 0.403]$  | $[-0.203, 0.345]$  | $[-0.406, 0.161]$  |
| S Int.          | $b = -.011,$       | $b = -.050,$       | $b = .212,$       | $b = -.324,$       | $b = -.335,$       |
| - Juxtaposition | $[-0.105, 0.073]$  | $[-0.436, 0.337]$  | $[0.104, 0.320]$  | $[-0.511, -0.137]$ | $[-0.539, -0.130]$ |
| T Int.          | $b = .075,$        | $b = .537,$        | $b = .140,$       | $b = -.246,$       | $b = -.170,$       |
| - Juxtaposition | $[-0.009, 0.187]$  | $[0.131, 0.944]$   | $[0.004, 0.276]$  | $[-0.505, 0.014]$  | $[-0.442, 0.082]$  |
| Replacement     | $b = -.143,$       | $b = -1.207,$      | $b = .119,$       | $b = -.203,$       | $b = -.346,$       |
| - Fusion        | $[-0.351, 0.065]$  | $[-1.621, -0.792]$ | $[-0.034, 0.271]$ | $[-0.541, 0.136]$  | $[-0.632, -0.059]$ |
| S Int.          | $b = -.136,$       | $b = -.553,$       | $b = .247,$       | $b = -.422,$       | $b = -.558,$       |
| - Fusion        | $[-0.293, -0.030]$ | $[-0.903, -0.202]$ | $[0.105, 0.388]$  | $[-0.657, -0.186]$ | $[-0.799, -0.317]$ |
| T Int.          | $b = .004,$        | $b = .034,$        | $b = .120,$       | $b = -.398,$       | $b = -.394,$       |
| - Fusion        | $[-0.053, 0.061]$  | $[-0.353, 0.421]$  | $[-0.034, 0.274]$ | $[-0.665, -0.130]$ | $[-0.662, -0.126]$ |
| S Int.          | $b = .218,$        | $b = .654,$        | $b = .333,$       | $b = -.430,$       | $b = -.212,$       |
| - Replacement   | $[0.061, 0.442]$   | $[0.286, 1.023]$   | $[0.176, 0.489]$  | $[-0.706, -0.154]$ | $[-0.493, 0.069]$  |
| T Int.          | $b = .319,$        | $b = 1.241,$       | $b = .257,$       | $b = -.368,$       | $b = -.048,$       |
| - Replacement   | $[0.081, 0.567]$   | $[0.828, 1.654]$   | $[0.108, 0.406]$  | $[-0.700, -0.035]$ | $[-0.341, 0.245]$  |
| T Int.          | $b = .089,$        | $b = .586,$        | $b = .152,$       | $b = .075,$        | $b = .164,$        |
| - S Int.        | $[0.009, 0.213]$   | $[0.194, 0.979]$   | $[0.015, 0.289]$  | $[-0.179, 0.329]$  | $[-0.081, 0.409]$  |

Notes. S Int. = Source integration, T Int. = Target integration, Path a =  $X \rightarrow M_{diff}$ , Path b =  $M_{diff} \rightarrow Y_{diff}$

