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Shape congruence in product design: Impacts on automatically activated attitudes

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ABSTRACT

Scientific studies have strongly emphasized the importance of automatic (unconscious) processes underlying consumers' behavior. However, research is missing on automatically activated attitudes resulting from product design. This study aimed at examining such attitudes by relying primarily on evaluative priming methods (i.e., affective priming task, and lexical decision task combined with a semantic priming procedure). In line with a processing fluency framework, it provides evidence that shape-congruent (vs. shape-incongruent) product designs may be associated with a more positive affective response and a greater activation of trust-related perceptions. Important implications are involved for retailing and professionals in charge of product management.

1. Introduction

Design is everywhere and definitely matters in marketing. For many years now, it has been recognized that the appearance of a product is a key determinant of marketing and sales success (e.g., Black and Baker, 1987; Bloch, 1995; Bruce and Whitehead, 1988; Gemser and Leenders, 2001; Mugge et al., 2018; Roy, 1994; Simonson and Schmitt, 1997). This is especially the case in most of today's societies marked by extensive advertising exposure and the self-service economy, where products and their packaging are often the unique medium between consumers and the brand products at the time the purchase decision is made. Research on the influence of product design on consumers' reactions is therefore highly valuable for designers and marketers, and definitely deserves attention in the scientific community.

While different roles of product design have been proposed (e.g., Becker et al., 2011; Bloch, 1995; Creusen and Schoormans, 2005; Veryzer, 1995), this research addresses in particular the influence of product "aesthetics". It refers to the pleasure derived from seeing the product, based on the "look" of a product (aesthetic responses being primarily emotional; Holbrook, 1980). Another major role of product design relates to how it implicitly conveys meanings to consumers (i.e., values, qualities that are not depicted explicitly, literally; e.g., Childers and Jass, 2002; Huettl and Gierl, 2012; Van Rompay et al., 2005; Zhang et al., 2006). This more cognitive dimension makes product design a great communication tool in many circumstances of everyday life. A large body of research has demonstrated the importance of these affective and meaning-communication functions on brand impression formation and consumers' positive responses towards products, including purchase decisions (e.g., Bloch et al., 2003; Norman, 2004; Favier et al., 2019; Reimann et al., 2010).

Studies have focused on various product design elements, such as color (Becker et al., 2011; Funk and Oly Ndubisi, 2006; Garber et al., 2000; Kauppinen-Räisänen and Luomala, 2010), shape (e.g., van Ooijen et al., 2017), typeface (e.g., Karnal et al., 2016; Velasco et al., 2014) and images (e.g., Ares et al., 2010; Madzharov and Block, 2010; Van Rompay et al., 2014). However, research is missing when it comes to the impact of visual congruence between design elements. The present study addresses this gap by focusing on shape, which is a prominent design element. Specifically, its objective was to examine whether congruence (vs. incongruence) between the shape of the product container and the shape of its label may result in more positive affective reactions and trust-related perceptions.

In addition, the present study was designed to take into account the substantial discrepancy between the huge number of products consumers are exposed to and the very limited resources they have to devote to these exposures (in terms of time, cognitive capacity, or motivation). This discrepancy makes it highly relevant for both researchers and practitioners to focus on whether and how product design can impact consumers at an automatic level that is not reliant on the availability of resources. Therefore, the present study aimed at examining the impact of congruence on consumers' automatic responses using implicit methods (e.g., evaluative priming techniques). In this way it differs from previous research on the impact of product design, which has largely relied on consumers' self-reported, explicit measures.

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This study was conducted with the purpose of making both a managerial and a theoretical contribution. On a practical level, it may provide guidelines for product design management. On a theoretical level, it aims to address the processes underlying the hypothesized positive effects of shape congruence, assuming that these effects result from greater processing ease (i.e., processing fluency theory; see below).

The next section reviews the existing body of studies on shape and congruence in product design. Section 3 is then dedicated to the theoretical framework of the study and its resulting research hypotheses. Section 4 advocates the relevance of using implicit methods for examining these hypotheses and, more generally, the impact of product design. The methods and the research design are described in Section 5, while the resulting findings are reported in Section 6. Finally, Section 7 presents the conclusion of this study, its implications at both theoretical and managerial levels, as well as its limitations and some directions for future research.

2. Literature on shape and congruence

To the best of our knowledge, only a few experimental studies in consumer research have addressed issues related to shape and congruence in product design. Van Rompay and Pruyn (2011) examined shape-typeface congruence in terms of symbolic meanings conveyed. They showed that when bottled water designs had both visual elements connoting a similar meaning (i.e., luxury or casualness in Experiment 1, and masculinity or femininity in Experiment 2) this resulted in higher ratings of price expectations, brand credibility, and brand aesthetics.

Becker et al. (2011) addressed shape-color congruence by examining participants' perceptions (taste intensity, product attitude, and taste expectation) of a yoghurt that combined an angular or rounded shape of the container with higher or lower color saturation level. Congruence was expected for an angular shape paired with a highly saturated color, drawing on previous research suggesting that both are associated with perceptions of potency. For example, it has been shown that angular shapes tend to convey meanings related to energy, toughness, and strength (contrary to rounded shapes; Berlyne, 1976), and that highly saturated colors foster perceptions of stimulus intensity (Schifferstein and Tanudjaja, 2004; Valdez and Mehrabian, 1994). However, the results of their study did not confirm any shape-color congruence effect on participants' perceptions – only positive main effects emerged for the angular shape.

Westerman and colleagues (Westerman et al., 2012, Exp.1) examined the impact of shape-shape congruence on participants' perceptions (mainly aesthetic judgement and purchase likelihood). They presented participants with images of a supposedly new chocolate product whose packaging consisted of a meaningless graphic pattern (angular vs. rounded) on a (angular vs. rounded) box. However, no congruence effect emerged (but just positive main effects of rounded graphics and contours), except with regard to ratings of innovation in design, as participants rated the combination of angular contour and angular graphics as being particularly low on the innovation dimension. These results were mainly confirmed in a second experiment, that applied the "angular vs. rounded graphics on angular vs. rounded containers" manipulation to two different product categories (i.e., water and bleach) with the purpose of examining whether a fear-evoking design (i.e., including angular shapes) was preferred for a product that has the potential to be harmful (i.e., bleach, unlike water). However, results did not confirm this effect of semantic congruence.

