"Asymmetric revelation" effect:

The influence of an increased number of photos on mental imagery and behavioural responses depending on target market

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Abstract

There has been little research exploring the effect of the number of photographs used to present a product, and the studies that have been carried out relate to experiments with a reduced number of non-informative photos. This article provides a first field study conducted on 3,658 real estate ads and shows that an increase in the number of photos decreases favourable behavioural responses for lower-range properties, but has no effect in the case of higher-range properties. This result is replicated and explained in an experimental study: for lower-range properties, the addition of photos deteriorates the valence of mental images, decreases mental self-imagery and increases perceived worry. These variables explain the negative effect of the number of photos on behavioural responses. However, for higher-range properties, the addition of photos – informative or not – does not improve behavioural responses. This "asymmetric revelation" effect depending on the segment of the property market being targeted is discussed.

Keywords: number of photos, mental imagery, inference, worry, real estate

Introduction

Revealing more or less information is an issue of major importance for many professionals looking to sell their products using visual material. It is a strategic challenge for many Internet websites in sectors such as the hotel and tourist industries, classified ads, online dating or real estate. However, the effect of the number of photographs presented on consumer behaviour is an issue that remains relatively unexplored by researchers and leaves professionals facing a great many questions. One website – *photographe immobilier*[1] – sums up an as yet unresolved debate between two competing views: some argue that an increase in the number of photos made available allows web users to get a better idea of the property for sale and allows real estate agents to limit the number of fruitless visits; others believe that photos act as "teasers" to generate interest but that they should not reveal too much information. This diversity of practices is reflected in other sectors: for example, *eBay* encourages its users to upload up to 12 photos of the item for sale and to present it with as much detail as possible[2] while on the classified site *leboncoin.fr*, only three photos can be uploaded free of charge. A better understanding of the effect of the number of photos is strategic from a managerial point of view for two main reasons. First, using a high number of photos requires time and skills (creating the photos, using professionals, etc.) and increases costs (photography, purchasing "additional photo packs"[3], etc.). Second, a better understanding of the effect of the number of photos would serve to strengthen the advisory role of online intermediaries and sellers, who are compelled to develop their expertise and value added in the face of disintermediation (Larceneux et al., 2015).

The existing research on the influence of the number of photos remains very limited, with conflicting views. Reflecting the debate among professionals, two theoretical perspectives can be identified. The first approach, based on microeconomic research, implicitly assumes that increasing the number of photos will have a positive effect. The presence of photos reduces information asymmetry (Akerlof, 1970) and makes it possible to adjust properties to suit individual preferences (Lancaster, 1990). However, some studies have found that increasing the number of photos does not always have a positive influence on the sale of items and the final sale price (Hou, 2007; Song and Baker, 2007). The second approach, based on research in consumer psychology, reveals that the influence of the number of photos is sometimes non-significant or negative on

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[1] https://photographeimmobilier.wordpress.com/.
[2] http://pages.ebay.fr/help/policies/selling-practices.html.
[3] For example, on leboncoin.fr, while three photos can be uploaded free of charge, it is possible to purchase a pack of seven additional photos (https://www.leboncoin.fr/ai/form/0).

attitudes and/or behavioural responses (Singh et al., 2000; Chowdhury et al., 2008, 2011). However, such studies are limited by the fact that the photos added do not include any information that provide a better picture of the quality of the item and observed effects are not always explained.

In this article, we suggest that increasing the number of photos can have different effects on consumer reactions depending on the intrinsic quality of the product for sale. So we make a distinction between higher-range products, i.e. those with an above-average sale price (Michel and Salha, 2005), and lower-range products. In a world of images where first impressions are crucial (Naylor, 2007), products are generally presented using flattering photos first (Olivola and Todorov, 2010). For lower-range products, a small number of flattering photos could thereby lead to biased initial inferences. Increasing the number of photos could then reveal new information about product attributes perceived negatively and lead to less favourable evaluations. Conversely, in the case of higher-range products, increasing the number of photos is likely to reveal new information about product attributes perceived positively, which should confirm the effect of the initial flattering photos. We call this the "asymmetric revelation" effect and believe it could explain some of the conflicting results found in the literature.

In order to study the mechanisms underpinning this effect, we draw on the concept of mental imagery, a key part of how sensorial information is processed (MacInnis and Price, 1987). Many researchers agree on the mediating role played by mental imagery in the influence of pictorial stimuli on the behavioural responses of consumers (Rossiter and Percy, 1980; Miniart et al., 1991; Babin, 1992; Lao, 2013; Gavilan et al., 2014; Yoo and Kim, 2014; Balbo and Gavard-Perret, 2015). More specifically, three dimensions of mental imagery are likely to be modified by adding photos: valence, quantity and mental self-imagery. These different dimensions make it possible to study the effect of the level of information provided about product attributes and the positive or negative nature of this information (depending on how attributes are perceived).

This article therefore has two objectives. In response to the call by Singh et al. (2000), the first is to study the influence of an increase in the number of photos on the behaviour of actual buyers. We test the existence of an "asymmetric revelation" effect linked to the market segment being targeted in the sale of a property. Our analysis is conducted on a database containing 3,658 classified ads for apartments for sale in Paris (France). This field study reveals that increasing the number of photos has no effect on favourable behavioural responses (click rate and duration of the sale) in the case of higher-range properties but has a negative effect on these responses for lower-range properties. The second objective is to provide an explanation for this effect. Three experimental studies were conducted in laboratory conditions on classified real estate ads, with a

distinction between adding to an ad containing three flattering photos of the property 1) three photos providing no additional information about the quality of the property, 2) three photos containing positive additional information (case of a higher-range property), and 3) three photos containing negative additional information (case of a lower-range property). The asymmetric effect observed in our empirical study is replicated in the experiments and we suggest explanatory mechanisms. The addition of non-informative photos or photos containing positive information do not improve the different dimensions of mental imagery. However, the addition of photos containing negative information deteriorates the valence of mental imagery and diminishes mental self-imagery, in turn associated with an increase in perceived worry.

This research is the first field study into the effect of the number of photos and the measure of mental imagery in the experiments provides a new explanation to this effect: it highlights the role of consumer inferences based on a limited number of photos and the impact of regulatory strategies adopted to deal with negative emotions when information contained in additional photos is perceived negatively. Therefore, this research significantly builds on the pioneering work of Singh et al. (2000) and Chowdhury (2008, 2011).

Literature review

When items are represented visually and not physically present, consumers face a higher level of uncertainty than in store (Dewally and Ederington, 2006). Information theory suggests that an increase in the number of photos used would be an indicator of quality that would limit information asymmetry (Milgrom and Roberts, 1986) and favourably increase behavioural responses (Li et al., 2009). The psychology literature on mental imagery provides an analytical framework that explains this process from the consumer's point of view.

The concept and dimensions of mental imagery

Mental imagery is a complex multidimensional concept that has given rise to various definitions in the fields of psychology and marketing (Gavard-Perret and Helme-Guizon, 2003). It can be defined as "*(1) a process (not a structure) by which (2) sensory information is represented in working memory*" (MacInnis and Price, 1987: 473). The images that result from this process are attenuated subjective representations of a sensation or perception without the corresponding sensorial solicitation (Holt, 1964). The sensorial information processed through mental imagery can produce visual, auditory, tactile, olfactory, gustatory or sensorimotor images (Betts, 1909; MacInnis and Price, 1987), reflecting the nature of the stimulus (Childers and Houston, 1983).

However, for most individuals it is visual imagery that dominates (White and Ashton, 1977; Gavard-Perret and Helme-Guizon, 2003). According to Lutz and Lutz (1978), three types of environmental stimuli can generate visual images: pictorial stimuli defined as *"any two-dimensional representation in which the stimulus array contains at least one element that is not alphabetic, numeric, or arithmetic"*, verbal stimuli (words) and imagery instructions. The stimuli studied herein – photos – therefore correspond to a specific form of pictorial stimuli.

Mental imagery can be displayed in individuals in terms of several dimensions, of which the main ones studied in the literature are quantity, ease of formation, valence, elaboration – mental self-imagery being a specific type of elaboration – and vivacity or clarity (Helme-Guizon, 1997). These last two dimensions are linked to the concrete and precise nature of the stimulus (Ellen and Bone, 1991; Babin and Burns, 1997; Miller and Stoica, 2003) as well as its familiarity (MacInnis and Price, 1987). An increase in the number of photos used should not make the stimulus more concrete or realistic, given that any photos added can be expected to be of an equivalent quality. Furthermore, Singh et al. (2000) showed that the number of photos had no influence on the vivacity of mental imagery. These dimensions of mental imagery will not therefore be included in our explanatory corpus on the effect of the number of photos used. Similarly, since the ease of formation is a dimension often associated with the quantity of images (Bone and Ellen, 1992), including the latter dimension in our explanatory corpus leads us to exclude the ease of formation dimension.

The quantity of mental imagery (Babin and Burns, 1997 ; Miller and Stoica, 2003) relates to the number of mental images produced in the consumer's mind. It is linked to the pictorial stimulus and can vary in accordance with the quantity of information presented (Gavilan et al., 2014) or the attractiveness of the stimulus (Miniard et al. 1991). Due to the varying degree of information contained in photos and the potential attractiveness of the elements represented, the number of photos used can have a mechanical influence on the quantity of mental imagery.

The valence of mental imagery relates to the agreeable, disagreeable or neutral nature of images (Kisielius and Sternthal, 1984; MacInnis and Price, 1987) and is directly linked to the positive or negative polarity of the stimulus (Helme-Guizon, 1997; Miller et al., 2000). Increasing the number of photos can modify the valence of the stimulus and therefore of the mental imagery.

