Stick to my guns: The impact of crowding on consumers' responsiveness to sale promotions

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Abstract

The current research examines the relationship between crowding and consumers' responsiveness to sales promotions. Six studies show that the experience and feeling of crowdedness reduce the impact of sales promotions, demonstrating that consumers' product/service purchase intention changes to a lesser extent in response to such promotions. This effect is found to be driven by consumers shifting their attention from the external environment to their internal feelings and thoughts when experiencing crowdedness. As a result, consumers rely more on their internal feelings and thoughts than on external cues in judgment, and consequently their purchase intention becomes less susceptible to external sales promotion information. In addition, this effect is found to be attenuated in situations where product attitudes are detached from consumers' own preferences, such as in the context of gift choices, and when the experience of crowding is not aversive (e.g., watching an exciting football game in a bar).

Keywords: Crowding, Internal focus, Sales promotions

Introduction

With the steady growth of population and global urbanization, overcrowding has become a worldwide feature and problem (McLeish 2009). According to the United Nations, more than 4 billion people, around 55% of the global population, live in an urban area or city where they experience various degrees of discomfort due to crowding (Meredith 2018). Overcrowding affects many aspects of our environment, society, and people's well-being by escalating pollution and environmental degradation (Leblanc 2021), contributing to unhealthy social competition (Jargin 2009), and leading to anxious feelings and decreased life satisfaction (Gillies 2014). Crowded retail environments are also ubiquitous. To survive amidst the violent competition, retailers try their best to keep consumers in the store longer, which potentially increases sales at the expense of making consumers feel crowded (Donovan et al. 1994).

As a pervasive aspect of urban human life, crowded environments influence consumers' behaviors. Previous research addressing these impacts largely focused on how the external crowded environment affects consumers' various consumption decisions, such as calorie intake (Hock and Bagchi 2018), purchase intention toward products displayed in more crowded places (O'Guinn, Tanner, and Maeng 2015), and a preference for safety-related products (Maeng, Tanner, and Soman 2013). Less studied is how the experience and perception of crowdedness may alter consumers' responsiveness to sales promotions. Sales promotions are widely used in marketing practice, and the term refers to using monetary or nonmonetary incentives as exogenous information with the purpose of influencing consumers' purchase behaviors (Blattberg and Neslin 1990; Cai, Bagchi and Gauri 2016; Chandon, Wansink and Laurent 2000). The current research aims to fill this gap by examining the relationship between crowding and the change of consumers' purchase intention in response to sales promotions. We propose that

crowding reduces the impact of sales promotions in the marketplace. That is, in a crowded environment, consumers' purchase intention changes to a lesser extent in response to sales promotions. We expect that the impact of sales promotions is reduced because consumers in a crowded environment tend to shift their attention from the external world to their internal feelings and thoughts, and in turn rely on their own inner voices rather than external cues. Such an enhanced relative internal focus then strengthens consumers' attitude persistence and renders them less susceptible to external marketing efforts, reducing the magnitude of change in their purchase intention in response to promotions. We further predict that the proposed effect of crowding on the impact of sales promotions will be attenuated 1) when product judgment is detached from consumers' own attitude and preference, such as in a gift choice or 2) when the crowding experience is not aversive (e.g., watching an exciting football game in a bar).

This article makes several contributions by bridging the research on crowding, internal focus, and the impact of sales promotions. First, it contributes to the growing literature on crowding in the consumption context (e.g., Hock and Bagchi 2018; Huang, Huang and Wyer 2018; Maeng and Tanner 2013; Maeng et al. 2013; O'Guinn et al. 2015), which explores how crowding influences consumers' attitudes toward the external environment, and the implications for product preferences. The current research augments this literature by examining how this situational factor affects consumers' internal processes and its effect on consumers' responsiveness to sales promotions. Moreover, this research contributes to our knowledge of the antecedents of consumers' responsiveness to sales promotions. Prior research on this topic revealed how the impact of a promotion can be affected by various factors, such as the value of the product (Cai et al. 2016), consumers' involvement in consumption (Darke and Ritchie 2007; Lee and Tsai 2014), consumers' self-perception (Gao, Zhang and Mittal 2017; Lee and Zhao

2014), language characteristics of promotional information (Davis, Bagchi and Block 2016), and salient knowledge of other consumers (Tsai, Zhao, and Soman 2021). Adding to this stream of literature, the present investigation shows that crowding, as a situational factor, can also influence the change of consumers' purchase intention in response to sales promotions. Last but not least, this research offers important implications for marketers in terms of how to coordinate their sales promotions and customer flow to maximize profits.