Finally, another study by Westerman et al. (2013) also investigated potential congruence effects between shape and a specific product attribute. They examined participants' perceptions of images of a water and a vodka product, involving identical bottles but whose label featured small triangular-like graphics with either a higher vs. lower degree of angularity. The authors hypothesized that angular shapes would be more preferred on the vodka bottle, on the basis that an expected "sharper" taste would be associated with sharper shapes and that cross-modality congruence is preferred. Still, the results provided limited support for this assumption.

Overall, these studies have provided limited evidence of congruence effects (apart from the study by Van Rompay and Pruyn, 2011, which focused on congruence at a symbolic level). In any event, they are hardly comparable to each other as they have addressed clearly distinct issues relating to shape and congruence. There is a lack of research on the impact that may result from congruence at a visual level between design elements. As mentioned above, this relates to the objective of the present study, which focused on the congruence of shape on consumers' attitudes, in particular at an "unconscious" level.

3. Theoretical background and research hypotheses

The present study is based on a theoretical framework of processing fluency (Reber et al., 2004; see also Becker et al., 2011; Van Rompay and Pruyn, 2011). This account proposes that objects differ in the ease with which they can be processed by the perceiver and that this "fluency" (i.e., processing ease and speed) is hedonically marked, as fluent processing is subjectively experienced as positive. The basic underlying idea is that high fluency arouses positive general affect because it indicates something about a positive state of affairs within the cognitive system (e.g., the availability of appropriate knowledge structures to interpret the stimulus; e.g., Carver and Scheier, 1990; Fernandez-Duque et al., 2000; Ramachandran and Hirstein, 1999; Schwarz, 1990) or in the environment (e.g., the familiar and presumably harmless aspect of an external stimulus; Zajonc, 1968, 1998; see Winkielman et al., 2003). This positive reaction is subsequently attributed to the stimulus which, as a result, elicits an overall positive reaction (see Reber et al., 2004). Stated differently, because fluency is experienced as positive and because people draw on their subjective experience in making evaluative judgments, fluent stimuli are generally evaluated more positively and are experienced as more pleasing to the senses or as more beautiful compared to stimuli that are processed less fluently (Reber et al., 2004). This account thus holds that any variable that facilitates fluent processing of a stimulus similarly results in increased liking of the stimulus.

The processing fluency account has been supported by various studies in social and cognitive psychology, showing for example that easy to process visuals are preferred over hard to process visuals (e.g., Winkielman and Cacioppo, 2001; Zajonc, 1968). The hedonic marker of fluency is also strongly supported by psychophysiological findings. For example, facial electromyography data showed that highly fluent stimuli are associated with stronger activity over the zygomaticus region (i.e., muscles association with smiling, indicative of positive affect), but not with the activity of the corrugator region (i.e., muscles associated with frowning, indicative of negative affect; Winkielman and Cacioppo, 2001).

Applied to product design, it can reasonably be suggested that the fluency with which packaging is processed (and consequently the attitude it generates) may be increased by congruence between different visual elements it encompasses (such as, in the reported experiment, between the angularity of a bottle and that of its label; see Fig. 1). In light of the above-mentioned developments (e.g., psychophysiological findings; Winkielman and Cacioppo, 2001), we assumed that this positive impact concerns in particular the affective dimension. Therefore, it was hypothesized that:

H1. Congruence between the shape of the container and the shape of its label (i.e., both clearly either angular or rounded) is associated with a more positive affective reaction.

Previous research has provided consistent evidence that fluent stimuli are also experienced as more credible or true (e.g., Begg et al., 1992; Parks and Toth, 2006; Reber and Schwarz, 1999; Unkelbach, 2007). For example, Reber and Schwarz (1999) manipulated the processing fluency of statements (by changing the contrast of the color in

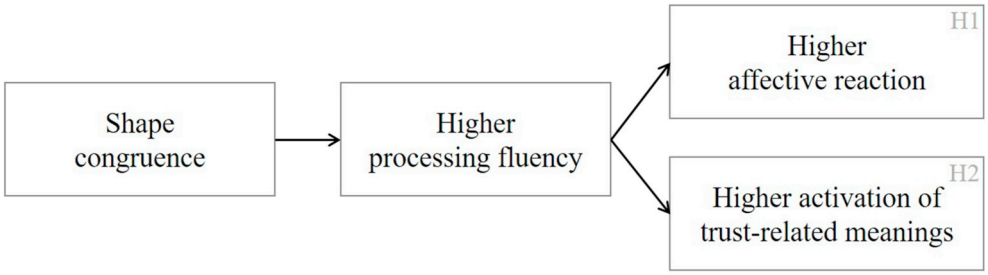

Fig. 1. Research model. Congruence between the shape of the container and the shape of the label is more fluently processed. This processing fluency leads to more positive affective reactions to the item, and activates greater feelings of trust related to the item.

which statements were presented) and found that statements that are more easily processed seemed to be more valid. This "truth effect" regarding more fluent stimuli has even been shown with stimuli that are presented only once (e.g., Reber and Schwarz, 1999; Unkelbach, 2007). In the context of the present study, it might therefore be assumed that congruence between visual elements of packaging may also impact consumers' spontaneous feeling of trust towards the product.

H2. Congruence between the shape of the container and the shape of its label (i.e., both clearly either angular or rounded) is associated with greater activation of trust-related meanings.

4. Beyond explicit measures

In order to examine the research hypotheses, a major factor distinguishing the present study from the previous studies dealing with shape and congruence relates to the way participants' reactions were analyzed. The above-mentioned studies dealing with shape and congruence used direct, explicit self-report measures (generally by means of Likert-scale items, and often one single item for each kind of reaction examined). Research in social psychology strongly supports that explicit self-report measures may not be optimal for assessing the sources of behavior for several reasons. A major limitation of such measures relates to the fact that they primarily tap into consciously accessible knowledge structures, as they rely on introspection (e.g., Gawronski and Bodenhausen, 2006; Greenwald et al., 2002). However, over the last 30 years, a great number of studies has provided evidence that human behavior (such as choice and purchase behavior) not only result from conscious and controlled thoughts but is also significantly influenced by automatic processes that are inaccessible to conscious awareness (e.g., Dijksterhuis and Bargh, 2001; Friese et al., 2008; Greenwald and Banaji, 1995; Hassin et al., 2005; Holland et al., 2005). According to the largely supported MODE model (Fazio and Towles-Schwen, 1999), behavior is predominantly influenced by controlled processes only if an individual is sufficiently motivated to engage in deliberate reasoning and has the necessary resources to do so, such as time and cognitive capacity. If either motivation and/or resources are missing, behavior will be influenced more by attitudes that are automatically activated.[1] In this latter case, implicitly measured attitudes are more successful for the prediction of behaviors (while explicit self-report measures serve to assess more deliberate evaluations; e.g., Friese et al., 2008a,b).