Mental self-imagery refers to the mental images through which individuals perceive themselves interacting with the stimulus presented (Bone and Ellen, 1992; Escalas, 2004) and therefore relates to how the consumer projects his experience of the item for sale. It is a particular form of elaboration: sensorial information is processed by one's working memory and integrated with prior knowledge structures (MacInnis and Price, 1987). The literature emphasises the key role played

by this dimension of mental imagery in behavioural responses (Gregory et al., 1982; Ellen and Bone, 1991; Philips et al., 1995), particularly in a complex context of consumption where it is not possible to have direct and perfect knowledge of the product (Lao, 2013). Mental self-imagery is said to vary in accordance with the level of details about the consumption context (Yoo and Kim, 2014; Krishnamurthy and Sujan, 1999; Lao, 2013) and the transformational content (i.e. oriented towards experiencing the item) of the stimulus (Gavilan et al., 2014). Photos that provide details and transformational content are therefore thought to enable consumers to imagine themselves interacting with the item. The number of photos used can therefore modify mental self-imagery.

Mental imagery as a mediator of the influence of pictorial stimuli on behavioural responses

Several research studies have demonstrated the mediating role of mental imagery in the way that pictorial stimuli influence behavioural responses (Rossiter and Percy, 1980; Miniard et al., 1991; Babin, 1992; Lao, 2013; Gavilan et al., 2014; Yoo and Kim, 2014; Balbo and Gavard-Perret, 2015). However, the effects of mental imagery vary depending on the level of elaboration of images (MacInnis and Price, 1987). A pictorial stimulus can be processed at more or less profound cognitive levels (Craik and Lockhart, 1972), from simply paying attention to actually recognising the visual content and analysing its significance and even as far as elaboration.

The influence of pictorial stimuli on behavioural responses via mental imagery with a low level of elaboration can be primarily explained by a better memorisation of the stimuli when mental imagery is developed (Paivio, 2007). According to Paivio's dual coding theory (1971, 1986), the perception of pictorial stimuli gives rise to both visual and verbal coding. This dual coding in memory increases the number of extraction pathways (Gavard-Perret, 1987), which makes it easier to recover the stimuli during the decision-making process.

The influence of pictorial stimuli on behavioural responses via mental imagery with a higher level of elaboration can also be explained by improved stimuli memorisation: according to Craik and Lockhart (1972), the higher the level at which information is processed, the more likely it is to be recovered in the future. Furthermore, elaborated mental imagery, specifically mental self-imagery, can act on behavioural responses by giving rise to positive affect with a favourable impact on the consumer's attitudes (Escalas, 2004; Lao, 2013). Finally, according to MacInnis and Price (1987), elaborated mental imagery can enable the consumer to more easily integrate a high number of attributes and thereby better manage complex decisions. It also favours the processing of missing information by facilitating inferences based on the available information. Photos are therefore interpreted so as to better evaluate the product: a photo of a kitten is interpreted as a sign of

softness, and one of a sunset generates a sense that the product has beautiful colours (Scott, 1994; Mitchell and Olson, 1981).

The effects on mental imagery of an increase in the number of photos
Our research question involves studying the effect of increasing the number of photos on behavioural responses depending on the target market segment. We compare a situation in which consumers are presented with a small number of photos that enable them to construct a mental image to one in which they are presented with a higher number of photos. We take into account the information contained in the additional photos (potential presentation of new attributes) and the valence of that information (attributes perceived positively or negatively).

The effects of a low number of photos on the valence and quantity of imagery and mental self-imagery
This research is based on the fact that in the real world photos representing a product are not equiprobably chosen, contrary to the assumptions made in a lot of laboratory research (Olivola and Todorov, 2010): products or people are represented primarily by flattering photos. This means that a low number of photos should contain mainly positive information, whether in the case of high-end or low-end products, thereby generating positive mental imagery. Given that products are rarely limited to a few attributes, some attributes linked to the quality of the product are therefore missing. According to the probabilistic consistency theory (Dick et al., 1990), consumers form inferences about a product when they notice that information relating to a crucial attribute is missing. MacInnis and Price (1987) point out that when consumers' mental imagery is stimulated – which is the case when they are presented with photos – they tend to draw inferences about the missing attributes based on the available information about the product: these inferences are therefore based on inter-attribute correlations. A reduced number of photos could therefore cause the consumer – via inference – to produce many mental images relating to the product and thereby give rise to strong mental self-imagery: an individual who manages to imagine the product's missing attributes can more easily project his use thereof.

Adding non-informative photos: non-significant effects on mental imagery
As far as we are aware, only Singh et al. (2000) have specifically looked at the influence that the number of photos has on mental imagery. Their study compares the effect of an advertisement containing 8 photos to one containing 4 photos and concludes that mental imagery is not increased when more photos are presented. However, their research presents three major limitations: vivacity

was the only dimension of mental imagery measured, the photos added do not provide any additional information, and they all have the same valence. Yet this study already suggests that it may not be relevant to increase the number of photos if no additional information in relation to the attributes is revealed. Studies by Chowdhury et al. (2008, 2011), although not on mental imagery, confirm this finding and show that adding non-informative photos either does not influence or negatively influences attitudes. The authors do not identify any explanatory mechanism for these experimental results.

Adding informative photos: potentially negative or non-significant effects on mental imagery regardless of stimuli valence

There is currently no consensus in the literature on the addition of photos containing new information about product attributes. On the one hand, it suggests that the quantity of mental imagery and mental self-imagery can be increased as the number of photos increases. Photos provide additional indications about the product that may give rise to new mental images (Babin and Burns, 1997) – thereby increasing the quantity – and can enable the consumer to more easily form a projection of his experience with the product (Walter et al., 2007; Yoo and Kim, 2014). On the other hand, it tells us that the addition of photos can also reduce the quantity of mental images and worsen mental self-imagery. Too many details about the product can inhibit mental imagery: consumers faced with a large amount of information become more passive and do not seek to imagine the product in more detail. Rossiter and Percy (1983) explain for example that TV advertising, due to the dynamic images it brings to viewers, inhibit their elaborated mental imagery whereas press advertising makes readers more active and stimulates their imagination. Finally, the number of informative photos may have no effect on quantity or mental self-imagery to the extent that consumers are already able to form a picture of the product as a whole with a limited number of photos. The addition of informative photos would not therefore modify the quantity of mental imagery or the mental self-imagery. This lack of effect may however depend on the valence of the information presented in the additional photos.

Adding informative photos: effect of the valence of additional stimuli on mental imagery

Chowdhury et al. (2008, 2011) show that the influence of the number of photos depends on the valence of the photos added: they found that while adding positive photos has no effect on consumer attitudes, negative photos have a negative impact on attitudes. However, these results are limited as the authors studied a very small number of photos (4 max.) which did not provide

any information about the quality of the product, and they did not consider the effects on mental imagery.

The influence on mental imagery of the valence of the stimuli has primarily been studied by measuring the valence of mental imagery (Balbo and Gavard-Perret, 2015), which is linked to the polarity of the stimuli. Miniard et al. (1991) establish a positive link between the attractiveness of the stimulus and quantity of mental imagery generated. In contrast, studies into the influence that the valence of stimuli has on mental self-imagery do not allow a conclusion to be reached about this link. On the one hand, Elder and Krishna (2012) reveal that "motor simulation" – a form of automatic elaboration of mental imagery that involves imagining oneself using a product – is stronger (weaker) when a product with a negative valence is visually oriented towards the consumer's dominant (non-dominant) hand. A negative stimulus could therefore generate equally strong mental self-imagery as a positive stimulus, but subsequently have a negative influence on the behavioural response. On the other hand, several research studies have suggested that a negative stimulus limits mental self-imagery. Oliver et al. (1993) show that a negative stimulus reinforces discursive analysis to the detriment of mental self-imagery. This effect can be explained by the theory of "worry as avoidance" (Borkovec et al., 1998), developed in the field of therapeutic psychology. This theory suggests that the emotion generated by a negative stimulus leads to a regulatory strategy that involves modifying the stimulus's coding in the working memory (Hayes et al., 2010). The coding is more verbal than visual, and the individual tends to worry about the consequences of the stimulus rather than imagining them. This is a protective form of worry: thinking about a negative stimulus by verbalising it generates fewer negative emotions than imagining the stimulus (Vrana et al., 1986). Stöber (1998) notes that worry is associated with less vivid mental imagery which is more difficult to access and above all less closely linked to the self.

Research hypotheses

Direct effect of the number of photos moderated by target market segment
Rational individuals tend to prioritise the most flattering photos (Olivola and Todorov, 2010). In light of this, the consumer makes positive inferences about the overall quality of the item based on a limited number of photos. In the case of higher-range products, an increase in the number of photos containing positive information should therefore confirm initial inferences and not modify behavioural responses. However, for lower-range products, increasing the number of informative photos can potentially reveal the product's flaws, which will tend to worsen behavioural responses. We therefore hypothesise as follows:

H1. *An increase in the number of photos negatively influences favourable behavioural responses in the case of lower-range products; no influence can be observed in the case of higher-range products.*

An explanation based on mental imagery

We propose to explain this primary effect based on mental imagery (dimensions: valence, mental self-imagery and quantity).