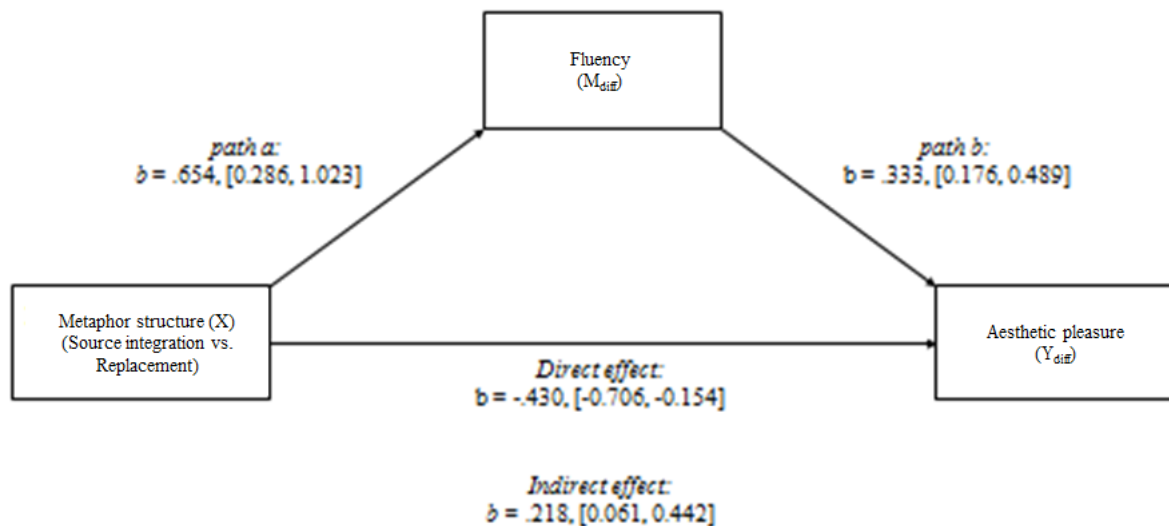


Figure 8. Mediator model for Source integration versus Replacement at 100ms as a visual example of the paths

Table 5.

*Mediation analysis for felt fluency on aesthetic pleasure at 5000ms*

|                 | Indirect           | Path a             | Path b            | Direct             | Total              |
|-----------------|--------------------|--------------------|-------------------|--------------------|--------------------|
| Fusion          | $b = -.131,$       | $b = -.349,$       | $b = .375,$       | $b = -.307,$       | $b = -.437,$       |
| - Juxtaposition | $[-0.277, -0.021]$ | $[-0.641, -0.058]$ | $[0.163, 0.587]$  | $[-0.596, -0.017]$ | $[-0.740, -0.135]$ |
| Replacement     | $b = .113,$        | $b = 1.410,$       | $b = .080,$       | $b = .076,$        | $b = .189,$        |
| - Juxtaposition | $[-0.081, 0.302]$  | $[1.041, 1.780]$   | $[-0.060, 0.220]$ | $[-0.229, 0.382]$  | $[-0.043, 0.421]$  |
| S Int.          | $b = .043,$        | $b = .154,$        | $b = .282,$       | $b = -.254,$       | $b = -.211,$       |
| - Juxtaposition | $[-0.044, 0.141]$  | $[-0.158, 0.465]$  | $[0.116, 0.448]$  | $[-0.490, -0.018]$ | $[-0.472, 0.501]$  |
| T Int.          | $b = .160,$        | $b = 1.118,$       | $b = .143,$       | $b = -.118,$       | $b = .042,$        |
| - Juxtaposition | $[-0.013, 0.312]$  | $[0.784, 1.451]$   | $[-0.020, 0.307]$ | $[-0.424, 0.188]$  | $[-0.205, 0.289]$  |
| Replacement     | $b = .769,$        | $b = 1.759,$       | $b = .437,$       | $b = -.142,$       | $b = .627,$        |
| - Fusion        | $[0.429, 1.195]$   | $[1.379, 2.139]$   | $[0.277, 0.598]$  | $[-0.533, 0.284]$  | $[0.315, 0.938]$   |
| S Int.          | $b = .148,$        | $b = .503,$        | $b = .295,$       | $b = .078,$        | $b = .227,$        |
| - Fusion        | $[0.048, 0.284]$   | $[0.195, 0.811]$   | $[0.122, 0.467]$  | $[-0.176, 0.333]$  | $[-0.027, 0.480]$  |
| T Int.          | $b = .491,$        | $b = 1.467,$       | $b = .335,$       | $b = -.011,$       | $b = .480,$        |
| - Fusion        | $[0.208, 0.803]$   | $[1.137, 1.797]$   | $[0.155, 0.514]$  | $[-0.383, 0.361]$  | $[0.194, 0.765]$   |
| S Int.          | $b = -.339,$       | $b = -1.256,$      | $b = .270,$       | $b = -.061,$       | $b = -.400,$       |
| - Replacement   | $[-0.650, -0.096]$ | $[-1.624, -0.888]$ | $[0.104, 0.436]$  | $[-0.407, 0.286]$  | $[-0.693, -0.107]$ |
| T Int.          | $b = -.057,$       | $b = -.292,$       | $b = .196,$       | $b = -.090,$       | $b = -.147,$       |
| - Replacement   | $[-0.158, 0.011]$  | $[-0.646, 0.062]$  | $[0.036, 0.356]$  | $[-0.351, 0.172]$  | $[-0.411, 0.117]$  |
| T Int.          | $b = .070,$        | $b = .964,$        | $b = .073,$       | $b = .183,$        | $b = .253,$        |
| - S Int.        | $[-0.090, 0.244]$  | $[0.621, 1.307]$   | $[-0.077, 0.223]$ | $[-0.092, 0.458]$  | $[0.020, 0.486]$   |