Theoretical background

Crowding

Crowding in our context refers to a large number of people per unit area (e.g., Hock and Bagchi 2018; Huang et al. 2018; Machleit, Eroglu, and Mantel 2000; Maeng et al. 2013). Crowding is generally considered an aversive experience. It makes people feel that their personal space is invaded due to increased spatial confinement (Delevoye-Turrell, Vienne, and Coello 2011; Huang et al. 2018; Neuberg, Kenrick, and Schaller 2011). As a result, crowding is found to have various negative impacts on an individual's social relationships and personal well-being (Baum and Greenberg 1975; Evans and Wener 2007; Stokols 1972). For example, passengers experience more negative mood and stress when they travel during rush hours due to crowding than during non-peak hours (Evans and Wener 2007). Also, anticipating social crowding tends to reduce people's interest in interacting with others and consequently makes them distance themselves (e.g., choosing more socially isolated seats; Baum and Greenberg 1975).

Not surprisingly, crowding affects consumer behavior in multiple ways, some apparent and some that might come as a surprise. For instance, crowding can activate a prevention focus, which makes consumers exhibit a stronger desire for safety-related options (e.g., pharmacy;

Maeng et al. 2013). One study showed that consumers tend to use the level of crowding as a cue for social class and indicate a higher willingness to pay for products presented in a less (vs. more) crowded environment (O'Guinn et al. 2015). Crowding may also affect consumers' consumption quantity (Hock and Bagchi 2018); it was found that crowdedness in shopping environments distracts consumers from self-regulation, which in turn increases their calorie consumption. Whereas prior findings shed light on how crowding shapes consumers' reactions to the external environment and affects consumers' product preferences, it remains to be explored how it influences consumers' internal processing and imposes effects on consumers' reaction to marketing practices. In the current research, we hypothesize that crowding can enhance consumers' internal focus and its impact on consumers' responsiveness to sales promotion.

Crowding and relative internal focus

Relative internal focus (in other words, private self-consciousness) is the extent to which individuals pay more attention to their internal psychological processes (e.g., thoughts, feelings, and attitudes) than to external environmental factors such as outer distractions and social influences (Cramer 2000; Fenigstein, Scheier, and Buss 1975). One previous finding that might be relevant to the current research is that a person's self-consciousness can be shaped by group size and number of observers when that person feels embarrassed (Diener et al. 1980). It is worth noting that relative internal focus is not necessarily related to public self-consciousness or social anxiety, and previous research treats private self-consciousness, social anxiety, and public self-consciousness as three independent factors (Hope and Heimberg 1988; Scheier 1980). For example, people can be sensitive to their internal feelings as well as concerned about their social appearance (Tomarelli and Shaffer 1985). In addition, the correlation between social anxiety and

private self-consciousness has been found to fluctuate around zero (Fenigstein et al. 1975; Hope and Heimberg 1988). Relative internal focus is also different from self-awareness, which is about inspecting whether our actions, thoughts, or emotions do or do not align with our value standards (e.g., Duval and Wicklund 1972; Eurich 2018; Wicklund 1975).

Internal focus has significant impacts on consumers' attitudes and behaviors (Goukens, Dewitte, and Warlop 2009; Hung and Wyer 2011; Novemsky et al. 2007; Pham et al. 2010). For example, consumers with high internal focus tend to attribute service outcomes to themselves rather than to service employees, which decreases satisfaction when the outcome is favorable and reduces dissatisfaction when the outcome is unfavorable (Pham et al. 2010). In addition, paying more attention to the internal self can predispose consumers to imagine themselves using the product, which enhances processing fluency and consequently boosts purchase intention (Hung and Wyer 2011), reduces variety seeking (Goukens et al. 2009), and decreases choice deferral (Novemsky et al. 2007). Overall, internal focus enhances consumers' sensitivity to their own inner voices and reduces susceptibility to external social influences (Patrick and Hagtvedt 2012).

