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Relationship between social media activities and thinking styles

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Abstract

Purpose – The purpose of this paper is to gain more insight into the relationship between social media activities and thinking styles, and its potential mechanism.

Design/methodology/approach – The current study conducted four studies using an experimental method and eye-tracking method to evaluate prediction.

Findings – Results from studies 1 and 2 showed that social media activities influence individuals' self-construal, and the impact of self-construal on the relative reliance on cognitive vs affective thinking styles. Study 3 supports the hypothesis that social media activities influence individual's thinking styles, and self-construal is a critical mediator in this process. Furthermore, the authors replicated these findings using an experimental method and eye-tracking method (Study 4), which enabled us to better understand the consumer's psychological experience when using social media.

Originality/value – This paper contributes to the social media activity literature in the following ways. First, this research advances the knowledge of social media by demonstrating that social media activities can have significant effects on thinking styles. Second, the current research brings important insights to the literature on self-construal. Finally, using eye-tracking methods, the authors also provided some new insights on consumer thinking and behavior.

Keywords Self-construal, Thinking styles, Eye-tracking, Social media activities

Paper type Research paper

1. Introduction

Social media is used by hundreds of millions of people every day to communicate and share experiences with others, and it has an extensive and profound influence on our life. More and more marketers are searching for a firm foundation on which to base their strategic decisions regarding how to employ social media to engage and influence their customers (Hoffman and Novak, 2012; Göbel *et al.*, 2017). Previous research has shown that different social media activities can affect user perception of relationships (Neubaum and Krämer, 2015), emotions (Hudson *et al.*, 2015), social capital (Ellison *et al.*, 2007) and enthusiasm (Valkenburg and Peter, 2007). Although considerable research has examined the effects of social media use on human cognition and behavior, the question of whether social media activities affect people's thinking styles is still in the air. To fulfill this research gap, this study adopted the self-construal perspective to examine whether social media activities are a potential antecedent of thinking styles.

Thinking styles are fundamental elements of human life (Cian *et al.*, 2015). They have critical implications on consumer choice, and past research has explored the conditions under which consumers would rely on affective thinking styles vs cognitive thinking styles in making judgments and decisions (Shiv and Fedorikhin, 1999). Although a growing body of research has examined predictors of thinking styles, most empirical studies have focused on predicting offline thinking styles, such as the need for cognition (Simon *et al.*, 2004), mood

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(Kuvaas and Kaufmann, 2004) and personality (Cooper *et al.*, 2000). No existing study has examined the influence of social media use on individuals' decision making, although previous research showed that using social media can translate into a consumer's thinking and behavior (Hoffman *et al.*, 2017; Weiger *et al.*, 2018).

In light of the increasing popularity of social media, research has focused on answering whether social media use is, simply put, good or bad for consumers (Wilcox and Stephen, 2013; Gavilanes *et al.*, 2018). Recent studies have begun to focus on different activities and the related social and psychological mechanisms (Ordenes *et al.*, 2017). More relevant to the present research, it was found that social media activities can exercise a significant influence on users' self-view (Lee *et al.*, 2012), which in turn influences their thinking styles. Thus, we think that the self-construal mediated the relationship between social media activities and thinking styles.

The present study focused on two activity levels: browsing and interacting. A previous study showed that these two activity levels might relate to users' social experiences in different ways (Hoffman *et al.*, 2017). According to the perspective of the socialization effect, social media affordances affect users' predispositions (Trepte and Reinecke, 2013). Hence, the present study theorizes that browsing content on social media would increase the independence of one's self-construal, while interacting with social media would increase the interdependence of one's self-construal; moreover, individuals with different self-construals are more inclined to rely on different thinking styles (cognitive and affective). A series of four experiments offers systematic support to our theory. The findings extend our theorizing by showing that social media activities also influence consumer choice.