Notes. S Int. = Source integration, T Int. = Target integration, Path a =  $X \rightarrow M_{\text{diff}}$ , Path b =  $M_{\text{diff}} \rightarrow Y_{\text{diff}}$

Table 6.

*Mediation analysis for felt fluency on interest at 5000ms*

|                 | Indirect effect    | Path a             | Path b            | Direct effect      | Total effect       |
|-----------------|--------------------|--------------------|-------------------|--------------------|--------------------|
| Fusion          | $b = -.173,$       | $b = -.349,$       | $b = .494,$       | $b = -.454,$       | $b = -.627,$       |
| - Juxtaposition | $[-0.390, -0.022]$ | $[-0.641, -0.058]$ | $[0.259, 0.730]$  | $[-0.777, -0.131]$ | $[-0.968, -0.286]$ |
| Replacement     | $b = .267,$        | $b = 1.410,$       | $b = .189,$       | $b = .384,$        | $b = .651,$        |
| - Juxtaposition | $[0.024, 0.517]$   | $[1.040, 1.780]$   | $[0.005, 0.373]$  | $[-0.016, 0.784]$  | $[0.339, 0.962]$   |
| S Int.          | $b = .059,$        | $b = .154,$        | $b = .381,$       | $b = -.336,$       | $b = -.277,$       |
| - Juxtaposition | $[-0.056, 0.189]$  | $[-0.158, 0.465]$  | $[0.177, 0.584]$  | $[-0.625, -0.046]$ | $[-0.589, 0.035]$  |
| T Int.          | $b = .458,$        | $b = 1.118,$       | $b = .409,$       | $b = -.488,$       | $b = -.030,$       |
| - Juxtaposition | $[0.195, 0.736]$   | $[0.784, 1.451]$   | $[0.216, 0.603]$  | $[-0.849, -0.126]$ | $[-0.347, 0.287]$  |
| Replacement     | $b = .777,$        | $b = 1.759,$       | $b = .441,$       | $b = .501,$        | $b = 1.277,$       |
| - Fusion        | $[0.448, 1.172]$   | $[1.379, 2.139]$   | $[0.268, 0.615]$  | $[0.080, 0.922]$   | $[0.946, 1.609]$   |
| S Int.          | $b = .065,$        | $b = .503,$        | $b = .129,$       | $b = .0285,$       | $b = .349,$        |
| - Fusion        | $[-0.026, 0.177]$  | $[0.195, 0.811]$   | $[-0.047, 0.304]$ | $[0.025, 0.544]$   | $[0.105, 0.593]$   |
| T Int.          | $b = .551,$        | $b = 1.467,$       | $b = .376,$       | $b = .054,$        | $b = .596,$        |
| - Fusion        | $[0.260, 0.866]$   | $[1.137, 1.797]$   | $[0.187, 0.565]$  | $[-0.347, 0.438]$  | $[0.297, 0.896]$   |
| S Int.          | $b = -.287,$       | $b = -1.256,$      | $b = .229,$       | $b = -.641,$       | $b = -.928,$       |
| - Replacement   | $[-0.571, -0.032]$ | $[-1.624, -0.888]$ | $[0.063, 0.394]$  | $[-0.986, -0.295]$ | $[-1.214, -0.642]$ |
| T Int.          | $b = -.025,$       | $b = -.292,$       | $b = .086,$       | $b = -.656,$       | $b = -.681,$       |
| - Replacement   | $[-0.096, 0.024]$  | $[-0.646, 0.062]$  | $[-0.082, 0.255]$ | $[-0.931, -0.380]$ | $[-0.951, -0.411]$ |
| T Int.          | $b = .085,$        | $b = .964,$        | $b = .089,$       | $b = .162,$        | $b = .247,$        |
| - S Int.        | $[-0.049, 0.235]$  | $[0.621, 1.307]$   | $[-0.058, 0.235]$ | $[-0.106, 0.429]$  | $[0.019, 0.475]$   |