This principle of moderated predictive validity of explicit and implicit measures according to situational circumstances has received strong empirical support, including in the context of product choice and consumption behavior (e.g., Friese et al., 2008). Arguably, consumers' lack of motivation or resources to engage in deliberate reasoning largely holds for many purchase situations in the real world, in which consumers are exposed to a broad range of buying options in the same category. Therefore, in order to examine the expected impact of shape congruence in terms of both affective reaction and trust-related perceptions, the present study relied primarily on a combination of two implicit measures (in addition to explicit self-reported measures), which are considered as measurements of automatic (unconscious) reactions that come to mind spontaneously in reaction to the target stimuli (Petty et al., 2009). To the best of our knowledge, no previous study used such a combination of implicit measures to analyze participants' responses to product design variants.

Furthermore, two additional advantages result from using implicit measures. Firstly, it has been widely documented that explicit self-reported measures are especially susceptible to response factors such as self-presentation and faking strategies (relating, for instance, to experimental demands and social desirability effects; e.g., Greenwald et al., 2002; Nederhof, 1985). In contrast, implicit measures are able to assess reactions that individuals are incapable of deliberately adjusting (e.g., Fazio et al., 1995) and therefore to examine the impact of product design in a context where biases such as experimental demand effects are unlikely to operate. Secondly, as the implicit measures used in the present study are based on rapid processing of the stimuli, they are arguably more sensitive to processing fluency compared to self-reported measures (in which the stimuli are typically presented until participants provide their response). It may further contribute to make these implicit measures relevant to examine the conceptual model underlying the present study.

However, while relying on implicit measures was definitely central to this study and to its potential contribution to the literature, explicit measures were also used in order to provide a comparison of their respective outcomes.

5. Methods

5.1. Participants

A total of 101 participants (59% females), aged 25–56 years (with a median age of 35 years old), took part in the study. Using an adult sample of participants overcomes the largely used student samples, as student are quite different from "ordinary" consumers and are usually invited to participate annually in many experiments. It might also overcome problems associated with samples drawn from online panels and crowdsourcing websites (e.g., Amazon's MTurk), such as quasi-professional respondents with excessive experience, or respondents interested only in maximizing their pay rate (see Deetlefs et al., 2015; Geuens and De Pelsmacker, 2017). All participants were native speakers with normal or corrected-to-normal vision. They were recruited by phone and face-to-face contacts, and received a fee at the end of the study for their participation.

[1] Automatically activated attitudes refers to attitudes activated without the perceiver's intent, merely triggered by exposure to a stimulus. Such automatic activation occurs quickly, within a few hundred milliseconds after stimulus exposure. It requires only very limited cognitive resources and is not controllable by the perceivers, who often remains unaware of the activation and its subsequent influences on behavior (Wittenbrink et al., 2001).

Fig. 2. Stimuli used in the study.

5.2. Design and stimuli

The design of the study included bottle shape and label shape as two two-level within-participant factors (angular vs rounded). The four design variants needed for the purpose of the study were developed with regard to two product categories (i.e., wine and perfume), thus resulting in eight stimuli with prominent bottle and label shapes (see Fig. 2). Using two categories was mainly justified by the objective of potentially adding consistency to the findings. With regard to the bottles, the two versions within each category were designed to vary exclusively according to their shape (e.g., identical wine or perfume color, glass color, bottle closure, bottle height, aspect ratio, perceived volume), which was either clearly angular or clearly rounded. Also, results from a pretest ensured equivalent typicality within each pair of bottle shape. With regard to the (angular vs. rounded) labels, the content of the perfume labels was quite simplistic and identical across the four stimuli, while the wine labels included different elements such as those that can typically be found in the product category. The wine names and emblems varied across the four labels used, which had been pretested to ensure their equivalence according to four criteria: general design/aesthetics, trustworthiness, wine complexity ("a wine that has numerous and various flavors"), and wine intensity ("a wine of great intensity in the nose and in the mouth"). In addition, the bottle-label combination (i.e., which wine label content was associated with which wine bottle) was counterbalanced across participants. These stimuli thus aimed at combining control and realism (experimentally-controlled but ecologically valid stimuli).

5.3. Procedure

5.3.1. Introductory phase

Participants were greeted individually in a first room by the experimenter. They were informed about ethical issues and the overall procedure of the experiment, and were told only that the study concerned spontaneous reactions towards images and products. Before entering the lab and starting the experiment, they were also asked to turn off and set aside their smartphones (or other digital devices). Participants were then seated in front of a computer (approximately 50 cm from the monitor) in small individual rooms. The first screen displayed general instructions as follows: "Thank you for taking part in this study. You will be asked to perform several simple tasks. Before starting each task, instructions will be presented on this screen. It is essential to stay focused on the tasks throughout the study. Please press the space bar to begin (the large bar at the bottom of the keyboard)."

Participants then performed three tasks designed to examine their reactions towards the eight stimuli in the following order: 1) an implicit affective measure (i.e., affective priming task), 2) an implicit cognitive measure (i.e., lexical decision task with a semantic priming technique), and 3) explicit measures. For each measure, instructions were also displayed at the start of the task on the monitor, so that participants went autonomously through the different measures without any interaction with the experimenter. All these tasks (instructions, stimuli presentation, measures) were run on PC[2] using E-Prime software (Schneider et al., 2002).

[2] Computer features: HP Compaq Elite 8100 cmt, MS Windows 7 Enterprise 64 bit (SP1), Intel Core i5 CPU 650@3.2GHz, 4 GB ram, Intel HD Graphics. Monitor: HP Compaq LA 2205 wg 59/60Hz.