2. Hypotheses development

2.1 Social media activities and self-construal

Self-construal refers to how people perceive themselves to be linked (or not) with other people (Brewer and Gardner, 1996). Two types of self-construal have been identified: the independent self-construal and the interdependent self-construal (Markus and Kitayama, 1991). One important distinction is how people view the self in relation to others and the social environment (Krishna *et al.*, 2008). It has been found that self-construal is an important determinant of individual behavior, information processing and product choice (Aaker and Lee, 2001; Zhang and Shrum, 2008). Previous studies showed that different usage patterns affect user cognition, and the behavior attribute of interacting or browsing might affect user's feelings toward other people in general (Neubaum and Krämer, 2015).

According to a previous study, the online environment affects users' cognition such that it becomes more similar to others' (Lee *et al.*, 2012). Moreover, it has been found that social media behavior to be similar to that for offline behavior, providing more direct evidence of interpersonal perception (Back *et al.*, 2010). When social media is used to interact with other people, as opposed to browsing, users are more likely to perceive each other (Neubaum and Krämer, 2015). The online social interactions would drive the experience of feeling connected with others (Sheldon *et al.*, 2011). However, this does not mean that everything that occurs in social media involves a high degree of social interaction (Hoffman and Novak, 2012). When users use social media to browse the news or get information, they are likely primarily focused on the content or information itself, with little intention at that time to directly socialize with other people. Thus, when social media is used to browse messages, users may be focused more on themselves and less on being social with others (Hoffman *et al.*, 2017; Weiger *et al.*, 2018).

In fact, it has been found that social media activities affect one's cognition such that the individual experiences greater social connection (Hoffman *et al.*, 2017; Weiger *et al.*, 2018) or loneliness (Neubaum and Krämer, 2015; Wang *et al.*, 2012). In addition, social connection and

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loneliness are important antecedents of self-construal (Ashton-James *et al.*, 2007; Ma-Kellams and Blascovich, 2013). Based on the aforementioned argument, the relevant research hypothesis is provided below:

H1. Social media activity (browsing content vs interacting with content) has an effect on the self-construal (independent vs interdependent).

2.2 Self-construal and thinking styles

Previous research found that people with an independent self-construal are more likely to perceive the self rather than the experiences of other people than people with an interdependent self-construal (Adam *et al.*, 2015). Thus, it is reasonable to infer that self-construal could affect users' thinking styles in judgments and decisions. Prior research has proposed that consumer judgments and decisions can be made in either a cognitive, reason-based manner – by carefully assessing and weighing the target attributes (Shafir *et al.*, 1993) – or in an affective, feeling-based manner – by using one's subjective affective reactions toward the target or momentary feelings.

The independent self-construal is asserting the autonomous nature of the self, realizing one's internal attributes and influencing one's environment (Markus and Kitayama, 1991). When making a decision, people with independent self-construals often engage in thoughts that are related to rationale (Adam *et al.*, 2015). Furthermore, those high in independence commonly possess greater rationality and intelligence, albeit in combination with some lack of social connection. In contrast, the interdependent self-construal is being part of a group, maintaining harmonious relationships and adjusting to others (Markus and Kitayama, 1991). When making a decision, people with interdependent self-construals often engage in thoughts that are related to intuition (Adam *et al.*, 2015). Furthermore, those high in interdependence commonly have greater levels of emotionality (Kövecses, 2003).

Past research indicated that self-construal is an important determinant of various aspects of consumption behavior (Aaker and Lee, 2001). This stream of literature has focused on the impact of self-construal on consumers' cognitive styles. We extend this stream of research by examining the impact of self-construal on the relative reliance on cognitive vs affective thinking styles. Taken together, the relevant research hypothesis is indicated below:

H2. Self-construal (independent vs interdependent) has an effect on the thinking style (cognitive vs affective).

2.3 Social media activities, self-construal and thinking styles

The self-construal is proposed as a mediator for two reasons. First, although people can be more or less interdependent, there is now abundant evidence that self-construal orientation is sensitive to context, such as unconsciousness priming manipulations (Kühnen and Oyserman, 2002) and social context (Brewer, 1991). Second, initial empirical support for the hypothesis that individuals being affected by the environment leads to psychological associations not just toward perpetrators, but also toward the overall external environment perception (Van Baaren *et al.*, 2004). This finding provides indirect support for the idea that being tweeted messages by a given brand's online social network affects not only the user's perception of their relationship with the brand but also his or her perception of his or her relationship with others in general.