Mediating effect of the valence of mental images

For lower-range products, the addition of informative photos is assumed to reveal negative information. This means the consumer is faced with both positive and negative information that can lead to both positive and negative affects. The affects generated by photos with an opposite valence are part of a compensation mechanism (Chowdhury et al., 2011). Adding less appreciated photos should therefore produce a less favourable affective response. Furthermore, an ill-appreciated stimulus diminishes mental imagery (Kisielius and Sternthal, 1984; Miller et al., 2000). In contrast, the addition of informative photos in the case of a higher-range product confirms its initially inferred quality. The consumer benefits from further positive information that does not generate an "addition" of positive affects but rather a peak effect centred around the most positive photo (Chowdhury et al., 2011). And given that the most favourable information is logically shown first, such additional photos should not be expected to heighten evaluations of the product. The valence of the mental imagery would therefore remain unchanged. The valence of mental imagery is a mediator of the influence of stimuli characteristics on behavioural responses (Balbo and Gavard-Perret, 2015), which leads us to the following hypothesis:

H2: The valence of the mental imagery mediates the influence that an increase in the number of photos has on favourable behavioural responses in the case of lower-range products:

- *adding photos that contain negative information about the product deteriorates the valence of the mental imagery, thus also diminishing behavioural responses;*
- *this mediating effect cannot be observed in the case of higher-range products, when the photos added provide additional positive information about the product, or when these photos are non-informative.*

Mediating effect of mental self-imagery, associated with the mediating effect of perceived worry

Products are rarely limited to a few attributes. Additional photos cannot be used to represent all of these attributes, and so the quantity of missing information remains non-negligible. The addition

of informative photos should not therefore inhibit mental imagery (Rossiter and Percy, 1983), and in particular mental self-imagery.

Adding photos revealing negative information about the product should deteriorate product appreciation and thus diminish mental imagery (Kisielius and Sternthal, 1984; Miller et al., 2000). Furthermore, the theory of worry as avoidance (Borkovec et al., 1998) suggests that the consumer adopts a strategy to regulate his emotions by limiting mental self-imagery in favour of the worry mechanism. The worsened mental self-imagery then leads to a reduction in favourable behavioural responses (Gregory et al., 1982; Anderson, 1983; Lao, 2013). Similarly, an increase in perceived worry can be expected to reduce favourable responses to the product when photos containing negative information are added: worried individuals tend to adopt behaviour that will protect them (Peters et al., 2006; Schmiege et al., 2009). Conversely, adding photos containing positive information should not be expected to favour the level of mental self-imagery or reduce worry since positive inferences formed on the basis of a small number of photos (Dick et al., 1990) already enable the elaboration of mental images and the reduction of perceived worry. In order to test this explanation of a reduction in mental self-imagery by an increase in worry, we propose the following two hypotheses:

H3a*: Mental self-imagery mediates the influence that an increased number of photos has on favourable behavioural responses in the case of lower-range products:*
- *adding photos that contain negative information about the product diminishes mental self-imagery, thus also diminishing favourable behavioural responses;*
- *this mediating effect cannot be observed in the case of higher-range products, when the photos added provide additional positive information about the product, or when these photos are non-informative.*

H3b*: Perceived worry mediates the influence that an increased number of photos has on favourable behavioural responses in the case of lower-range products:*
- *adding photos that contain negative information about the product increases perceived worry, thus diminishing favourable behavioural responses;*
- *this mediating effect cannot be observed in the case of higher-range products, when the photos added provide additional positive information about the product, or when these photos are non-informative.*

No role played by the quantity of mental images

The addition of informative photos should not inhibit the quantity of mental imagery (Rossiter and Percy, 1983) as they do not enable a perfect representation of the product as a whole. Furthermore, given that the most favourable information is logically displayed first, additional photos containing

positive information should not favour the quantity of mental images any more than photos containing negative information (Miniard et al., 1991). Finally, if a higher number of photos can allow the consumer to form a visual representation of various aspects of the product and thereby produce more mental images, those faced with a reduced quantity of information about a product will imagine the elements not visually presented (Dick et al., 1990) based on the photos displayed (Smith, 1991). This means it is likely that the quantity of mental images will not increase with a higher number of photos, regardless of the valence of the photos added or their level of information, since an increase in the quantity of available information about the product diminishes the mechanism of inferences. We therefore hypothesise that adding photos does not modify the quantity of mental images; this dimension is retained for the purposes of our analyses.

Study 1 – Field study

The objective of this first study is to test H1 with potential buyers who have actually consulted classified ads for the purposes of buying a property.

Methodology and data

The data was collected through *meilleursagents.com* which uses agents as intermediaries to publish property ads. Professionals working in the sector have the possibility to post ads and choose the number of photos they wish to upload, as well as indicate a certain number of criteria (number of rooms, price, surface area, storey, presence of balcony, lift, cellar or car park, construction date and geographic area) to describe each property. We selected ads for apartments for sale within the city limits of Paris, covering a 9-month period from 1 January to 30 September 2016. We selected a total of 31,578 classified ads during this period. Due to the fact that indicating the different criteria is optional, we restricted the number of ads selected to those in which all criteria were provided.

Two independent variables are considered in this study: the number of photos visible on the page of the property for sale ranges from 1 to 11 (the last group "11" includes ads with 11 or more photos), and the target market segment, determined by the price per square metre (price indicated on the ad, including agency fees, divided by the number of square metres in the surface area). This figure is an indicator of the intrinsic quality of the property, having taken into account the control variables relating to location.

The dependent variables – consumers' behavioural responses – are determined by click rates and the duration of the sale. Click rates are generally used in research studies on online behaviour (Robinson et al., 2007) and correspond to the number of people who try to contact the real estate

agency divided by the total number of Internet users who consulted the ad. This variable is determined by taking the number of contacts for every 1,000 visits in logarithmic format in order to satisfy conditions of normality. The duration of the sale enables us to study the indirect influence of the number of photos on the purchasing behaviour of consumers (via the click rate). This variable is traditionally used in real estate analyses (Donald et al., 1996) and is determined by the amount of time the ad remains online.

The control variables integrate all of the criteria indicated about the apartments (see Appendix 1a). In order to limit the effects of atypical properties that correspond to specific markets and maintain the most homogenous possible basis for the purposes of comparison, we retained 3,658 comparable classified ads, which form our database. The properties for sale in our sample are consistent with the real market. Appendices 1b and 1c describe the selection process.

Field study results

Effect of the number of photos on the click rate depending on the target market segment

A moderation model (Appendix 1d) was used to test whether the effect of the number of photos on the click rate is dependent on the property's target market segment. This model was implemented using the macro PROCESS (Model 1). The test relies on the bootstrapping procedure, which is less sensitive to potential multi-normality problems than Sobel's Z test (Hayes, 2013). It involves testing the interaction effects on the click rate between the number of photos and the target market segment as determined by the price per square metre.

The results of the model (Appendix 1e) show that, having controlled for all of the variables, the number of photos has a negative effect on the click rate ($a1 = -0.101$; $p < 0.000$) while the target market segment (price per square metre) has no direct effect. The correlation between the number of photos and the price per square metre is not too high ($r = 0.19$), making it possible to calculate the interaction term, which proved to be significant ($a3 = -0.008$; $p < 0.01$). The increase in the R^2 due to the interaction effect is significant (var $R^2 = 0.002$; $F = 7.4$, $p < 0.01$), allowing us to conclude that the effect of increasing the number of photos on the click rate depends on the target market segment.

The price per square metre variable does not represent a normative focal value due to the heterogeneity of the properties available on the real estate market and the fact that there is no single average price (different organizations suggest different average prices: notaries, who are 6 to 9 months behind the market, and websites such as *meilleursagents*, *seloger* or *pap* use different algorithms). A floodlight analysis was therefore conducted (Cadario and Parguel, 2014; Spiller et

al., 2013) using the Johnson-Neyman criterion, which involves testing at which levels of the moderator (price per square metre) – not pre-determined – the interaction is significant. The results (Appendix 1f) show that for lower-range properties (price per square metre below 10,331 euros), an increase in the number of photos tends to significantly reduce an ad's click rate, whereas for higher-range properties (price per square metre above 10,331 euros), increasing the number of photos has no significant effect on the click rate. H1, which suggests an "asymmetric revelation" effect, is therefore validated.

Mediation via the click rate of the effect of the number of photos on the duration of the sale, depending on the target market segment

In order to further develop our analysis of behavioural responses, we can assume that this negative revelation effect has a harmful impact on the sale of the property concerned as it limits the possibility for the seller to convince the potential buyer in person: in the case of lower-range properties, the reduction in the click rate caused by the number of photos could reduce the efficiency of the sale. A moderated mediation analysis was therefore conducted to estimate the explanatory capacity of this model with regard to the speed of the sale (Appendix 1d). The bootstrapping technique to determine the precise nature of indirect effects (Hayes and Scharkow, 2013) was once again considered to be more rigorous than the approach used by Sobel (1982) or Baron and Kenny (1986) to study moderated mediation, and model 7 from Hayes's macro PROCESS was used (Borau et al., 2015).

The objective is to test the indirect effects of the number of photos on the duration of the sale via the click rate. In order to be a mediator, the indirect effect (*ab*) must be significant with a confidence interval of 95%, excluding "zero". The results show that the number of photos has no direct effect on the duration of the sale. However, the click rate reduces ($b1 = -0.434$; $p < 0.000$) the duration of the sale (Appendix 1g). The results confirm that the indirect effect is significant ($int_1 \times b_1 = -0.004$; $[-0,0063; -0,0009]$) and the mediating effect of the click rate proves to be significant only for lower-range properties (Appendix 1h): an increase in the number of photos reduces the click rate, which in turn increases the duration of the sale. Figure 1 presents all of the results of this field study.