The current research proposes that crowding tends to heighten consumers' relative internal focus. Previous research provides support for this possibility. First, people in a crowded environment are usually exposed to an overwhelming quantity of sensory experiences including sounds, body contact, and ambient smells (Hock and Bagchi 2018). This perceptual overload motivates individuals to shun further external stimulation (e.g., Evans and Wener 2007; Maeng and Tanner 2013; Piezunka and Dahlander 2015). For example, as an attempt to limit inputs, people are less likely to look around in a crowded environment (Evans and Wener 2007; Milgram 1970). Similarly, to block out the overstimulation from their surroundings, people in a crowd tend to create a personal space through various aspects of body language, such as closing

their eyes and hunching their shoulders (Hirsch and Thompson 2011). Be that as it may, the human brain is a non-stop, always-active system. It is impossible to completely shut down the reception and processing of information (Alexander et al. 2013; Van den Berg 1986). Based on the unitary resource model of attention, there is a single source of attention divided among different demands based on task requirements and voluntary allocation (Kahneman 1973; Sears and Jacko 2007). Since people's cognitive processes cannot be fully shut down, people can inhibit inputs from undesirable targets by voluntarily shifting their attention to other domains (LaBerge et al. 1997; Sears and Jacko 2007). For example, people can immerse themselves in internally-generated thoughts and feelings (e.g., meditation) to escape from unwanted surroundings (Trungpa 2019). Furthermore, athletes are found to engage in strategic self-talk in competitions in order to boost an internal focus of attention that helps block out external distractions (Galanis et al. 2022; Hardy, Oliver and Tod 2008). Similarly, consumers in a crowded environment may shift their attention inward in an effort to filter out overwhelming external stimuli (e.g., Andrews et al. 2015; Milgram 1970).

Second, crowding increases social avoidance (Harrell, Hutt and Anderson 1980; Huang et al. 2018; Maeng et al. 2013). Research in evolutionary psychology has suggested that people's desire for physical space stems from the inherent motivation to distance ourselves and stay away from potential threats from others (Neuberg et al. 2011). Personal space serves as a protective buffer (Delevoye-Turrell et al. 2011). Studies have demonstrated that when people perceive that their personal space is invaded in a crowded environment filled with others, they often show an enhanced tendency toward social withdrawal (Aiello et al. 1977; Huang et al. 2018; Hui and Bateson 1991; Maeng et al. 2013). For example, consumers in a crowded shopping environment are reluctant to consult service people when they need to make purchase decisions (Hui and

Bateson 1991). Under such circumstances, when consumers are less likely to draw on external information to make their decisions, they tend to use their own internal feelings and thoughts as bases for decision making (Patrick and Hagtvedt 2012; Santee and Maslach 1982).

Taking these observations and evidence together, with sound reasons to expect that crowding will motivate consumers to limit attention paid to external non-social and social information, we predict that crowding will boost relative internal focus. That is, consumers experiencing crowdedness will tend to shift their attention from the external environment to their internal feelings and thoughts, on which they then rely (rather than on external cues) as bases for product judgments. We further predict that this heightened internal focus will reduce the impact of sales promotions. Specifically, consumers with an enhanced internal focus tend to show a smaller change in purchase intention in response to sales promotions.

Relative internal focus and the impact of sales promotion

Sales promotions are widely used in marketing practice, and the term refers to using monetary or nonmonetary incentives as exogenous information with the purpose of influencing consumers' purchase behaviors (Blattberg and Neslin 1990; Cai et al. 2016; Chandon et al. 2000). Sales promotions may take the form of discounts or additional benefits to customers, without a price increase (Chandon et al. 2000; Lee and Tsai 2014). In every year of the past 30 years, the largest portion of marketing budgets in the U.S. goes to promotion, which rose to $244.7 billion in 2020 (Statista 2021). Despite the considerable expenditure on sales promotions, about 70% of promotions fail to generate sufficient profits to offset their cost (Busignani 2017). Furthermore, consumers' purchase intention tends to dive once the promotion ends (Arkes, Kung, and Hutzel 2002; Chen, Tsai, and Chuang 2010). For example, sales of retail stores

typically drop significantly after Black Friday promotions end, sometimes to an even lower level than before the promotion started. This is because the marketing offering in promotion serves as a reference point for consumers, and they tend to view the post-promotion offering as a loss, which lowers their purchase intention (Chen et al. 2010). Clearly, understanding the impact of sales promotion is critical for both researchers and practitioners.