Specific to the context of social media use, this study uses the social cognitive theory of mass communication (Bandura, 2001) to understand the mediating effect of self-construal. According to social cognitive theory of mass communication, communication media promote changes by informing, enabling, motivating and guiding participants (Bandura, 2001). In the present context of social media, different social media activities are expressed

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explicitly or implicitly and lead to different psychological outcomes for individuals, which will impact individual self-views and behaviors (Lee *et al.*, 2012). Browsing content on social media leads users with little intention to directly socialize with other people, thus resulting in a sense of self that is independent from others on social media. However, interacting with social media helps users feel connected to others, leading to a heightened sense of the self as being connected to others (Hoffman *et al.*, 2017; Weiger *et al.*, 2018).

Existing studies demonstrated that interacting promotes more social connection among individuals, and browsing decreases social connection (Lee *et al.*, 2012; Wang *et al.*, 2012). Social connectedness was defined as the tendency for individuals to value and emphasize the importance of relationships (relative to other more independent concerns, such as the individuating attributes and needs of the self) (Ma-Kellams and Blascovich, 2013). Some researchers argued that social connectedness could represent an interdependence self to a certain degree (Milyavskaya *et al.*, 2010). Existing research on individual differences has shown that those high in interdependence would prefer affective thinking, whereas those high in independence would prefer cognitive thinking (Adam *et al.*, 2015). As a consequence, the self-construal activated via social media will mediate subsequent thinking styles and behavior. Based on this logic, this study proposes the following hypothesis:

H3. Self-construal will mediate the relationship between social media activities and consumer thinking styles.

3. Method

The current study conducted four studies to evaluate our prediction through an empirical method and eye-tracking method. Across experiments, the study operationalized social media activities by either observing different activities during social media activities or measuring participants' chronic usage patterns. The study also employed a variety of decision and evaluation tasks to provide converging evidence for our hypothesis. The sampling frame for this study was youth, since this group represents active internet users in China. Thus, data were collected using an experiment, and the target population for this paper was college students who were more regular users of social media. To ensure the eligibility of respondents, respondents were initially asked whether they have universal access to the social media, and possess more time and resources to engage in social media activities. The main decision tasks across the studies involved websites and laptops, as they were relevant to our participants, who were college students with moderate knowledge about these categories. We compare the four studies in Table I.

3.1 Study 1: social media activities and self-construal

Previous research showed that social media activities affect consumer perceptions of connectedness with unspecified others (Lee *et al.*, 2012). We experimentally manipulated social media activities based on Hoffman *et al.* (2017) work, who conducted several scenarios to manipulate social media activities. Study 1 demonstrated that different social media activities influence self-construal.

Experiment design. In this study, 47 college students (27 females, $M_{\text{year}} = 21.32$, $\text{SD} = 2.68$) were recruited. Participants were randomly assigned to one of the two experimental conditions: browsing and interacting. Before the experiment began, all of the participants were told to participate in a simulation of using social media. Participants were first asked to follow a brand on Sina Weibo (the top tweeting website in China), which pushed phone ads. Subjects in the interacting group were prompted to comment in response to the brand asking "Which feature of the phone do you like?"; meanwhile, subjects in the browsing group were required to click phone ads. Participants were asked to read the ads

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Variable	Reference	Item description	Cronbach's α
Study 1			
Social media activities	Hoffman *et al.* (2017)	Manipulated	/
Self-construal	Kuhn and McPartland (1954)	e.g.: Who am I?	/
Study 2			
Self-construal	Gardner *et al.* (1999)	Manipulated	/
Thinking styles	Cian *et al.* (2015)	Manipulated	/
Study 3			
Social media activities	Hoffman *et al.* (2012)	e.g. Find information about my interests;	0.70
		Socialize with people I already know	0.83
Thinking styles	Cian *et al.* (2015)	Manipulated	/
Self-construal	Singelis (1994)	e.g. I respect people who are modest about themselves	0.84
		I act the same way no matter who I am with	0.82
Study 4			
Social media activities	Hoffman *et al.* (2012)	e.g. find information about my interests;	0.80
		Socialize with people I already know	0.83
Thinking styles	Hong and Chang (2014)	Manipulated	/