Figure 1 – Mediation via the click rate of the effect of the number of photos on the duration of the sale, moderated by the target market segment
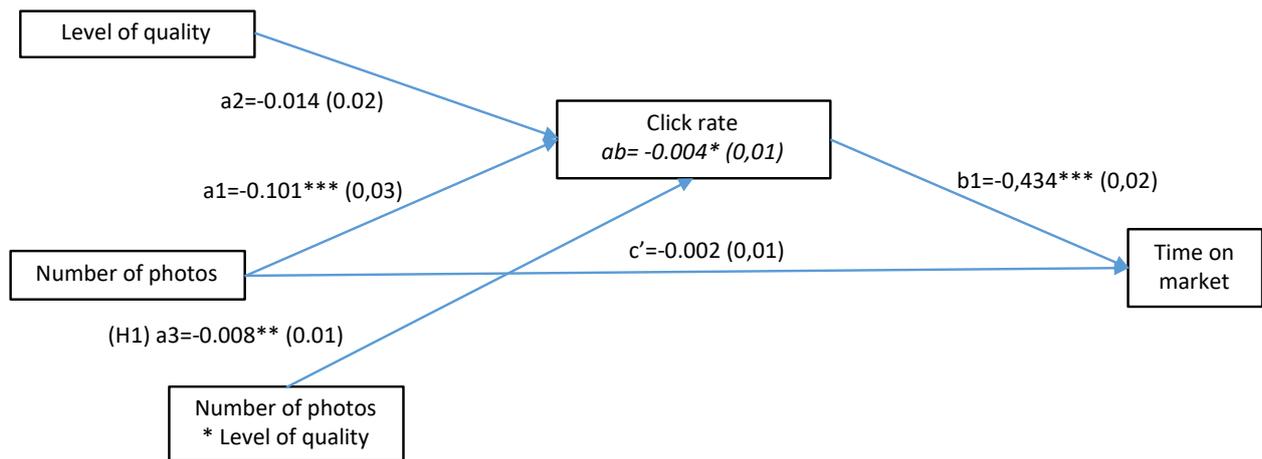
Sig:***p<0,001 ; **p<0,01 ; *p<0,05; (standard error); *aibi=mediation effect*

Number of negative photos in ads for lower-range properties

The negative effect of the number of photos on the click rate can be explained by the fact that ads for lower-range properties are likely to display more photos containing negative information than ads for higher-range properties. We therefore conducted a random extraction from two samples of classified ads corresponding to two different market segments, with 6 to 7 photos and in various arrondissements (10, 11, 12, 13, 14). In 26 extracted ads for higher-range properties (27 lower-range), the average price was 11,689 euros (7,117 euros) with a comparable average surface area in both groups (59 m² *vs* 57 m² respectively). 231 photos (184) were extracted for higher-range (lower-range) properties, giving an average of 7.5 (6.8) photos per ad. Four researchers coded the valence of the information contained in the photos. The higher-range properties displayed an average of 0.2 photos per ad containing negative information, compared to 3.0 in the case of lower-range properties. Almost all of the ads displayed photos containing positive information first. This conclusion allowed us to develop the conditions for an experiment.

Study 2 – Experimental study

Methodology

Experiment plan

The dimensions processed are the number of photos displayed on the real estate ad, the information revealed in the photos and the valence of that information (target market segment). Three experiments were conducted with each one presenting an initial condition comprising an ad for a

3-room apartment with 3 photos containing positive information. We then compared this initial situation (condition 3 POS) with the addition of: (1) 3 similar non-informative photos (condition 6 POS=), making it possible to evaluate only the effect of increasing the number of photos; (2) 3 photos containing positive information about other rooms (condition 6 POS+); (3) 3 photos containing negative information about other rooms (condition 3 POS 3 NEG). The stimuli used are presented in Appendix 2a.

Study context

124 participants, Masters students living in Paris or the Paris region, looked at classified ads as part of an online questionnaire administered using Qualtrix in experimental laboratory conditions. Following an introduction outlining the context of the study, respondents were shown a scenario (Appendix 2b) in which they were asked to select apartments for members of their family (couple with a child) looking to buy an apartment within the city limits of Paris. They were required to evaluate the extent to which they wanted to make contact with the agency to acquire more information. In the interests of realism, the 12 photos of apartments were taken from real ads.

The dependent variable is determined by intentions to click with a view to contacting the agency. The mediator variables related to the quantity of mental images (Babin and Burns, 1997), their valence (Miller et al., 2000), mental self-imagery (Green and Block, 2000; Lao, 2013) and perceived worry (Schmiege et al., 2009). The control variables relate to lasting involvement (Strazzieri, 1994) and subjective expertise (Lombart, 2004). All of the measures (Appendix 2c) were adapted to the context of real estate.

Random attribution and control of experimental data processing

The first level of verification relates to the relevance of the random attribution with regard to the following criteria: lasting involvement, subjective expertise, age and gender. ANOVA analyses (Appendix 2d) reveal that respondents had a high level of involvement with no observable differences between the different conditions ($F = 0.3$; ns). This was also true of subjective expertise ($F = 0.9$; ns). There is an equal gender distribution (average of 32% male; $F = 0.2$; ns.) and age distribution (average of 23 years old; $F = 0.26$; ns.). These variables did not differ from one condition to the other and are therefore excluded from the analyses that follow.

The second level of verification relates to the processing of the target market segment (Appendix 2e). Photos containing negative information about the properties were negatively evaluated: the average valence of the photos added in condition 3 POS 3 NEG is perceived less favourably (m = 2.3) than the initial condition 3 POS (m = 4.9; $t(62) = 10.5$; $p < 0.000$), while the average valences

of the photos added in conditions 6 POS= and 6 POS+ were not significantly different to the initial condition. As expected, respondents perceived different target market segments: condition 3 POS 3 NEG was associated with lower-range properties (m = 1.2) than the initial condition 3 POS (m = 2.4; t(62) = 11.3; p < 0.000), and the segments associated with conditions 3 POS, 6 POS + and 6 POS= were not significantly different.

Experiment results

Three experiments were used to test our hypotheses. They required the implementation of a parallel mediation model to account for the simultaneous effects of four mediators (quantity of images, valence, mental self-imagery and perceived worry). In line with existing research on mental imagery (Lao, 2013; Balbo and Gavard-Perret, 2015; Vellera and Gavard-Perret, 2016), we used the procedure recommended by Hayes (2013) (models 4). The equations tested are presented in Appendix 2f.

The results of the first experiment (Appendix 2g) reveal that, compared to the 3 initial photos, the addition of 3 non-informative photos has no influence on intentions to click. These photos do not modify the quantity of mental images, their valence or mental self-imagery, nor do they reduce perceived worry. Figure 2 shows that simply increasing the number of similar photos has no effect on mental imagery or behavioural responses. These results are consistent with Chowdhury (2008, 2011).

Figure 2 – Study 2.1: Effect of adding non-informative photos
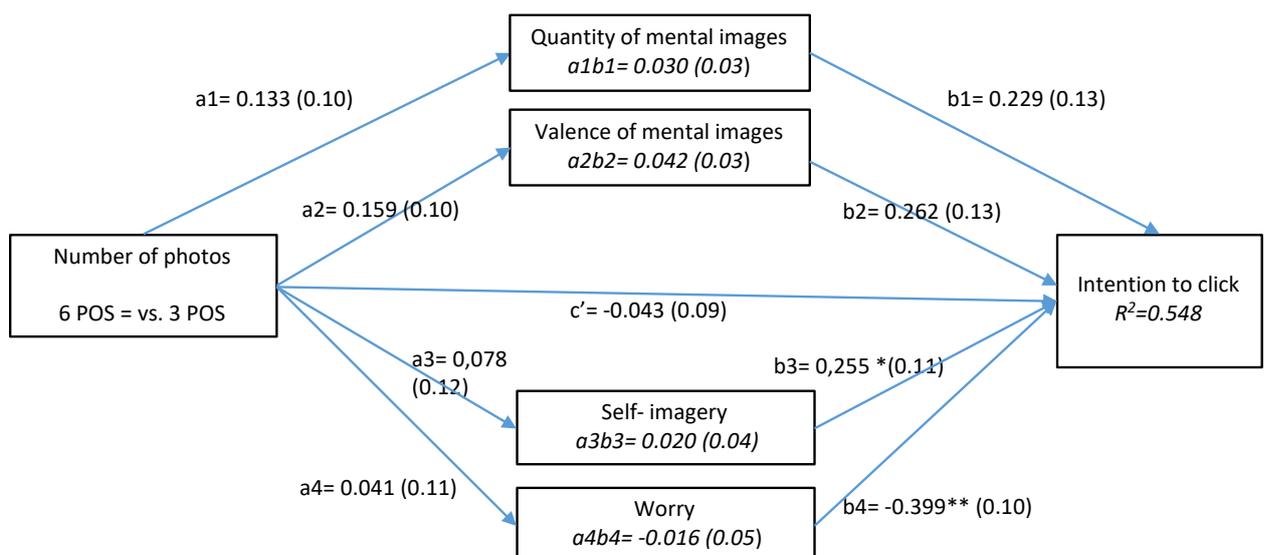
Sig:***p<0.001 ; **p<0.01 ; *p<0.05; (standard error); *aibi=mediation effect; R² indicated for complete model*

The results of the second experiment reveal that adding 3 photos containing positive new information about other rooms in the apartment has no significant impact on intentions to click (Appendix 2h). Once again, the addition of these 3 photos does not change the quantity of mental images, their valence or mental self-imagery, nor does it reduce perceived worry among respondents. Although this positive information improves the valence of the mental images (a2 = 0.344; p < 0.05), this does not prove to mediate the influence of the number of photos on intentions to click. This second experiment replicates the results of the first. Figure 3 presents these results.