Given the importance of promotion in the marketing domain, previous research has identified various factors that can influence consumers' reactions to sales promotions (Cai et al. 2016; Davis et al. 2016; Lee and Ariely 2006; Lee and Tsai 2014; Shaddy and Lee 2020). For example, a price-based promotion is less effective for consumers considering the purchase of nonessential low-priced products (Cai et al. 2016). Sales promotions are more effective in changing consumers' purchase intention when consumers hold a less concrete shopping goal (Lee and Ariely 2006). Furthermore, including a consolation prize lowers the impacts of a promotional lottery because the very existence of consolation reduces consumers' expectation of getting the desirable prize (Yan and Muthukrishnan 2014).

In the current research, we focus on how crowding, a ubiquitous phenomenon in retail settings, influences the impact of sales promotions. We approach this research question by examining changes in consumers' purchase intention when they are exposed to sales promotion information versus when they are not. Consumers are often exposed to sales promotion information that may change their purchase intention (Cai et al. 2016; Shaddy and Lee 2020; Xu and Wyer 2010). For example, a flyer notifying consumers of a sales promotion for a brand of orange juice in the supermarket might significantly increase their likelihood of purchasing the juice. On the other hand, learning that a gym's promotion of offering additional access to group classes has just ended may reduce consumers' interest in joining the gym. Such changes in sales

promotions might cause a significant (positive or negative) shift of consumers' prior purchase intention toward the product or service (Vogel and Wanke 2016; Xu and Wyer 2010).

Consumers' responsiveness to sales promotions can be captured by the magnitude of change in consumers' purchase intention after exposure to a given promotion (Chandon et al. 2000; Taylor 1965; Xu and Wyer 2010). The extent to which purchase intention changes depends on consumers' subjective sense of certainty about their attitude toward the product (Krosnick et al. 1995; Rucker 2021; Tormala and Rucker 2007). To this extent, prior research has suggested that internal focus may have an impact on attitude certainty (Fazio and Zanna 1978; Tormala and Rucker 2007; Wu and Shaffer 1987). For example, consumers tend to have a more certain attitude when it is formed based on firsthand experiences that go through their own internal processing than when the attitude is formed based on secondhand information from others (Fazio and Zanna 1978). Similarly, given that internal beliefs are easier to access and more stable, internal thoughts and feelings can generate a greater sense of certainty than can be generated by environmental cues (Haddock, Rothman, and Schwarz 1996; Haddock et al. 1999). The logic behind this finding is that firsthand, personal information is more intense, easier to retrieve, and perceived as more valid, thereby enhancing attitude strength (Petty, Briñol, and Tormala 2002; Schwarz et al. 1991). In the current research context, we predict that when consumers are exposed to sales promotion information under crowded conditions, they tend to shift their attention from the external environment to their internal feelings and thoughts, and consumers rely more on their internal feelings and thoughts than on external cues (e.g., sales promotions) when making judgments. Thus, they are more certain about their judgment (i.e., their preexisting attitude) and show less change in purchase intention in response to new sale promotion information.

The current research

Putting these observations together, we predict that the extent to which sales promotions change consumers' purchase intention will depend on target consumers' tendency to focus on their internal thoughts and feelings (vs. external cues). We theorized previously that in retail and business settings, crowding—a situation that consumers often experience—can enhance relative internal focus. Consequently, crowding is expected to reduce the impact of sales promotion, in the form of smaller changes in consumers' purchase intention in response to promotions. Formally, we hypothesize that:

H1 Consumers' purchase intention toward a product/service will be less affected by sales promotion information when they experience crowdedness than when they do not experience crowdedness.

H2 The effect of crowding on consumers' responsiveness to a sales promotion is driven by an enhanced relative internal focus.

Moderation by detachment from own preference

We predict that crowding reduces the impact of sales promotions because consumers experiencing crowdedness tend to shift their attention from the external environment to their internal thoughts and feelings. This enhanced relative internal focus strengthens attitude certainty, which in turn reduces changes in purchase intention in response to sales promotion information. Thus, this effect should be more salient when consumers' purchase decisions are based on their own preferences.