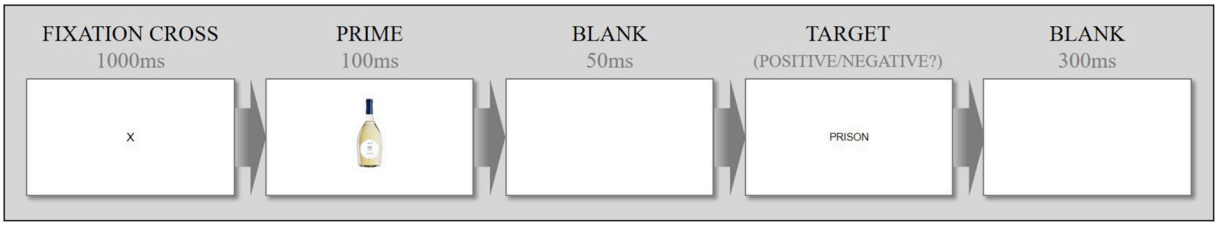

Fig. 3. Experimental paradigm for the affective priming task.

5.4. Implicit affective measure

The study used two evaluative priming tasks (e.g., Fazio et al., 1995) to examine respectively affective reactions and activated trust-related meanings resulting from shape (in)congruence in product design. These implicit measures are based on the notion that a person's ability to indicate the connotation of a positive or negative target word (e.g., happiness vs cancer) is facilitated (i.e., shorter response times) when it follows a brief exposure of a stimulus (i.e., a "prime", in this case, a product) that is evaluatively consistent with the target. When using such measures, the primes presented automatically activate the evaluation associated with that prime, and this creates a processing advantage for targets that are evaluatively congruent (Fazio and Olson, 2003).

Participants first performed an affective priming task aimed at examining their automatic affective response towards the eight stimuli. Participants were told that various words would be presented in the center of the screen. For each of these words, they would be asked to indicate, as quickly as possible, whether it was positive (by hitting the key labeled "Pos") or negative (by hitting the key labeled "Neg"). To minimize measurement noise, participants were asked to position their left and right index fingers on the two keys. They were also told that prior to the presentation of the words, pictures would be very briefly presented, which they would not have to pay attention to. Their task was only to indicate as quickly and as accurately as possible whether the presented words were positive or negative.

The affective priming task consisted of 64 randomly presented experimental trials preceded by eight randomly presented practice trials. Each trial included five different screens (see Fig. 3). It basically consisted of a target presentation (an affective word, in uppercase black Arial font of size 28, appearing on a white background in the center of the screen) subsequent to a 120-ms presentation of a prime (the eight stimuli, appearing in the center of the screen, again on a white background). Primes and targets were separated by a 50-ms blank screen, which resulted in a 170-ms stimulus onset asynchrony.[3] Each trial began (prior to the primes) with a 1000-ms white screen including a black fixation cross in the center, aimed at maintaining participants' gaze direction towards where primes and targets appeared, and ended (after the target words) with a 300-ms blank white screen.

Each of the eight products (primes) was presented eight times, four times followed by a positive word (e.g., liberty, love, peaceful, delighted) and four times by a negative word (e.g., prison, torture, disgusted, terrified). More specifically, each stimulus was associated with two positive and two negative words, each of them presented twice. These words (like, more generally, the overall affective priming procedure) were similar to those used in a study by Pleyers et al. (2007). The four different specific words that were assigned to a given stimulus were counterbalanced across participants. It was also ensured that none of the words used was semantically related to the two product categories (based on the results of a pretest).

The principle underlying such an affective implicit measure is therefore that, for a given product variant (i.e., prime), participants' shorter reaction times to indicate the affective valence of subsequently presented positive [vs negative] target words would be indicative that this product variant is actually associated with a positive [negative] affective evaluation (as it would have facilitated the processing of these affectively-congruent targets). Further to the initial work by Fazio et al. (1986), the affective priming effect has been reported in a large number of studies and demonstrated to be a replicable and robust phenomenon (e.g., Fazio, 2001; Klauer and Musch, 2003).

5.5. Implicit cognitive measure

The affective priming task was followed by a lexical decision task combined with a semantic priming technique, aimed at examining how the eight stimuli respectively activated specific meanings. Like the previous task, this implicit measure was also based on the fact that the primes (i.e., products) presented automatically activate the evaluation associated with that prime, and this creates a processing advantage for targets that are evaluatively congruent (Fazio and Olson, 2003).

Participants were then told that they would be presented with letter strings that would consist of either words or non-words, and that they would be asked to indicate for each string whether or not it actually was an existing word (by hitting keys labeled "Yes" or "No"). As in the previous task, they were asked to position they left and right index fingers on the two keys, and to respond as quickly as possible. Finally, they were told once again that pictures would be very briefly presented prior to the strings and that they should not pay any attention to them. The lexical decision task included 96 randomly presented trials. The five-screen sequence of each trial, which were comparable to that of the previous task, were as follows: 100-ms fixation cross, a 120-ms prime (i.e., one of the eight products), 50-ms blank screen, a target (i.e., a string of letters), 300-ms blank screen.

Each of the eight products (i.e., primes) was presented 12 times, including six times followed by a non-word target (e.g., gheidca, hicrg) and six times by a word target (e.g., table, plug).[4] Among the target words a trust-related word was presented twice (i.e., "trust" and "sincere"; two different words were used to increase the variability of the targets), with words vs. non-words having equivalent word-length.

Such a more cognitive implicit measure is based on the notion that, for a given product, participants' shorter response times for a specific target word/meaning (e.g., trust) would be indicative that this product actually automatically activates this meaning in participants' mind (as it would have facilitated the processing of these semantically-congruent targets).

5.6. Explicit measures

The next phase consisted of explicitly asking participants to spontaneously express their feelings towards various products that would be presented (i.e., the eight products), by clicking with the mouse on a

[3] Priming at shorter SOAs (e.g., under 300 ms) is thought to reflect automatic priming mechanisms (Hutchison et al., 2001).

[4] The full list of non-word targets included "hicrg", "gheidca", "tvlixé", "ajborvuns", "pidfèsakl" and "zopse", while that of word targets included "table", "plug", "basket", "composition", "trust", and "sincere".