Figure 3 – Study 2.2: Effect of adding photos containing additional positive information – the case of a higher-range property
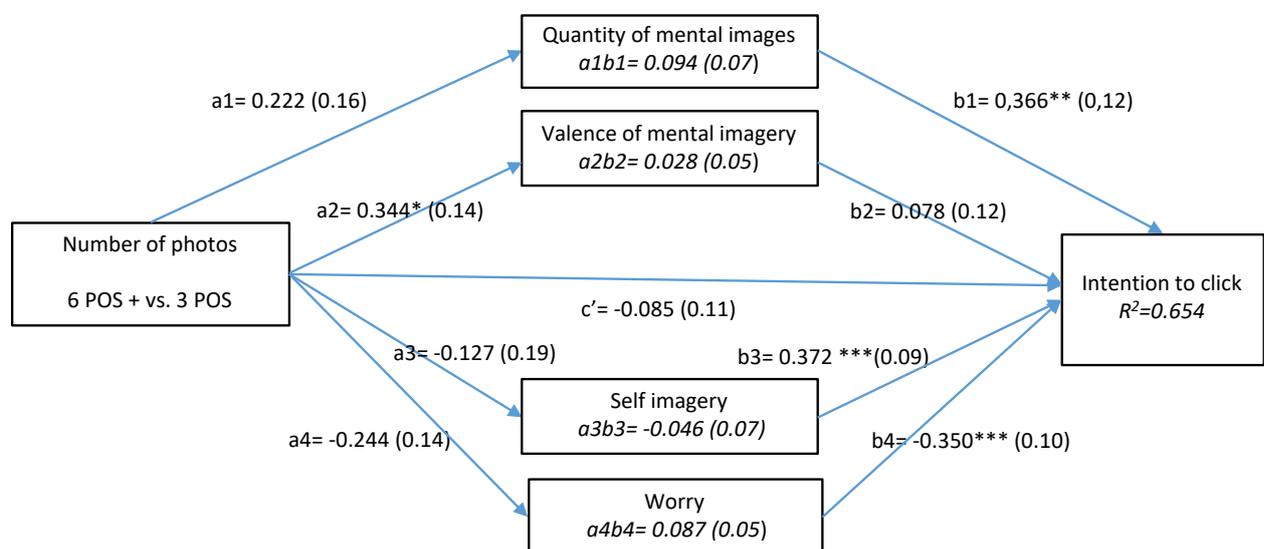
Sig:***p<0.001 ; **p<0.01 ; *p<0.05; (standard error); *aibi=mediation effect; R² indicated for complete model*

In contrast, the results of the third experiment (Appendix 2i) reveal that adding 3 photos containing negative information significantly reduces intentions to click (c= -1.969; p < 0.000). This overall effect can be broken down into a direct effect (c'= -0.664; p < 0.05) and indirect effects via a reduction of the valence of the mental images (a2b2 = -0.609; [-1.39; -0.10]), a reduction in mental self-imagery (a3b3 = -0.184; [-0.59; -0.01]) and an increase in perceived worry (a4b4 = -0.444; [-1.05; -0.07]). However, this negative information does not modify the quantity of mental images. In fact, with the initial condition, respondents produced a quantity of mental images (m = 4.5/7) that was not significantly modified with the addition of negative photos (m = 4.2; ns.). Figure 4 presents these results.

Figure 4 – Study 2.3: Effect of adding photos containing additional negative information – the case of a lower-range property
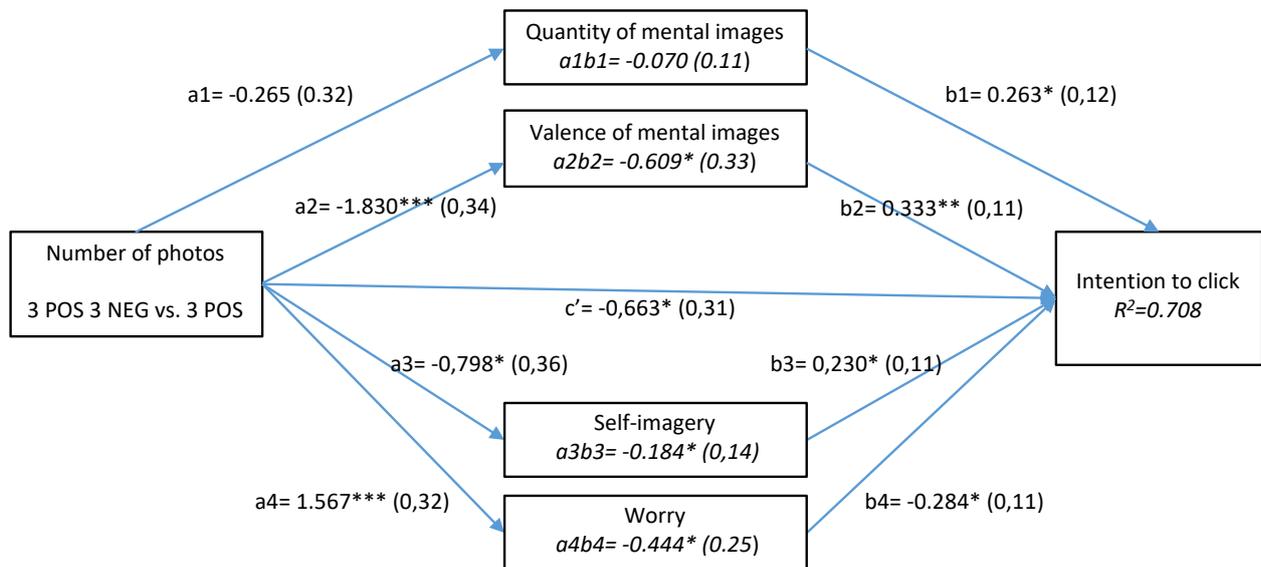
Sig:***p<0.001 ; **p<0.01 ; *p<0.05; (standard error); *aibi=mediation effect; R² indicated for complete model*

In order to test the robustness of the results obtained under PROCESS, structural equation model constructed on latent variables was tested for each condition using *SmartPLS*. The results obtained with the latent variables proved similar, i.e. non-significant for experiments 1 and 2 and significant for experiment 3 (except for the quantity dimension). Finally, the power of the last model calculated with *G*Power 3* produced a satisfactory value, allowing us to conclude that the results have good reliability.[4]

Lastly, the three experiments confirm the "asymmetric revelation" effect found in study 1 and replicate the validation of H1. These models show that the valence of mental images has a negative mediating effect on the influence of the number of photos in the case of lower-range properties; this mediation is not observed in the case of higher-range properties: H2 is validated. H3a and H3b are also validated: mental self-imagery and perceived worry are parallel mediators of the influence that the number of photos has on behavioural responses in the case of lower-range properties. Finally, these experiments show that the quantity of mental images plays no role when photos are added, whether informative or non-informative.

Conclusion and discussion

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[4] Ces résultats (modèles d'équations structurelles et analyses de puissance) sont disponibles sur demande aux auteurs

The aim of this research was to study the extent to which an increase in the number of photos influences behavioural responses and to explain the underlying mechanism, taking into account the target market segment for the item being sold. Singh et al. (2000) called on researchers to explore more "natural" contexts for the effect of the number of photos used. Our empirical study, conducted on 3,658 classified real estate ads, provides an initial response. Confirming their results in laboratory conditions, we find that increasing the number of photos has no significant effect on the behaviour of potential buyers. However, this absence of any effect only applies to higher-range properties: our results reveal that increasing the number of photos has a negative effect in the case of lower-range properties. This highlights what we term an "asymmetric revelation" effect that is dependent on the intrinsic quality of the item for sale. In order to clearly explain the mechanisms underpinning this effect, laboratory experiments were conducted in relation to an initial scenario with 3 photos containing positive information by introducing 3 different conditions with 3 additional photos on top of those present in the initial scenario (3 non-informative photos, 3 photos containing additional positive information and 3 photos containing additional negative information). These processes reveal how respondents evaluate the target market segment of each property. The results of these experiments confirm the "asymmetric revelation" effect identified in the field study. This research study proposes mechanisms explaining this effect.

In the case of higher-range properties, the lack of any impact of an increase in the number of photos can be explained by the probabilistic consistency principle (Dick et al., 1990) according to which inferences are made based on a limited number of photos. These inferences enable the consumer to form a representation of the product just as well as with a higher number of photos, which we show by measuring mental imagery (dimensions: valence, quantity and mental self-imagery). Singh et al. (2000) and Chowdhury et al. (2011) found that adding non-informative photos has no effect, a result which our experimental study confirms and extends to scenarios in which the photos provide additional information about the quality of the item for sale. Chowdhury et al. (2011) analysed their results as revealing a threshold effect in affect by showing that the addition of positive photos does not increase positive affect. We propose an alternative explanation based on mental imagery and the role of inferences. Our results also contribute to the existing literature on the effects of quantity: several studies have suggested that a large quantity of similar stimuli does not increase mental imagery as this imagery is already produced through the representation of a single prototypical stimulus (Hsee and Rottenstreich, 2004; Kahneman et al., 2000). We show that the presence of several complementary stimuli relating to the same property does not increase mental imagery either.