Note: Manipulated variables do not report Cronbach's α, so we used "/" to distinguish them

Table I. Experimental variables

and prepare to answer questions about the product. After 5 min, participants then filled out a self-construal questionnaire (Twenty Statement Test (TST); Kuhn and McPartland, 1954), and answered questions regarding familiarity with the phone brand. The questionnaire involves generating 20 self-construals in response to the question "Who am I?" Following Gardner *et al.* (1999), participants' responses on the TST (self-construal) were subsequently coded by two raters as independent if they described a personal attribute, and as interdependent if they described a social role or relationship (intercoder reliability = 0.88). Finally, participants reported demographic information.

Results and discussion. To test *H1* that people who are guided to interact by a business account while using social media will express a more interdependent self-construal than people who are guided to browse. The number of self-construal that participants listed on the TST were submitted to a 2 (activities: browsing vs interacting) analysis of variance (ANOVA), gender is covariate (Cross and Madson, 1997). Results showed a main effect of activities, $F(1, 45) = 4.14$, $p < 0.05$. Participants who were required to interact had a more interdependent self-construal ($M = 8.31$) than those who were required to browse ($M = 6.20$). Gender had no significance on the self-construal ($p > 0.1$).

These results demonstrated that social media activities affect one's self-construal (*H1*). While the results of Study 1 succeeded in demonstrating the impact of social media activities on expressions of self-construal, Study 2 also replicated previous findings that individuals with different self-construals are more inclined to rely on different thinking styles.

3.2 Study 2: self-construal and thinking styles

This study tests the basic prediction that self-construal affects both cognitive and affective styles of processing in judgments and decisions (*H2*). To test *H2*, we manipulated participants' self-construal and asked participants to look a human silhouette that represented their thinking styles (Adam *et al.*, 2015).

Experiment design. A total of 44 healthy college students (25 females, $M_{year} = 20.86$, SD = 2.06) were recruited to participant in the eye-tracking experiment. They were

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randomly assigned to one of the two experimental conditions (independent vs interdependent). Experiment materials were displayed on a 20-inch monitor with a resolution of 1,024 × 768. The participants' eye movements were tracked and recorded by an SMI eye-tracker RED, and data processing was conducted by BeGaze analysis tool 2.5. An eye-tracking metric in pixel coordinates was used to explore ocular behavior when observing locations on a human silhouette.

To induce self-construal, we first adopted a manipulation that has been widely used in previous research (Gardner *et al.*, 1999). Specifically, the manipulation involved asking participants to read a scenario about a visit to the city. This hypothetical scenario had identical descriptions between the two self-construal conditions, except that different pronouns were used to activate the relative accessibility of different self-construals. In the independent condition, the pronouns were all singular (e.g. I, my, me); in the interdependent condition, the pronouns were all plural (e.g. we, our, us). After the self-construals manipulation, participants were shown a 500 × 500-pixel human silhouette for 5s, and were asked which body part they felt more closely associated with (the "brain" or the "heart"). The eye tracker recorded the subjects looking at the human silhouette.

Based on literature related to thinking styles, we assumed that the head is a symbol of rationality, whereas the heart is the "abode" of emotion (Adam *et al.*, 2015). When participants looked at that location on a human silhouette, as measured in pixel coordinates, it represented their thinking styles (Cian *et al.*, 2015). Fixation can indicate information acquisition processes, and tracking eye fixation is the most efficient way to capture individual information from the external environment (Chae and Lee, 2013).