In some situations, consumers' judgments and purchase decisions may not be based on their own preferences. For example, when consumers purchase gifts for others, they are likely to consider the gift recipients' preferences rather than their own (Cavanaugh, Gino and Fitzsimons

2015; Zhang and Epley 2012). In gifting, consumers evaluate a gift with a clear premise that they will not be the user of that product and their own preference should not be the reference for judgments (Branco-Illodo, Heath, and Tynan 2020; Ruth, Otnes, and Brunel 1999). In addition, consumers hold a belief that if the gift has been selected based on the giver's preference but not the recipient's, lack of care will be signaled to the recipient and harm the relationship (Branco-Illodo et al. 2020; Ruth et al. 1999). Recent research has shown that gift givers tend to focus more on what recipients like instead of what they themselves like (Steffel, Williams, and LeBoeuf 2015), and this recipient-focused orientation can lead gift-givers to choose gifts that are personalized but not versatile for recipients (Steffel et al. 2015). Putting the above together, we predict that with one's own preference being less of a concern in judging a gift option, the enhanced relative internal focus caused by crowding may not translate into more stable purchase intention in response to sales promotions because the product is not purchased solely based on consumers' own preferences. Thus, we hypothesize:

H3 The effect of crowding on consumers' responsiveness to a sales promotion is attenuated when product judgment is detached from one's own preferences, such as in the context of gifting.

Moderation by the nature of crowding

Our theory maintains that consumers treat crowding as an aversive experience because it exposes them to an overwhelming quantity of sensory experiences (Delevoye-Turrell et al. 2011). In order to block out undesirable overstimulation from their surroundings, consumers in a crowd tend to shift their attention inward in an effort to filter out external stimuli (e.g., Andrews et al. 2015; Huang et al. 2018). As a result, this enhanced relative internal focus reduces consumers' responsiveness to sales promotions. Although crowding is generally considered an aversive experience, consumers might find it less aversive if they join a crowded environment

voluntarily. For instance, Xu and her colleagues (2012) found that when consumers perceive their proximity to other people to be voluntary, they consider such proximity desirable and are more likely to choose the product that may be liked by others. In many of these cases, consumers may actually enjoy being in a crowded environment when it enhances their consumption experience (Huang et al. 2018; Xu, Shen, and Wyer 2012). For example, consumers enjoy being in a crowd when watching an exciting football game (Huang et al. 2018). In addition, crowding will not trigger avoidant responses if the crowd consists of in-group members, because being surrounded by in-group members is not considered an aversive experience (Maeng and Tanner 2013; Schultz-Gambard 1979). Therefore, we predict that crowding will not influence consumers' responsiveness to a sales promotion if consumers do not perceive crowding to be aversive. We hypothesize the following:

H4 The effect of crowding on consumers' responsiveness to sales promotions is attenuated when crowding is not perceived to be aversive.

Summary of studies

The impact of sales promotions can be measured at both the individual (i.e., micro) level and the aggregated (i.e., macro) level. In the current research, we examine the impact of sales promotions at the micro level by looking at the change in consumers' purchase intention when they are exposed to sales promotion information versus when they are not (Studies 1 to 5; e.g., a price discount, a free gift, or the end of a sale promotion; Cai et al. 2016; Shaddy and Lee 2020; Xu and Wyer 2010; Yang and Mattila 2020). In addition, at the macro level, we measure the impact of sales promotions by observing fluctuations in sales or market share caused by promotions (Study 6; e.g., Chandon et al. 2000; Kwok and Uncles 2003). Moreover, to demonstrate the robustness of our effects, various operationalizations of crowding were

employed in our studies, including the real experience of crowding (Study 1), stimulated imagination of a crowded scene (Studies 2 to 5), as well as population density as a proxy for crowdedness in the daily environment (Study 6).

Specifically, we conducted six studies to examine how crowding affects the impact of a sales promotion. Study 1 showed that consumers who are in a crowded environment exhibit less change in purchase intention when encountering new sales promotion information about a product (e.g., a sales promotion), and this effect is found to be independent of the type of promotion information (i.e., information about an ongoing promotion or about the end of a promotion). Study 2 provided support for the proposed underlying mechanism by demonstrating that the observed effect is mediated by consumers' heightened relative internal focus when experiencing crowding. Study 3 further tested the proposed mechanism by exploring contingencies of the observed effects. Specifically, the observed effect was weakened when a consumer's own product preferences are less involved in the purchase decision, such as in the context of interpersonal gifting (Study 3). Study 4 supported the prediction that crowding affects consumers' reactions toward products with a sales promotion but has no such effect in other situations when the sales promotions do not exist. Study 5 identified the theoretically-relevant boundary condition that crowding will not decrease the impact of a sales promotion when the crowding is a desirable experience (i.e., watching an exciting football game in a bar). Finally, the external validity of our findings was confirmed through examination of consumers' actual purchase data (Study 6).

Study 1

Study 1 tested our prediction that crowding decreases the impact of sales promotions. We expected that, when the environment is crowded, consumers' purchase intention toward a product/service will be less affected by a sales promotion in the form of increased product volume at the same price, which is commonly adopted in sales promotions (Blattberg and Neslin 1990; Chandon et al. 2000).