Fig. 4. Screenshot from the explicit task.

horizontal evaluative line whose endpoints read "definitely not" and "definitely". For each of the eight products (whose order was randomized), participants sequentially answered four items. The first one read "Is this product beautiful (pleasing appearance)?". Such an aesthetic judgment has been widely used in previous studies on product design (including in those dealing with shape and congruence) and may be considered to be primarily affective (e.g., Holbrook, 1980). The second item was designed to examine participants' feeling of trust and read "Does this wine [perfume] inspire a feeling of trust?". Besides these two main items (connected with the research hypotheses), two additional items dealing with inferred sensory perceptions were included in order to increase the variety of items. The first of these additional items related to the perceived sensory intensity and read "Does it look like a powerful wine? (a wine of great intensity in the nose and in the mouth)" for the four wine products, and "Does it look like a powerful perfume? (a perfume of great intensity)" for the four perfume products. The last item, dealing with perceived sensory complexity, read "Does it look like a complex/subtle wine? (a wine that has numerous and various flavors)" for the four wine products, and "Does it look like a complex/subtle perfume?" for the four perfume products. The item on taste intensity was inspired by the literature on cross-modal correspondence (e.g., Schifferstein and Spence, 2008), suggesting that an intense sensation in one modality (e.g., the experience of a powerful, strong taste) might result from an intense sensation in another modality (e.g., perceiving a packaging shape as being strong or potent; which specifically applies to angular shapes, as suggested by previous research; e.g., Becker et al., 2011; Berlyne, 1976; Zhang et al., 2006). Although it lies beyond the shape congruence issue central to the present study, it could therefore be assumed that products with an angular bottle (or combining an angular bottle with an angular label) would result in a perception of higher taste intensity. In line with this assumption, Becker et al. (2011) found that their angular (vs. rounded) yoghurt packaging shape was associated with a subjective experience of a more intense, strong taste (at least among participants with greater sensitivity to design).

For each question, the products were presented in the center of the screen, with the question above and the evaluative line below (see Fig. 4).

5.7. Post-experimental measures

The final part of the experimental procedure recorded data about participants' personal details, including age, gender, and consumption profile (monthly budget dedicated to the product category, purchasing frequency; as well as estimated average price when purchasing a bottle of wine for personal consumption, with regard to the wine products category).

Once the computer task for the experimental phase was completed, the experimenter conducted a structured interview to examine participants' awareness about the hypotheses of the study.[5] Finally, participants were thanked, signed a document related to data use restriction and confidentiality issues, and were paid for their participation.

6. Results

6.1. Data processing

Seven participants were excluded from the analyses for several reasons. Two of them were eliminated because the post-experimental interview revealed that the language in which the study was conducted was not their first language (which was problematic regarding the implicit measures, which were based on reaction times towards target words); three participants because they showed some awareness with regard to the research hypotheses and the way they were "supposed" to answer in the experimental tasks; and two participants because they showed particularly high numbers of too long reaction times in the affective priming task (more than 20% reaction times above 1500 ms; which questioned their true involvement in the experiment). This resulted in a total of 94 participants left for the analyses.

6.2. Implicit affective measure

With regard to the implicit affective measure, we first excluded all response times associated with errors (i.e., indicating the wrong affective valence of the word; 2.11% of the data). To reduce the influence of outlier responses, we also excluded response times shorter than 200 ms or longer than 1500 ms (2.51% of the data), which is the criterion widely used for this task (e.g., Hermans et al., 2002; Pleyers et al., 2007).

The impact of shape congruence was analyzed using paired-samples

[5] The two questions systematically asked were as follows: "Do you have an idea about the purpose of this study?"; "Did you feel that you were supposed to answer in a particular way? (If so, in what way)".

Table 1
Descriptive statistics and paired-samples T tests results of the two implicit measures.

	Descriptive statistics				Paired-samples T tests		
	Congruent		Incongruent		*t*	*df*	*p*
	Mean	(SD)	Mean	(SD)			
A. Implicit affective measure							
Wine & Perfume	47.23	(62.48)	−31.54	(76.30)	10.71	93	.000
Wine	31.82	(91.62)	-.08	(101.59)	2.81	93	.006
Perfume	62.64	(66.47)	−63.00	(100.99)	10.66	93	.000
B. Implicit cognitive measure							
"Trust" & "Sincere"							
Wine & Perfume	553.33	(72.91)	575.23	(87.71)	−3.62	93	.000
Wine	558.77	(83.37)	589.26	(95.52)	−3.74	93	.000
Perfume	547.89	(78.28)	561.20	(104.34)	−1.55	93	.126
"Trust"							
Wine & Perfume	555.94	(80.79)	573.86	(102.56)	−2.15	93	.035
Wine	569.54	(99.34)	583.91	(128.51)	-.98	93	.332
Perfume	542.35	(96.42)	563.81	(137.68)	−1.80	93	.075
"Sincere"							
Wine & Perfume	550.34	(79.50)	576.60	(96.52)	−2.96	93	.004
Wine	548.59	(99.15)	595.33	(132.90)	−3.35	93	.001
Perfume	553.43	(91.54)	558.60	(98.33)	-.47	93	.637

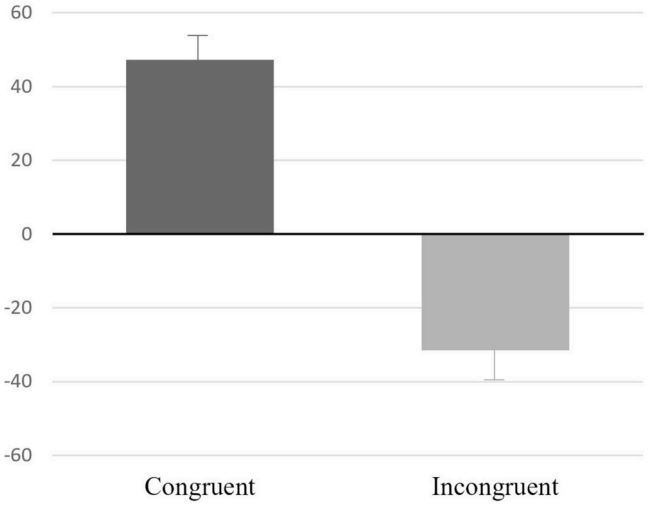

Fig. 5. Implicit affective measure. Results from the affective priming task regarding the four congruent stimuli and the four incongruent stimuli (considering both product categories). Higher scores indicate more positive reactions (as greater affective congruency between target words and products are indicated by shorter response times, these scores were calculated by subtracting the mean response time for positive words from the mean response time for negative words).

T tests comparing the congruent stimuli (i.e., angular [rounded] bottle combined with angular [rounded] label) to the incongruent stimuli (see Table 1A). A more positive affective reaction emerged towards the four congruent product variants than the four incongruent variants (see also Fig. 5). This was also observed when considering the two product categories separately (i.e., within each category, the two congruent stimuli vs. the two incongruent stimuli). These results were not moderated by participants' individual variables.