Results and discussion. An ANOVA with self-construal as the independent variable and pixel coordinates along the vertical axis as the dependent variable revealed that participants with an independent self-construal had significantly higher pixel coordinates than participates with an interdependent self-construal ($M_{\text{independent}} = 418.33$ pixels, $M_{\text{interdependent}} = 366.60$ pixels; $F\ (1,\ 42) = 7.34$, $p < 0.05$). As the heat maps show (Figure 1), participants with an independent self-construal looked at the head area of the silhouette, whereas those with an interdependent self-construal looked at the heart area.

These results supported *H2* that different type of self-construals did involve different thinking styles. Particularly, the heat maps supported that individuals with an independent self-construal are more inclined to rely on affective feeling, whereas individuals with an interdependent self-construal are more likely to rely on cognitive reasoning. However, how social media activities affect thinking styles requires further in-depth examination. It was not clear whether usage patterns create a fundamental change

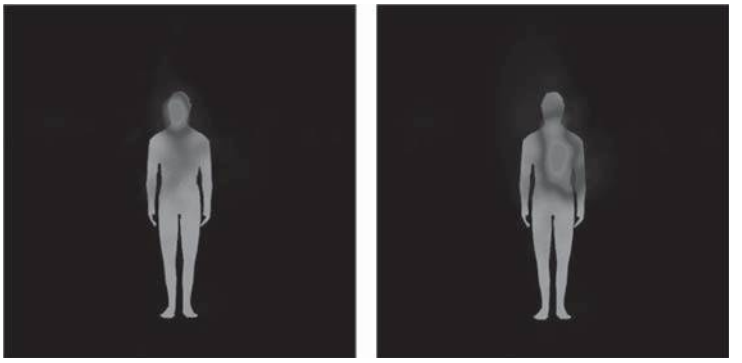

Figure 1.
Heat maps

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in the way that participants construe themselves in relation to others. Hence, the purpose of Study 3 was to test the relationship between activities and thinking styles that are mediated by the self-construal.

3.3 Study 3: mediating effect of self-construal

Study 3 proved that the self-construal activated via social media activities will mediate thinking styles (*H3*). Study 3 measured social media activities through a self-report survey. We also evaluated participants' self-construal to directly examine its mediating role in the relationship between activities and thinking styles. We evaluated their thinking styles through selecting one of two sections of an online newspaper.

Pretest. We asked 43 students from an online subject pool to rank various sections of an online newspaper on rationality and emotionality. We chose the business, car, social, science, history, art, entertainment, food, music and style sections for this purpose, assuming that the first five sections would be more representative of rationality while the latter five would be more representative of emotionality. Entertainment section was ranked as the most emotional ($M = 7.65$) and science section as the most rational ($M = 1.98$), on a nine-point scale.

Experiment design. We recruited 121 college students (66 females, $M_{year} = 20.50$, SD = 1.87). We first asked participants to report their social media activities (Hoffman *et al.*, 2012), which were assessed based on 14 items (7 scale; 1 = I never use social media for this reason, 7 = I almost always use social media for this reason). Second, thinking styles about rationality and emotionality were measured as in the pretest (Cian *et al.*, 2015). Participants were asked to rate their intention to choose two sections of a website on a seven-point scale (1 = strongly prefer entertainment, 7 = strongly prefer science). In addition, the self-construal was measured using the self-construal scale (Singelis, 1994). In this scale, each dimension has 12 items with seven-point Likert scales ranging from 1 (strongly disagree) to 7 (strongly agree). We used the Chinese translation by Wang *et al.* (2008). Finally, participants reported their demographic information.

Results and discussion. Using the method by Hoffman *et al.* (2012), we compared participants' social media activities. Social media activities were manipulated by dividing the participants into browsing and interacting groups according to their activities scale scores. Participants with a higher browsing activity score were included in the browsing group, and those with a higher interacting activity score were included in the interacting group. The browsing group was comprised of 65 participants, and the interacting group was comprised of 46 participants. The means of browsing and interacting within each group were compared. There were significant differences in results, indicating that the grouping was valid.