For lower-range properties, the addition of photos containing negative information worsens behavioural responses. This finding can be explained by the elaboration of more negative mental images and a reduction in the intensity of the mental self-imagery. In contrast to Elder and Krishna (2012) and Keller and Block (1996), who show that a negative stimulus can generate a high level of mental self-imagery but with a negative valence, our results show that a negative stimulus can also lead to diminished mental self-imagery, i.e. the refusal to project oneself interacting with the item for sale. Chowdhury et al. (2011) analysed the effect of non-informative negative photos based on the negative affect generated. We show that a negative effect can also be observed with informative photos and propose an explanation based on mental imagery that takes into account the individual's initial overall affective response (Derbaix and Pham, 1989). The theory of worry as avoidance (Borkovec et al., 1998), which we test by jointly measuring mental self-imagery and perceived worry, points to the role played by emotions in mental imagery: individuals faced with a negative stimulus tend to adopt a mechanism that regulates their emotions, causing them to mobilise their cognitive resources for verbal thoughts (formulating their worries) rather than to produce mental images (Hayes et al., 2010). Our results can be interpreted in light of the literature on the influence of affective responses on the cognitive system (Zajonc, 1980; LeDoux, 1996; Damasio, 1995), which emphasises the influence of emotional information on memorisation and decision-making. While several studies on consumer psychology have shown the effect of mental imagery on emotions (Pham, 2004; Escalas, 2004; Brehonnet et al., 2012; Lao, 2013), our results point to the need to consider the effect of negative emotions on projections of the self interacting with items for sale.

From a managerial perspective, this research study shows that the effect of photos is more complex than the mere addition of visual representations to provide buyers with further information. It enriches previous reflections on the "more is better" bias often observed among vendors (Weaver et al., 2012). Our results counter the economic view that an increase in the number of photos used makes it possible to adjust the item for sale to the preferences of the consumer. These preferences are not static and can change and adapt to different contexts (Burson, 2007): the fact that in the case of lower-range products a low number of photos generates high click rates does not necessarily result in phenomena of dashed expectations or disappointment (Oliver, 1977). On the contrary, sales are significantly quicker with a few photos than with many photos which reveal negative information. In the case of an online ad that leads to direct contact (websites for real estate, meeting websites or classified ads, for example), the "teaser" option with a limited number of photos is therefore more effective as it maintains the possibility of being able to access a higher number of potential buyers and developing a targeted sales pitch when meeting buyers in person.

Our results also point to a recommendation that professionals or other individuals should pay greater attention when selecting the photos to be displayed on search engines in order to make a good first impression (Naylor, 2007). In this regard, there are two main focuses for real estate professionals. The first is to optimise the content of photos by developing their expertise in "home staging" or using the services of a professional such as a "decorologist" (Barnett, 2014). Morrow and Elroy (1981), for example, showed that a space is most attractive when it is "moderately" tidy. The second is to improve and measure the quality of their photographs. Specialised platforms (such as *OuiFlash*) now offer real estate agencies the services of professional freelance photographers who will rank their photographs. A pre-test of the effectiveness of their photos can be conducted by measuring their capacity to maximize the positive valence of the mental images elaborated and to improve mental self-imagery while reducing the levels of worry among potential buyers.

Limitations and future research

This study carries a certain number of limitations that point to new research avenues. First, in our field study the quality of the photos (professional or amateur), their content (interior/exterior, presence/absence of a layout diagram, etc.) and the content of the text were not controlled, which might explain the model's weak R^2 (0.135). For example, it would be beneficial to use a system of image recognition that could categorise the image content into large databases. In the experimental study, the single-item measure of perceived worry presents a methodological limitation Furthermore, our respondents were students who were asked about a scenario that involved looking for an apartment. It would be useful to replicate and enrich these results with real prospective buyers, taking into account the utilitarian or experiential dimension of the purchase, given that the latter is said to increase resources and mental imagery (Choi and Fishbach, 2011). Real estate purchases are considered utilitarian in the context of an investment and experiential when made in response to the need for a primary residence (Bracke, 2015). Furthermore, our study only relates to the number of photos used; it would be interesting to study both the influence of the text and the number of photos on mental imagery. In particular, the literature highlights the effects of instructions to imagine (Lutz and Lutz, 1978; Ellen and Bone, 1991; Lao, 2013; Vellera and Gavard-Perret, 2016); phrasal structures such as "*Imagine yourself in this property*" could also be tested. Similarly, the effects of congruence between the additional photos and the text could be explored in more depth.

Our results also raise questions about the arrival of technological tools that can make virtual visits possible. This way of representing a property could more easily reveal negative aspects to potential

buyers and inhibit mental imagery by providing too much information (Rossiter and Percy, 1983; Babin and Burns, 1997). This question is also relevant to real estate professionals who use augmented reality tools, sometimes seen by consumers as gadgets (Langlotz et al., 2013) rather than a way to encourage mental self-imagery.

Finally, it would be useful to replicate this study in sectors in which the number of photos uploaded is a particularly strategic issue. A negative revelation effect would be highly damaging in the tourism sector, on recruitment platforms or dating websites. More generally, the challenge of ensuring a presence on search engines and social networks is about achieving the *perfect pitch* (Edmiston, 2016), which means choosing those visual and textual elements that create the best possible first impression, whether for products, services or people. This makes the magic of a real-life meeting more likely to take place.

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Appendix 1a – Control variables

The control variables used in the model for Study 1 are as follows:
- Surface area in square metres
- Number of rooms
- Storey
- Top-storey property (or not)
- Presence (or not) of a balcony
- Presence (or not) of a lift
- Presence (or not) of a cellar
- Presence (or not) of a car park
- Building construction date: 5 categories were established to reflect the architectural styles in Paris (Paris stone buildings predating 1850; buildings from the Haussmann era constructed between 1850 and 1905; buildings constructed between 1905 and 1945; post-war buildings associated with the style of the *Trente Glorieuses* (1945–1974); and contemporary buildings constructed since 1975, the reference category in our analyses)
- Geographic sector of the property: 6 sectors were identified reflecting their sociological homogeneity (Paris city centre (arrondissements 1, 2, 3 and 4), the left bank (5, 6, 7 and 8), the right bank (9, 10 and 11), the south-east (12, 13 and 14), the reference category, the south-west (15, 16 and 17) and the north-east (18, 19 and 20))

Appendix 1b – Apartment selection criteria

We selected apartments for sale within the Paris city limits with average prices per square metre of between €3,000 and €15,000. Properties priced at below €3,000 per m^2 mostly require significant refurbishments and would therefore generate different mental imagery mechanisms to apartments which can be inhabited immediately. Properties that cost more than €15,000 per m^2 fall under the luxury market segment, which is run by dedicated agencies. Properties with a surface area smaller than 9 m^2 were also excluded as they do not meet the minimum legal requirement in France.[5] Finally, only properties constructed before 2011 were selected (thereby excluding new builds, which represent a separate market particularly in terms of price).

Appendix 1c – Description of apartments for sale

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5 http://www.notaires.paris-idf.fr/actualites/location-de-micro-logements-et-de-petites-surfaces-quelles-sont-les-regles.

The 3,658 classified ads that make up our database reflect real market conditions: according to Insee, in 2013 97% of housing in Paris was made up of apartments, and the average number of rooms was 2.8 (compared to 2.7 in our sample), with an average surface area of 60.4m² (vs 57.9).

<u>Proportions of criteria matched by apartments for sale</u>

N = 3658	Criterion	%
	Top storey	11.1%
	Balcony	11.4%
Characteristics	Lift	52.5%
	Cellar	65.4%
	Car park	10.8%
	Paris centre (arr. 1,2,3,4)	6.6%
	Left bank (arr. 5,6,7,8)	9.2%
Location	Right bank (arr. 9,10,11)	17.3%
	South-east (arr. 12,13,14)	14.3%
	South-west (arr. 15,16,17)	33.1%
	North-east (arr. 18,19, 20)	19.3%
	Old Paris	8.0%
	Haussmann	40.8%
Construction period	1905–45	20.3%
	1945–74: *Trente Glorieuses*	21.0%
	Post-1975	9.9%

<u>Means and standard deviations of apartment characteristics</u>

	Minimum	Maximum	Mean	SD
Number of photos	1	11	6.7	2.4
Number of rooms	1	8	2.7	1.3
Price per m²	4091	15000	9102	1688
Surface (m²)	9	217	59.7	30
Storey	1	30	3.4	2.4

<u>Appendix 1d – Equations used in moderation and moderated mediation models</u>

Moderation and moderated mediation can be represented mathematically with the following regression models:

$$M = \beta_1 + a_1 X + a_2 Z + a_3 (X \times Z) \text{ (model 1)}$$

$$Y = \beta_2 + c' X + b_1 M \text{ (model 2)}$$

The indirect effect, i.e. the overall moderated mediation index, is written as follows:

$$t_1 \times b_1 \text{ where } t_1 \text{ is the interaction effect between X and Z}$$

Where

- Y: Duration of sale

- X: Number of photos
- M: Click rate (mediator)
- Z: Price per m^2 (moderator)

Appendix 1e – Effect of the number of photos on click rates (model 1)

DV	IV	F	R^2	Coeff.	Std. Err..	T	p
Click rate		8.1***	0.041				
	Constant			-3.811	0.40	-9.45	0.000
	Number of photos			-0.101	0.03	-3.59	0.000
	Market segment (price per m²)			0.014	0.02	0.60	0.550
	Inter. No. of photos*Price per m²			0.008	0.00	2.73	0.006
	Total surface area			0.000	0.00	0.69	0.488
	Storey			0.007	0.01	1.12	0.262
	Top storey			0.055	0.04	1.28	0.202
	Balcony			0.001	0.04	0.01	0.989
	Lift			0.115	0.03	3.84	0.000
	Cellar			0.051	0.03	1.77	0.077
	Car park			0.028	0.05	0.59	0.556
	Paris centre (arr. 1, 2, 3, 4)			0.135	0.07	2.01	0.045
	Left bank (arr. 5, 6, 7, 8)			-0.133	0.06	-2.15	0.032
	Right bank (arr. 9, 10, 11)			-0.020	0.05	-0.41	0.680
	South-west (arr. 15, 16, 17)			0.023	0.04	0.56	0.577
	North-east (arr. 18, 19, 20)			0.182	0.05	4.00	0.000
	Old Paris			-0.016	0.07	-0.23	0.818
	Haussmann			0.148	0.05	2.89	0.004
	1905–45			0.033	0.05	0.60	0.546
	1945–74			-0.048	0.05	-0.95	0.343