6.3. Implicit cognitive measure

With regard to the lexical decision task, data from trials for which an incorrect response was given (i.e., categorizing a word as a non-word, or vice versa; 1.13% of the data) were excluded from the analyses, as well as reaction times below and above three standard deviations for each word or non-word (1.96% of the data), which is the criterion largely used regarding this kind of task (e.g., Holland et al., 2005; Zerhouni et al., 2016).

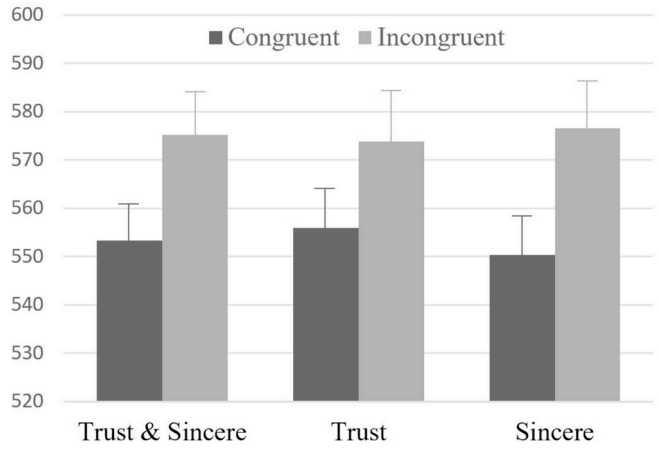

Fig. 6. Implicit cognitive measure. Results from the lexical decision task regarding the four congruent stimuli and the four incongruent stimuli (considering both product categories). Lower mean response times indicate greater activation of "trust" and "sincere" meanings.

As was done for the affective priming task, the resulting data were analyzed using paired-samples T tests comparing the congruent stimuli to the incongruent stimuli (see Table 1B). Results indicated faster reaction times for the "trust" and the "sincere" meanings for the four congruent (vs. the four incongruent) product variants (see also Fig. 6). This significant effect was observed when considering these two meanings together (merged results) as well as separately. No such effect was observed with regard to the other word targets.

When considering the two product categories separately, significant effects in favor of the congruent variants (i.e., faster reaction times) emerged for the wine product category with regard to the "trust" and "sincere" merged meanings and to the "sincere" meaning specifically. As for the perfume product category, only a marginally significant effect was observed with regard to the "trust" meaning. Again, no such results were observed with regard to the other word targets. These results on the lexical decision task were not moderated by participants' personal details (i.e., age, gender, and consumption profile).

6.4. Explicit measures

With regard to the explicit measures, quite similar ratings were observed between the congruent and the incongruent stimuli (see Table 2). However, some slight differences reached significance. Specifically, congruent product variants were associated with higher ratings of sensory intensity and of sensory complexity when considering the merged data for the two product categories (while sensory intensity also reached significance for the perfume category specifically). As for the two implicit measures, no significant moderating effect was shown with regard to participants' individual differences.

It should be emphasized that many participants sometimes provided identical answers to the four consecutive questions of the explicit task (i.e., by clicking four times sequentially on the very same position along the continuum; which happened for 12% of all data). This may be considered problematic as these questions related to quite different dimensions.

Table 2
Descriptive statistics and paired-samples T tests results of the explicit measures.

	Descriptive statistics				Paired-samples T tests		
	Congruent		Incongruent		*t*	*df*	*p*
	Mean	(SD)	Mean	(SD)			
A. Explicit "aesthetics" measure							
Wine & Perfume	54.84	(14.73)	53.31	(15.71)	1.87	93	.065
Wine	54.11	(17.15)	52.12	(17.76)	1.81	93	.073
Perfume	55.58	(19.96)	54.49	(20.93)	.86	93	.394
B. Explicit "trust" measure							
Wine & Perfume	53.73	(15.11)	52.59	(15.82)	1.57	93	.120
Wine	52.92	(18.40)	51.61	(17.85)	1.06	93	.291
Perfume	54.54	(18.88)	53.58	(20.69)	.93	93	.354
C. Explicit "sensory intensity"							
Wine & Perfume	43.01	(15.65)	40.94	(16.58)	2.02	93	.046
Wine	43.18	(18.69)	42.47	(19.74)	.56	93	.578
Perfume	42.84	(19.58)	39.40	(19.69)	2.45	93	.016
D. Explicit "sensory complexity"							
Wine & Perfume	47.45	(15.17)	45.60	(15.44)	2.05	93	.043
Wine	47.98	(18.36)	45.87	(18.33)	1.61	93	.110
Perfume	46.93	(19.16)	45.33	(20.09)	1.27	93	.206

7. Discussion

Over the last few years, an increasing body of scientific literature has emphasized the important role of product design on consumers' reactions. Focusing on the impact of shape congruence in product design, this lab study consisted of presenting a quality sample of participants (i.e., non-student participants, of various profiles) with quality stimuli (both well-controlled and realistic images of wine and perfume products) in the context of a well-controlled experimental design that primarily relied on a combination of implicit measures for accessing participants' automatically activated attitudes.

7.1. Summary of results

Results from the affective priming measure showed that products whose bottle shape and label shape were either both angular or rounded (compared to shape-incongruent designs) aroused a more positive affective response. Although based on less significant and less consistent results, findings from the lexical decision task may suggest that these congruent product designs might also be associated with greater activation of trust-related meanings. The present study thus emphasizes significant positive effects that may result from congruence in product design, at least when it comes to the shape of different elements encompassed by the packaging.

Compared to previous studies that addressed the effects of shape and congruence (and which provided mixed results), this experiment was fundamentally different with regard to the way participants' reactions were measured (beyond considerations related to the stimuli used, such as the product categories or image features). Within contrast to self-report explicit measures, the present study relied primarily on implicit measures aimed at examining participants' automatic (unconscious) responses. This approach is grounded in theoretical models and strong empirical evidence (e.g., Fazio and Towles-Schwen, 1999; Friese et al., 2008a,b) according to which consumers' behavior is influenced more by attitudes that are automatically activated when they do not have sufficient motivation, time or cognitive capacity to engage in deliberate reasoning (which actually applies to many purchase situations, where consumers are exposed to a wide range of buying options). Consistent with this, the notion that purchase situations are typically characterized by multiple buying decisions that are far from fully conscious has been suggested for a long time (e.g., Clement et al., 2013; Simonson, 1990). Also, an additional major advantage of the implicit measures used relates to preventing participants from being aware of the evaluative aspect of the study – and more generally of the purpose of the study. Implicit measures also minimize interference from conscious, deliberate processes (i.e., experimental demands or social desirability effects; e.g., Fazio et al., 1995; Greenwald et al., 2002).