To examine the effect of social media activities on thinking styles, ANOVA showed that subjects in the browsing group were more likely to select science news ($M = 4.63$), while those in the interacting group were more likely to select entertainment news ($M = 3.70$; $F(1, 109) = 11.62$, $p < 0.05$). In other words, subjects in the browsing group were more likely to rely on cognitive thinking style, while those in the interacting group were more likely to rely on affective thinking style. These results supported *H3*.

As expected, participants belonging to the browsing group had higher scores on the independent self-construal ($M = 5.15$) than those in the interacting group ($M = 4.55$; $F(1, 109) = 31.02$ $p < 0.001$). In contrast, participants belonging to the interacting group had higher scores on the interdependent self-construal ($M = 5.31$) than those in the browsing group ($M = 4.67$; $F(1, 109) = 49.61$, $p < 0.001$). Taken together, these results confirmed *H1*.

We also used social media activities as the independent variable, the self-construal as the mediator, and the participants' news preference as the dependent variable. We then tested our hypothesis using the mediation model (Hayes, 2013). A 95% bias corrected bootstrap (based on 5,000 samples) confidence interval (CI) revealed that the indirect effect of social

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media activities on news preference through the independent self-construal was significant (point estimate = −0.515, 95% CI = (−0.938, −0.203)). Meanwhile, the indirect effect of social media activities on news preference through the interdependent self-construal was significant (point estimate = −0.445, 95% CI = (−0.824, −0.116)). Thus, this supported *H3* that a self-construal mediation effect exists. These results supported our prediction that different social media activities cause a difference in self-construal, and affect thinking styles. Furthermore, Study 3 demonstrated that the self-construal mediates the relationship between social media activities and thinking styles (*H3*). Thus, social media activities involve different thinking styles.

3.4 Study 4: social media activities and consumer behavior

Study 4 also tested how different social media activities affected product choice using the eye-tracking method. Longer fixation duration (FD) on the area of interest (AOI) can indicate a higher degree engaging with and understanding the information (Luan *et al.*, 2016). A previous study demonstrated that rational people prefer the utilitarian attributes of a product, and emotional people prefer the hedonic attributes of a product (Shiv and Fedorikhin, 1999). In Study 4 of this paper, rather than using a binary-choice context, we presented participants with either the image of a hedonic product or that of a utilitarian product and asked them to report their preference for the given product (Hong and Chang, 2015).

Pretest. A total of 32 college students were given a choice between two laptop computers, each described with six attributes. Three attributes (hard drive, battery life and warranty) pertained to cognitive dimensions, and three attributes (customizable colors, design and visual appeal) pertained to affective dimensions. Participants were asked to rate each of the six attributes on a seven-point scale (1 = appeals to thoughts, 7 = evokes my feelings). Results showed that the affective attributes indeed evoked more feelings than they appealed to reason, compared to the cognitive attributes. These results suggested that these laptop attributes did relate to affective vs cognitive dimensions as intended.

Experiment design. For this experiment, we recruited 80 healthy college students from Central South University (45 females, $M_{year} = 20.88$, SD = 1.92). All of the students used social media at least once a day.

Study 4 had a 2 (social media activities: browsing vs interacting) × 2 (product attribute: utilitarian vs hedonic) between-subjects design. First, we measured their social media activities as in Study 3. Second, all of the participants were told to imagine that they were going to buy a laptop computer and were randomly assigned to one of two conditions (the affectively superior laptop and the cognitively superior laptop). In the experimental material, the picture of the product was on the left, and the description of product was on the right. Laptop computer descriptions contained the six attributes used in the pretests. Laptop computer A was superior on all three of the cognitive dimensions, whereas laptop computer B was superior on all three of the affective dimensions. All of the participants were shown a laptop computer picture for 15s, and eye movements were recorded. In addition, the main dependent measure was participants' purchase intention for the laptop computer, which was assessed on a seven-point scale (1 = not at all, 7 = very much). Finally, participants were thanked and debriefed.