*** $p < 0.001$; refs: arr.: South-east: 12, 13, 14; period: post-1975; bootstrap = 1000

Appendix 1f – Effect of the number of photos on click rates depending on target market segment

Market segment (euros per m²)	Effect	Std. error	t	p

3397	**-0.073**	**0.02**	**-4.07**	**0.000**
4557	**-0.063**	**0.01**	**-4.32**	**0.000**
5717	**-0.054**	**0.01**	**-4.66**	**0.000**
6297	**-0.049**	**0.01**	**-4.86**	**0.000**
7458	**-0.039**	**0.01**	**-5.24**	**0.000**
9198	**-0.024**	**0.01**	**-4.07**	**0.000**
9778	**-0.019**	**0.01**	**-2.97**	**0.003**
10331	**-0.014**	**0.01**	**-1.96**	**0.050**
10359	-0.014	0.01	-1.92	0.056
10939	-0.009	0.01	-1.06	0.290
11519	-0.004	0.01	-0.41	0.683
12679	0.006	0.01	0.46	0.648
13260	0.011	0.01	0.75	0.455
14420	0.021	0.02	1.16	0.245
15000	0.026	0.02	131	0.189

Appendix 1g – Effect of the number of photos on duration of sale (model 2)

	F	R²	Coeff.	Std. err.	t	p
Duration of sale	31.6***	0.1354				
Constant			4.356	0.46	9.45	0.000
Click rate			-0.434	0.02	-20.29	0.000
Number of photos			-0.002	0.01	-0.31	0.756
Total surface area			0.001	0.00	2.46	0.014
Storey			-0.016	0.01	-2.07	0.038
Top storey			0.089	0.06	1.57	0.116
Balcony			-0.185	0.05	-3.60	0.000
Lift			-0.103	0.04	-2.65	0.008
Cellar			-0.097	0.04	-2.60	0.009
Car park			-0.186	0.06	-3.02	0.003
Paris centre (arr. 1, 2, 3, 4)			0.244	0.09	2.83	0.005
Left bank (arr. 5, 6, 7, 8)			0.135	0.07	1.84	0.066
Right bank (arr. 9, 10, 11)			-0.171	0.06	-2.79	0.005
South-west (arr. 15, 16, 17)			-0.114	0.05	-2.14	0.033
North-east (arr. 18, 19, 20)			-0.108	0.06	-1.86	0.063
Old Paris			-0.431	0.09	-4.67	0.000
Haussmann			-0.443	0.07	-6.64	0.000
1905–45			-0.291	0.07	-4.15	0.000
1945–74			-0.115	0.06	-1.77	0.078

Appendix 1h – Effect of mediator (click rate) depending on moderator values (price per m²)

	Price per m²	Effect	Std. err.	CI (95%)	
Click rate	7414	0.017	0.00	0.011	0.024
Click rate	9101	0.011	0.00	0.006	0.016
Click rate	10788	0.005	0.00	-0.002	0. 012

Appendix 2 – Experimental study

Appendix 2a – Experiment conditions

Text of ad included in each condition:

"In a lively neighbourhood we are offering this 62 m² 3-room property. It includes a living room and two bedrooms. Located on the 3rd storey of a 6-storey stone building with a due east aspect overlooking the street. Metro station just 4 minutes away. Few refurbishments needed."

Condition 1 - **3 POS**: 3 photos containing positive information

Living room	Entrance	Bedroom 1
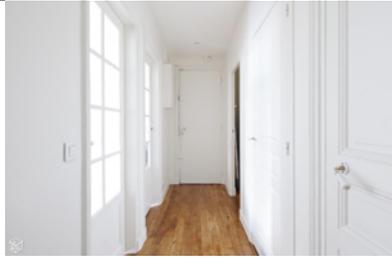
Condition 2 - **6 POS =**: 3 photos containing positive information + 3 additional photos without any new information (3 views of the living room presented in the first photo)
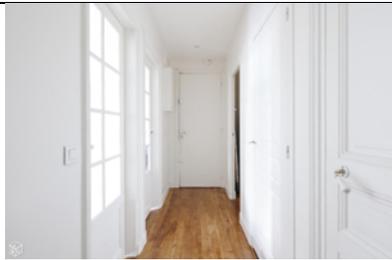
Living room	Entrance	Bedroom 1
Living room	Living room	Living room
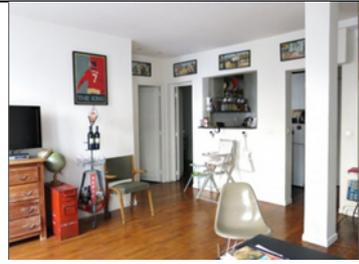
Condition 3 - **6 POS+**: 3 photos containing positive information + 3 additional photos containing new positive information (representing the bathroom, kitchen and second bedroom, which were not presented in the initial condition). Higher-range property.

Living room	Entrance	Bedroom 1
Bathroom	Kitchen	Bedroom 2

Condition 4 - **3 POS 3 NEG**: 3 photos containing positive information + 3 additional photos containing new negative information (representing the bathroom, kitchen and second bedroom, which were not presented in the initial condition). Mid-range property.

Living room	Entrance	Bedroom 1
Bathroom	Kitchen	Bedroom 2

Hello. This study relates to the real estate market. We will present you with a purchasing scenario accompanied by a real estate ad.

"Imagine that members of your family, a couple aged 45–50 with a 10-year-old child, are living outside Paris (parents, uncles, aunts, etc.). They would like to buy a 3-room apartment (living room and two bedrooms) in Paris with a surface area of around 60/70 m² with a budget of around €500,000 (corresponding to the average price of an apartment in Paris). They will be taking out a mortgage, so this is a major investment for them.

Generally speaking, they enjoy life in Paris but also like having their "little comforts" and having friends over for dinner. They're looking for an apartment that would be nice to live in which they can perhaps use full-time in a few years.

They plan to make the journey to visit a few properties in a single day. They would prefer not to have to come back a second time as the journey is not easy for them (more than 500 km from where they live).

They have asked you to help select a few apartments to visit when they come to Paris. You begin looking online. There are many offers that correspond to their budget. Among the ads online, you see the following one."

VARIABLES AND ITEMS	Psychometric quality
7-point scale (from totally disagree to totally agree)	Cronbach's alpha

Quantity of mental images – adapted from Babin and Burns (1997)
 	
After looking at this ad …
 	
    Many images come to mind
 	
    I have lots of images of this apartment in my head
 	
    Nothing comes to mind (inv)
	0.75

Valence of mental images – adapted from Miller et al. (2000)
 	
After looking at this ad, the images that come to mind are mostly
 	
    negative – positive
 	
    disagreeable – agreeable
 	
    unpleasant – pleasant
	0.98

Mental self-imagery – adapted from Lao (2014)
 	
After looking at this ad …
 	
    I can easily imagine what it would be like to live in this apartment
 	
    It's clear to see what life in this apartment would be like
 	
    I can imagine daily life in this apartment
	0.94

Perceived worry – adapted from Schmiege et al. (2009) I would be a bit worried about recommending this apartment to my family	-

Intention to contact
 	
  After seeing this ad …
 	
    I will almost certainly call the agency
 	
    I'm going to contact the agency immediately because it would be a pity to miss out on this apartment
 	
    I'm going to try to send an email and/or call the agency until I can get an appointment
	0.87

Subjective expertise – adapted from Lombart (2004) I know quite a lot about real estate	0.50

Compared to my friends, I know about real estate	
I don't feel very well informed about real estate (inv)	
Lasting involvement – adapted from Strazzieri (1994)	
Finding an apartment for family members means paying careful attention	0.56
It is important to think carefully before visiting an apartment	
In this situation, a poor decision could have embarrassing consequences	

	3 POS	6 POS=	6 POS +	3 POS 3 NEG	F	sig
N	34	30	30	34		
Intention to contact	4.8	4.9	4.9	4.3	15.1	0.000
Quantity of mental images	3.9	4.4	4.4	4.0	1.4	ns.
Valence of mental images	5.0	5.4	5.7	3.1	31.2	0.000
Mental self-imagery	4.7	5.1	4.6	4.7	2.4	0.050
Perceived worry	3.1	3.2	2.6	3.8	12.3	0.000
Lasting involvement	5.6	5.6	5.6	5.8	0.3	ns.
Subjective expertise	3.9	4.3	4.0	4.2	0.9	ns.
Age	22.2	21.6	21.8	22.1	0.2	ns.
Gender (% male)	30	30	27	32	0.1	ns.