The present study also included explicit measures, in which participants were asked to express their feelings towards the different product variants by indicating a position along an evaluative continuum. These measures only showed a significant congruence effect with regard to participants' feelings of sensory intensity for the perfume product category (although the congruence effect also reached significance for wine and perfume merged results, as they did with regard to sensory complexity). However, the data from these explicit measures points to an additional problem that may arise with self-reporting (e.g., Likert scale items). This is because many participants sometimes provided identical answers to the four consecutive questions (i.e., by clicking four times sequentially on the same position along the continuum; which happened for 12% of all data), although these questions related to quite different dimensions (i.e., aesthetic judgement, feeling of trust, perceived sensory intensity, perceived sensory complexity) for which it is arguably unlikely that four identical responses truly reflected participants' genuine feelings. One could argue that these participants were tempted to give the fastest response to the items without paying enough attention to them, which might strongly undermine the reliability of these explicit measures. This concern is supported by a response times analysis. The mean response time for the first item (i.e., aesthetics judgement) is relatively similar for both a series of four identical responses and four non-identical responses (M = 3954 ms vs. M = 3721 ms, respectively), and these mean response times are in both cases slower compared to those of the next three items (which may be considered unsurprising, as the first item presents participants with a new stimulus). However, a substantially greater decrease in response times between the first and the next three items is observed for series of identical responses (M = 1986 ms; 47% decrease) than for a series of non-identical responses (M = 2420 ms; 24% decrease). As a result, these data may suggest that the reliability of many answers (that can be estimated at 12% of all series of four answers, and that may concern primarily the last three items of these series) is very likely to be affected by participants' tendency to respond carelessly. The question of whether these series of identical responses should be removed from data analysis is a sensitive issue. In addition, removing them would have left only 54 and 56 participants to perform the analysis for the wine and perfume products categories, respectively (i.e., those for which data would have been available regarding each of the four product variants; only 43 participants out of 94 never provided four identical answers across the eight products).

Nevertheless, the outcomes of this study are far from being dismissive of self-report explicit measures. Such measures may obviously prove convenient and useful to examine consumers' reactions to product design, specifically regarding purchase contexts where consumers have sufficient resources (i.e., motivation, time, cognitive capacity) to engage in deliberate reasoning (e.g., Fazio and Towles-Schwen, 1999; Friese et al., 2008a,b). Instead, as a methodological implication, this study stresses that research on the impact of congruence in product design should also better consider implicit ways of measuring consumers' reactions, especially as such measures are presumably more predictive of behaviors in circumstances where consumers' resources are lacking.

7.2. Theoretical implications

On the theoretical level, the findings from the implicit measures may be considered as supporting the processing fluency account, according to which the high fluency of a stimulus arouses positive affect (because it indicates that things in the environment pose no cognitive challenges or danger) which is subsequently attributed to the stimulus, which, as a result, elicits a positive reaction (see Reber et al., 2004). In

the context of this theoretical framework, the present findings support the assumption that a greater processing ease (and a subsequent more positive reaction) stems from shape congruence of the product packaging. It may be argued that the theoretical contribution of the present study is strengthened by the implicit measures used being based on rapid processing of the stimuli (which arguably makes them highly sensitive to processing fluency).

The findings also suggest that this positive impact concerns in particular the affective dimension, as stronger congruence effects emerged for the affective dimension than the semantic dimension. This is in line with strong prior evidence regarding the hedonic marker of fluency (including psychophysiological findings; Winkielman and Cacioppo, 2001). Also, the support that the results on the affective dimension offer for the processing fluency account is arguably strengthened by the larger congruence effect observed for the perfume product category. Indeed, it suggests that compared to a strong angularity congruence (i.e., in the wine product category), a perfect shape congruence between the container and the label further facilitates the fluent processing of the stimuli and the resulting positive affective reaction.

Nevertheless, the (smaller but rather significant) effects on automatically activated trust-related meanings are in keeping with studies that suggest that fluent stimuli are also experienced as more credible (Begg et al., 1992; Reber and Schwarz, 1999; Unkelbach, 2007). Generally speaking, the present study thus supports the relevance of the processing fluency account for examining congruence in product design.

It may be discussed that another major theoretical framework for packaging congruence effects may be found in cue-consistency theory (Maheswaran and Chaiken, 1991), which has been largely ignored in the literature in the field of product design. It holds that multiple sources of information are more useful when they provide corroborating information than when they offer disparate information. In such cases, attitudes can be derived by a straightforward integration of their values. Cue-consistency theory suggests that marketing cues will have a positive effect on quality perceptions when they provide corroborating versus disparate information. As a result, it may account for any positive effects that results from congruent meanings conveyed by different elements of packaging (e.g., shape and typeface or shape and color both evoking feminity, potency, etc.). It may be difficult to disentangle between processing fluency and cue consistency accounts, especially regarding studies focusing on symbolic meanings connoted by the product design elements. For instance, the significant congruence effects that Van Rompay and Pruyn (2011, Exp.2) found between masculine or feminine shapes and typeface may have resulted from a symbolic congruence between the masculine or feminine associations evoked by both elements (i.e., emerging from higher cognitive process) as well as from basic visual congruence, as the masculine and the feminine typefaces used were definitely more angular or rounded, respectively. The present study however was not underpinned by the cue-consistency theory because this account primarily pertains to product evaluation (e.g., perceived quality) and, more importantly, because it assumes that higher cognitive processes are involved (i.e., that meanings are inferred about each of the target packaging elements).