Results and discussion. The subjects were divided into browsing and interacting groups as in Study 3. The browsing group was comprised of 40 participants, and the interacting group was comprised of 40 participants.

Eye tracking. In the context of the laptop computer, AOI 1 was the area of the picture and AOI 2 was the area of the text. Eye-tracking results revealed observable differences in FD between the two different experimental materials.

We then conducted a 2 × 2 ANOVA with activities and product attributes as the independent variables, and FD as the dependent variable. When the dependent variable was

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FD (AOI 1), the main effect of social media activities and product attributes was insignificant, and the interaction between the two factors was insignificant ($F < 1, p = 0.86$). When the dependent variable was FD (AOI 2), the interaction between the two factors was insignificant ($F < 1$, $p = 0.82$), but the main effect of social media activities on FD was significant ($F = 4.36$, $p < 0.05$). These results revealed that participants used to browsing ($M = 9{,}794.22$ ms) paid more attention to the text than participants used to interacting ($M = 8{,}991.32$ ms).

Purchase intention. We then conducted a 2 × 2 ANOVA with purchase intention as the dependent variable. The main effect of activities and product attribute was not significant. However, the interaction between the two factors was significant (F (1, 76) = 10.10, $p < 0.01$) (Figure 2). Specifically, participants used to interacting had a higher purchase intention rather than participants used to browsing ($M_{\text{browsing}} = 3.55$) when the products' hedonic attributes were superior ($M_{\text{interacting}} = 4.40$; F (1, 76) = 3.94, $p = 0.06$). Conversely, participants used to browsing had a higher purchase intention when the products' utilitarian attributes were superior ($M_{\text{browsing}} = 4.35$, $M_{\text{interacting}} = 3.45$; F (1, 76) = 6.77, $p < 0.05$).

Study 4 eye-tracking results demonstrated that participants used to browsing pay greater attention to the text compared to participants used to interacting. This indicated that people used to browsing may be more rational and engage the product of the text while the product's picture is of little concern. When product attributes matched social media activities, people used to browsing paid attention to the text information provided when they saw a cognitively superior product. Conversely, people used to interacting paid attention to the picture information when they saw an affectively superior product. From the results of purchase intention, people used to browsing were more likely to choose the product with superior utilitarian attributes, whereas those used to interacting were more likely to choose the product with superior hedonic attributes. These results also provided support for *H3*.

4. Conclusions

The present work examined the impact of social media activities on thinking styles based on the perspective of the self-construal. Results showed that users' social media activities affect their different thinking styles (refer Table II). Furthermore, the self-construal is the mediating mechanism between the different usage activities and thinking styles. Specifically, users browsing content on social media are more inclined to rely on cognitive thinking styles through increased independent self-construal; meanwhile, users interacting with others on social media are more inclined to rely on affective thinking styles via increased interdependent self-construal. These findings are in line with the social cognitive theory of mass communication (Bandura, 2001). Taken together, our results create a bridge between psychological research on social media activities and consumer research on decision making.

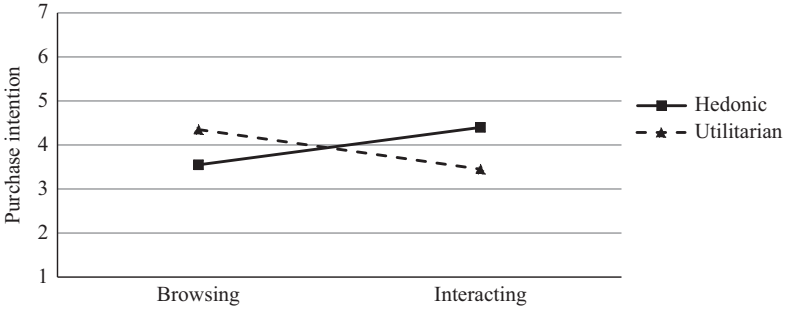

Figure 2.
Interaction effect

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4.1 Theoretical implications

First, this research advances our knowledge of social media by demonstrating that social media activities can have significant effects on thinking styles, even in tasks that are unrelated to social media use or involve more general social behavior. There is unlikely to be a single answer of whether social media use is, simply put, good or bad for individuals. Specifically, most studies have identified a positive and direct link between frequency and the amount of use and more obvious intimacy (Neubaum and Krämer, 2015), feeling positive emotions (Park *et al.*, 2012) and subsequent activity (Ramani and Kumar, 2008); others have found a negative link, such as interpersonal alienation and loneliness (Lee *et al.*, 2013). This research has proposed that these social media activities can influence consumer judgment and decision making.