Appendix 2e – Verification of data processing

Perceived valence of photos presented in ad

	Living room	Entrance	Bedroom 1	Bathroom	Kitchen	Bedroom 2
3 POS	5.03	5.00	4.63			
	1.13	0.95	1.00			
6 POS=	4.43	4.50	4.77	4.07	4.73	4.73
	0.90	1.11	1.04	1.31	0.98	0.91
6 POS+	4.57	4.67	4.23	4.80	4.93	4.83
	0.97	0.76	0.94	0.89	1.01	0.99
3 POS 3 NEG	5.09	5.09	4.74	2.71	1.97	2.29
	1.08	0.93	0.99	1.19	1.11	1.31

7-point scale (very negative/very positive); standard deviations are in italics

Perceived market segment

Market segment (3 points: low 1, mid 2, high 3)

	Living room	Entrance	Bedroom 1	Bathroom	Kitchen	Bedroom 2	Mean of market segments
3 POS	2.5	2.4	2.2				2.4
6 POS=	2.2	2.3	1.8	2.1	2.4	2.5	2.2
6 POS +	2.1	2.3	1.9	2.4	2.6	2.3	2.3
3 POS 3 NEG	2.5	2.5	2.2	1.2	1.1	1.4	1.8

Simultaneous mediations can be represented mathematically with the following regression models:

$$M1 = \beta_1 + a1Xi \text{ (model 1)}$$

$$M2 = \beta_2 + a2Xi \text{ (model 2)}$$

$$M3 = \beta_3 + a3Xi \text{ (model 3)}$$

$$M4 = \beta_4 + a4Xi \text{ (model 4)}$$

$$Y = \beta_4 + c'Xi + b1M1 + b2M2 + b3M3 + b4M4 \text{ (model 5)}$$

$$Y = \beta_5 + cXi \text{ (model 6: overall)}$$

$$Y = \beta_6 + c'Xi \text{ (model 7: direct)}$$

$$Y\ \beta_7 + (a1 + a2 + a3 + a4)Xi + b1M1 + b2M2 + b3M3 + b4M4 \text{ (model 8: indirect)}$$

Where

- Xi represents the *different conditions*
- Y represents the *intention to click*
- M1 represents the *quantity of mental images*
- M2 represents the *valence of mental images*
- M3 represents *mental self-imagery*
- M4 represents *perceived worry*

and

- c represents the overall effect of Xi on Y
- c' represents the direct effect of Xi on Y
- c-c' represents the indirect effect *(c - c' = a1b1+a2b2+a3b3+a4b4)*, i.e. the effect of Xi on Y as explained by Mi

Appendix 2g – Results of experiment 1: 3 POS vs 6 POS =

DV	IV	F	R²		Coeff.	SE	t	p	CI (95%)	
Model 1.1										
Quantity of mental images		1.7	0.028							
	constant				4.367	0.30	14.58	0.000	3.77	4.97
	3 POS *vs* 6 POS=			a1	0.133	0.10	1.30	0.200	-0.07	0.34
Model 1.2										
Valence of mental images		2.5	0.042							
	Constant				4.819	0.29	16.54	0.000	4.23	5.40
	3 POS *vs* 6 POS=			a2	0.159	0.10	1.60	0.200	-0.04	0.36
Model 1.3										
Mental self-imagery		0.4	0.007							
	Constant				4.789	0.35	13.76	0.000	4.09	5.49
	3 POS *vs* 6 POS=			a3	0.078	0.12	0.65	0.517	-0.16	0.32
Model 1.4										
Worry		0.1	0.002							
	Constant				2.989	0.40	7.40	0.000	2.18	3.80
	3 POS *vs* 6 POS=			a4	0.041	0.11	0.56	0.577	-0.20	0.36
Model 1.5										
Intentions to click		13.1***	0.548							
	Constant				2.473	0.72	3.45	0.001	1.04	3.91
	Quantity of mental images			b1	0.229	0.13	1.79	0.079	-0.03	0.49
	Valence of mental images			b2	0.262	0.13	2.00	0.050	0.00	0.52
	Mental self-imagery			b3	0.255	0.11	2.29	0.026	0.03	0.47
	Worry			b4	-0.399	0.10	-3.92	0.003	-0.60	-0.19
	3 POS *vs* 6 POS=				-0.043	0.09	-0.50	0.618	-0.22	0.13
Model 1.6 overall					**Effect**	**ES**	**t**	**p**	**CI (95%)**	
Intentions to click										
	3 POS *vs* 6 POS=			c	0.038	0.09	0.28	0.780	-0.20	0.27
Model 1.7 direct					**Effect**	**ES**	**t**	**p**	**CI (95%)**	
Intentions to click										

	3 POS *vs* 6 POS=	c'	-0.043	0.08	-0.50	0.618	-0.21	0.13

Model 1.8 indirect					**Effect**	**ES**	**CI (95%)**	
Intentions to click	Total	$c\text{-}c'$			0.078	0.09	-0.10	0.26
	Quantity of mental images	*a1b1*			0.030	0.03	-0.01	0.15
	Valence of mental images	*a2b2*			0.042	0.03	-0.01	0.14
	Mental self-imagery	*a3b3*			0.020	0.04	-0.03	0.13
	Worry	*a4b4*			-0.016	0.05	-0.12	0.06

DV	IV	F	R²		Coeff.	SE	t	p	CI (95%)	
Model 2.1										
Quantity of mental images		2.0	0.034							
	Constant				4.278	0.35	12.30	0.000	3.58	4.97
	3 POS *vs* 6 POS+			a1	0.222	0.16	1.43	0.158	-0.09	0.53
Model 2.2										
Valence of mental images		2.9	0.084							
	Constant				4.633	0.33	13.86	0.000	3.96	5.30
	3 POS *vs* 6 POS+			a2	0.344	0.14	2.30	0.025	0.04	0.64
Model 2.3										
Mental self-imagery		0.4	0.008							
	Constant				4.994	0.43	11.63	0.000	4.13	5.85
	3 POS *vs* 6 POS+			a3	-0.127	0.19	-0.67	0.509	-0.51	0.26
Model 2.4										
Worry		3.1	0.050							
	Constant				3.367	0.35	9.61	0.000	2.67	4.07
	3 POS *vs* 6 POS+			a4	-0.244	0.14	-1.75	0.085	-0.52	0.04
Model 2.5										
Intentions to click		20.4***	0.654							
	Constant				2.145	0.64	3.35	0.015	0.86	3.42
	Quantity of mental images			b1	0.366	0.12	2.99	0.004	0.12	0.61
	Valence of mental images			b2	0.078	0.12	0.64	0.521	-0.16	0.32
	Mental self-imagery			b3	0.372	0.09	4.23	0.000	0.19	0.55
	Worry			b4	-0.350	0.10	-3.48	0.001	-0.55	-0.15
	3 POS *vs* 6 POS+				-0.085	0.11	-0.77	0.441	-0.30	0.13
Model 2.6 overall					**Effect**	**ES**	**t**	**p**	**CI (95%)**	
Intentions to click										
	3 POS *vs* 6 POS+			c	0.061	0.16	0.37	0.710	-0.27	0.39
Model 2.7 direct					**Effect**	**ES**	**t**	**p**	**CI (95%)**	
Intentions to click										

	3 POS *vs* 6 POS+	*c'*	-0.085	0.11	-0.77	0.441	-0.30	0.13

Model 2.8 indirect			**Effect**	**ES**	**CI (95%)**	
Intentions to click	Total	*c-c'*	0.145	0.14	-0.13	0.44
	Quantity of mental images	*a1b1*	0.094	0.07	-0.01	0.27
	Valence of mental images	*a2b2*	0.028	0.05	-0.01	0.27
	Mental self-imagery	*a3b3*	-0.046	0.07	-0.22	0.09
	Worry	*a4b4*	0.087	0.05	-0.00	0.23

DV	IV	F	R²		Coeff.	SE	t	p	CI (95%)	
Model 3.1										
Quantity of mental images		0.6711	0.011							
	Constant				4.765	0.52	9.16	0.000	3.72	5.81
	3POS *vs* 3POS 3NEG			*a1*	-0.265	0.32	-0.82	0.416	-0.91	0.38
Model 3.2										
Valence of mental images		27.7***	0.309							
	Constant				6.808	0.56	12.2	0.000	5.69	7.92
	3POS *vs* 3POS 3NEG			*a2*	-1.830	0.34	-5.26	0.000	-2.52	-1.14
Model 3.3										
Mental self-imagery		4.9*	0.073							
	Constant				5.665	0.58	9.72	0.000	4.50	6.83
	3POS *vs* 3POS 3NEG			*a3*	-0.798	0.36	-2.21	0.031	-1.52	-0.07
Model 3.4										
Worry		23.5***	0.275							
	Constant				1.533	0.52	2.95	0.045	0.49	2.57
	3POS *vs* 3POS 3NEG			*a4*	1.567	0.32	4.85	0.000	0.92	2.21
Model 3.5										
Intentions to click		28.1***	0.708							
	Constant				2.403	0.88	2.71	0.009	0.63	4.18
	Quantity of mental images			*b1*	0.263	0.12	2.21	0.031	0.03	0.50
	Valence of mental images			*b2*	0.333	0.11	3.07	0.033	0.16	0.55
	Mental self-imagery			*b3*	0.230	0.11	2.11	0.039	0.12	0.44
	Worry			*b4*	-0.284	0.11	-2.52	0.014	-0.51	-0.06
	3POS *vs* 3POS 3NEG				-0.663	0.31	-2.17	0.034	-1.27	-0.05
Model 3.6 overall					**Effect**	**ES**	**t**	**p**	**CI (95%)**	
Intentions to click										
	3POS *vs* 3POS 3NEG			*c*	-1.969	0.35	-5.57	0.000	-2.68	-1.26

Model 3.7 direct			**Effect**	**ES**	**t**	**p**	**CI (95%)**	
Intentions to click								
	3POS *vs* 3POS 3NEG	*c'*	-0.663	0.31	-2.17	0.032	-1.27	-0.05
Model 3.8 indirect			**Effect**	**ES**			**CI (95%)**	
Intentions to click	Total	*c-c'*	-1.307	0.35			-1.99	-0.68
	Quantity of mental images	*a1b1*	-0.070	0.11			-0.38	0.07
	Valence of mental images	*a2b2*	-0.609	0.33			-1.39	-0.10
	Mental self-imagery	*a3b3*	-0.184	0.14			-0.59	-0.01
	Worry	*a4b4*	-0.444	0.25			-1.05	-0.07