Notes. S Int. = Source integration, T Int. = Target integration, Path a =  $X \rightarrow M_{\text{diff}}$ , Path b =  $M_{\text{diff}} \rightarrow Y_{\text{diff}}$

Table 7

*Percentages of correct product recognition and confidence intervals at 95% of all metaphor structures, per metaphor and when products of the metaphor structure were recognised (1 +2)*

|                          | <u>100ms</u>      |              | <u>5000ms</u>     |               |
|--------------------------|-------------------|--------------|-------------------|---------------|
|                          | % correct         | 95% CI       | % correct         | 95% CI        |
| Juxtaposition 1          | 45.7              | [35.8, 55.6] | 92.8              | [86.7, 97.6]  |
| Juxtaposition 2          | 53.1              | [42.0, 64.2] | 95.2              | [90.4, 98.8]  |
| Juxtaposition 1 + 2      | 24.7 <sup>a</sup> | [16.0, 33.3] | 88.0 <sup>a</sup> | [80.7, 95.2]  |
| Fusion 1                 | 18.5              | [11.1, 27.2] | 96.4              | [91.6, 100.0] |
| Fusion 2                 | 53.1 <sup>1</sup> | [42.0, 64.2] | 95.2              | [90.4, 98.8]  |
| Fusion 1 +2              | 11.1 <sup>a</sup> | [4.9, 18.5]  | 91.6              | [84.4, 97.6]  |
| Source integration 1     | 24.7              | [16.0, 34.5] | 92.8              | [86.8, 97.6]  |
| Source integration 2     | 53.1 <sup>1</sup> | [42.0, 65.2] | 84.3              | [75.9, 92.8]  |
| Source integration 1 + 2 | 13.6 <sup>a</sup> | [6.2, 21.0]  | 78.3              | [68.7, 86.7]  |
| Target integration 1     | 18.5              | [9.9, 27.2]  | 95.2              | [90.4, 98.8]  |
| Target integration 2     | 39.5 <sup>1</sup> | [28.4, 50.6] | 83.1              | [74.7, 91.6]  |
| Target integration 1 + 2 | 11.1 <sup>a</sup> | [4.9, 18.5]  | 78.3              | [68.7, 86.7]  |
| Replacement 1            | 0.0               | [0.0, 0.0]   | 65.1              | [54.2, 74.7]  |
| Replacement 2            | 1.2               | [0.0, 3.7]   | 86.7 <sup>1</sup> | [78.3, 94.0]  |
| Replacement 1 +2         | 0.0               | [0.0, 0.0]   | 62.7              | [51.8, 73.5]  |

*Notes.* Product recognition of all metaphor structures was significantly higher at 5000ms than at 100ms, per column: <sup>a</sup> = significantly higher than Replacement 1+2, <sup>1</sup> = significant higher than metaphor structure 1