Second, this research contributes important insights into the literature on self-construal. Although existing research has attempted to have proposed different some reasons as to why social media activities may affect consumers' choice from the theoretical level (Wilcox and Stephen, 2013; Weiger *et al.*, 2018), little research has actually examined these mechanisms empirically. Past research has shown that self-construals are not only chronically determined, but can be temporarily activated (Gardner *et al.*, 1999). Based on the social cognitive theory of mass communication (Bandura, 2001), this study made contributions to the discourse on the important role of self-construal in the relation between social media activities and thinking styles. These findings help to better understand how social media activities affect consumer thinking styles, and helps us to understand that the self-construal is a consequence of social media activities, such as the selection effect and socialization effect (Trepte and Reinecke, 2013).

Finally, using eye-tracking methods we also provided some new insights into consumer thinking and behavior compared to traditional empirical methods. Emotion and cognition may be difficult to measure by traditional empirical analysis because some subconscious processing may occur automatically. However, eye-tracking data challenges this through objective eye-tracking metrics. Therefore, employing neurocognitive methods to investigate consumers' physiological characteristics will deepen our understanding of the relationship between social media activities and users' thinking and behavior.

4.2 Practical implications

First, social media marketers must be cautious when deploying guides in social media, as the tactics may lack synergy. When identifying consumer activities in social media, marketing managers should take into consideration the rational-emotional association of their message. The information will be much more powerful when consumer activities match rather than mismatch the rational vs emotional content of the message. For example, when marketing managers find that consumers used to browsing (interacting) in social media, they can recommend a rational product or emphasize the product with superior utilitarian attributes.

Second, social media users should be aware of how social media activities can influence their thinking style. Social media marketers will increasingly be guiding interaction, because interacting with the corporate content increases the number of users and has become a

Table II. Result of hypothesis testing under different methods

Hypothesis	Empirical method	Eye-tracking method
H1 Social media activity → self-construal	Support	/
H2 Self-construal → thinking style	/	Support
H3 Social media activity → thinking style	Support	Support

Note: "/" means that this method is not applied in the part of study

business trend. However, social media users can adopt some browsing strategies to facilitate the choice of a utilitarian product. For example, social media users may pay more attention to rational information or do not easily interact with corporations on social media.

Third, there are various social media platforms in social marketing industry, each one with different characteristics. Thus, considering that every social media platform transmits messages to the audience differently, the results of the study cannot be generalized on all available social media platforms. For example, social marketing industry may encourage users to interact such as on Instagram, because its users tend to communicate with emotional images.

4.3 Limitations and directions for future research

Although our research contributed to both theoretical and practical perspectives, limitations still exist. First, although our data seem to provide some support for our proposed self-construal, we cannot claim to have completely ruled out those explanations. Our approach can be expanded by incorporating additional moderators. Further research should examine the moderating role of awareness and familiarity for which some potential factors should mitigate this conceptual link (Cian *et al.*, 2015). Second, in our empirical experiment, we chose college students as the experimental sample because college students have universal access to the internet, and possess more time and resources to engage in social media activities. Future research should examine the role of social media on individuals' activities using a more diverse population. Third, although our laboratory method (empirical experiment and eye-tracking method) had the advantage of high internal validity, future studies could use multiple methods to replicate the findings to better present the consistency of our results. Nonetheless, we hope our results have evoked an interest in the effect of social media activities on consumer choice. Although our four studies suggest that this effect is quite robust, it could be tested further with different products and in different contexts.

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