7.3. Managerial implications

Over the last years, substantial developments in product offerings and advertising opportunities (e.g., digital devices) have resulted in people being exposed to an unprecedented number of products through virtually all circumstances of their everyday life (e.g., at home, at work, at leisure, in the streets, in points-of-sale, etc.). For example, today's retailers have plenty of products in the same category from different manufacturers. In these situations where consumers are bombarded with products but have limited resources (which, in addition, are simultaneously required for various concurrent tasks and thoughts), products hardly attract close attention from consumers. The attention consumers pay may not improve when making purchases (e.g., facing large product ranges at point-of-sale), in which the likelihood of a given product having the information on its packaging examined by a consumer might arguably be quite low. As a result, product design is of crucial importance as it can be a powerful way of implicitly shaping consumers' reactions without requiring the increased levels of cognitive resources typically needed for examining explicit information. More generally, product design may be an effective means of circumventing the resource-consuming weighing of pros and cons that may be involved in purchasing a product. In addition, research shows that product design may successfully impact consumers on various levels such as spontaneous liking, beliefs towards the product (e.g., quality), and even sensory inferences and subjective experience when seeing or consuming the product (e.g., Becker et al., 2011).

Supporting the key role of product design, the present study is of particular importance for marketers and designers in charge of creating a product or renewing its visual identity. It strongly suggests that these professionals should pay close attention to visual congruence between design elements such as container shape and label shape in order to best impact consumers' automatic responses (including affective reaction and sense of trust). While both researchers and practitioners have shown an increasing interest for the substantial effects of design on consumers' emotions and behaviors (e.g., Desmet and Hekkert, 2009), this study emphasizes shape congruence as a major design issue when it comes to positively influencing the potential buyers, especially in a cluttered retail environment. Practical implications of the present study are even more substantial when considering that beyond consumers' affective reaction and feeling of trust, the positive impact of congruence might arguably apply to other dimensions including brand equity[6] (as brand credibility is considered an important determinant of consumer-based brand equity; e.g., Erdem and Swait, 2001), and subsequently price expectations (as brand value is reflected in product price).

Yet, just browsing retailers' stores or websites may highlight that incongruent product designs are far from uncommon. Also, designers may even deliberately use an incongruent design with the aim of standing out from numerous competing products. However, this strategy actually finds little support in scientific studies, which provide no evidence of positive impact of incongruence between design elements on attention capture. For instance, findings suggesting that consumers' attention may be attracted by presenting incongruent information in advertising (Lee and Mason, 1999) are far from suggesting that such an attentional impact may result from visual incongruence between design elements of a packaging. On the contrary, the present study warns against using incongruence in product design as it might be associated with less positive impacts with regard to consumers' automatically activated attitudes.

7.4. Limitations and future research

A direction for future research could consist of replicating the results beyond the product categories used in the present study (e.g., food products, drugs, home and personal care products). Future studies could also examine the impact of shape congruence in the context of decision-making process in real life situations. They could provide insights into the decisive role congruence might have when consumers cope with a wide range of product offers under low motivation and/or resources (i.e., limited cognitive capacity and/or time constraints). In terms of real life situations, it could be useful to address the impact visual congruence may have when it comes to attentional responses, as capturing consumers' attention is considered to be an important function of product design, particularly in a cluttered environment (e.g., Creusen and Schoormans, 2005). Future research should also look more

[6] i.e., the value of a brand to consumers (Keller, 1993).

closely at whether the impact of congruence is moderated by intrapersonal factors like, for example, involvement and expertise regarding the product category. In particular, while this study only used a limited number of items to examine participants' interest in the product categories in order to limit the duration of the experiment, the results could be different using a more detailed assessment of such individual variables. This may hold especially for the category of wine products, as it is typically associated with varying degrees of interest and knowledge among the general population, and as previous research has suggested a greater impact of design-related factors (vs. written information on the label) on buying decisions among consumers who do not have an extensive knowledge in the field of wine (Szolnoki et al., 2010). In addition to intrapersonal factors, consumers' reactions to product design and visual congruence may also be influenced by other variables relating to the market context or cultural differences (e.g., Aslam, 2006; Hekkert and Leder, 2008). Conducting studies on the impact of congruence in product design similarly in different cultures may also provide strong additional support for the role of processing fluency. As unlike basic visual processes (and the processing ease of a stimulus), higher cognitive processes of symbolic meanings connoted by visual elements (i.e., processes that are not involved in the processing fluency account) may be particularly culture-dependent (e.g., Aslam, 2006), evidence of similar congruence effects across different cultures could be considered as further support to the processing fluency account.

Another avenue for future research could be developed through studies aiming at comparing the impacts of different levels of shape congruence in product design. It could be assumed that larger effects may result from a "perfect shape congruence" (i.e., product designs featuring an identical shape – such as a square or a circle – for the bottle and the label, as was the case for the perfume stimuli in the present study) than from a looser "angularity congruence" (i.e., bottle and label being just both clearly angular or rounded, as was the case for the wine stimuli). Supporting this assumption, it turns out that the highly significant congruence effect observed in the present study regarding the implicit affective measure is actually larger for the perfume stimuli than for the wine stimuli ($\eta^2 = 0.55$ vs. $\eta^2 = 0.08$, respectively).[7]

Future studies should also better consider examining the impact of visual congruence (and, more generally, of product design) using implicit measures, in order to analyze consumers' reactions on a more "automatic" level. As previously proposed, in addition to avoiding potential problems that may arise with explicit measures, such measures might allow for increased predictive validity of consumers' behavior. This holds, in particular, for the many purchase circumstances where consumers' lack of motivation, time, or cognitive capacity prevent them from using a resource-consuming deliberate reasoning strategy with regard to the extensive purchase options they face. Besides the evaluative priming techniques used in the present study, further insights into the impact of congruence on consumer reactions may also be provided by other implicit techniques such as the implicit association test (Greenwald et al., 1998). More generally, studies may also use other "indirect" methods, characterized by allowing researchers to make inferences about consumers' attitudes by observing their responses on a task without having to directly ask them to report their attitudes. For example, psychophysiological techniques such as pupil dilatation or galvanic skin response analysis could provide relevant data regarding, respectively, the affective valence and intensity aroused by various products whose design varies according to shape congruence (e.g., Juvrud et al., 2018; Ramsøy et al., 2017).

Finally, it may be interesting for consumer research to see if any positive impact of visual congruence on trust-related perceptions applies to attributes like specific claims associated with the product. For example, future studies should examine whether health claims or sustainability claims are more trusted if the shape of the label is congruent with that of the bottle.

[7] Eta squared can be interpreted as of small effect for values of 0.01, as of moderate for values of 0.06 and as of large effect for values of 0.14 and more (Cohen, 1988; Pallant, 2013).

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