In addition, to rule out the possibility that crowding simply suppresses purchase intention and consequently makes sales promotions less effective, we included an additional condition in which participants learned that the sales promotion had ended. We predicted that crowding would decrease the impacts of both ongoing and ended sales promotions. That is, purchase intention increases to a lesser extent when participants learn that a promotion is available, and decreases to a lesser extent when they learn that the promotion has ended.

Design, participants, and procedure

A total of 205 undergraduates from a large university (151 women, M_{age} = 21.17) participated in this study for a small payment. Participants were randomly assigned to conditions of a 2 (crowding: crowded vs. uncrowded) × 2 (promotion information: ongoing promotion vs. ended promotion) between-subjects design.

In this study, we manipulated crowding with a behavioral manipulation: by varying the number of participants in experimental sessions (Hock and Bagchi 2018; Huang et al. 2018; Maeng and Tanner 2013). While all sessions took place in the same lab room, in the *crowded* conditions there were 20 to 26 participants in the room, whereas in the *uncrowded* conditions there were only 4 to 6 participants in the room. As a manipulation check of actual crowding, participants indicated the perceived crowdedness in their current surrounding environment using

a 9-point scale (1 = “not crowded at all” and 9 = “very crowded”).

Marketers often use nonmonetary incentives (i.e., offering more products/services to consumers without charging extra money) to attract consumers to purchase products/services. Following previous research (similar to a 25% extra weight of the product for the same price; Mishra and Mishra 2011), in this study we manipulated sales promotion by increasing the service volume without charging extra money. In the *ongoing-promotion* condition, participants first read a gym advertisement featuring a membership plan that grants access to five fitness classes, and they indicated their intention to join this gym with four items along 9-point scales (“unlikely to join/likely to join,” “not appealing/appealing,” “dislike/like,” and “bad/good;” Time 1 purchase intention, $\alpha = .90$). Then participants were told that the same gym they saw earlier was now offering a promotion, and as a result they could get full access to more than 70 fitness classes at the same price (see Web appendix A for the two ads used). After viewing the second advertisement, participants again reported their intention to join the gym service with the same four items (Time 2 purchase intention, $\alpha = .95$).

In contrast, participants in the *ended-promotion* condition read and evaluated the gym service based on the same two ads, but in reversed order. Specifically, participants first read the gym advertisement with promotion (i.e., the Time 2 ad in the *ongoing-promotion* condition) and indicated their intention to join the gym service with the same four items (Time 1 purchase intention, $\alpha = .95$). They were then presented with the advertisement without the promotion on the next page (i.e., the Time 1 ad in the *ongoing-promotion* condition) and were told that the promotion was over, before they reported their intention to join the gym service again with the same four items (Time 2 purchase intention, $\alpha = .94$).

Results

As expected, participants in the crowded condition indicated higher perceived crowdedness (M = 6.57, SD = 2.10) than did those in the uncrowded condition (M = 2.69, SD = 2.07; $F(1, 203) = 117.03$, $p < .001$, $\eta^2 = .47$).

To test our proposed effect that crowding reduces the impact of promotion, following past literature (Bizer et al. 2006; Chandon et al. 2000; Taylor 1965), we built an index of the impact of sales promotion by calculating the absolute value of the difference between participants' Time 1 and Time 2 purchase intentions.[1] A lower score indicates a smaller change in purchase intention in response to sales promotions. A 2 × 2 ANOVA on the impact of sales promotion index yielded only a significant main effect of crowding ($F(1, 201) = 26.08$, $p < .001$, $\eta_p^2 = .12$; see Fig. 1), but not a significant main effect of promotion information or an interaction effect (ps > .40). This suggests that crowding influences the impact of sales promotions regardless of the type of promotion information. Specifically, the purchase intention of participants in the crowded condition was less influenced by the sales promotion information than the intention of those in the uncrowded condition, both when they received information about an ongoing promotion ($M_{crowded}$ = .83, SD = .76 vs. $M_{uncrowded}$ = 1.86, SD = 1.53; $F(1, 201) = 17.29$, $p < .001$, $\eta^2 = .08$) and about the ending of a promotion ($M_{crowded}$ = 1.09, SD = .77 vs. $M_{uncrowded}$ = 1.86, SD = 1.70; $F(1, 201) = 9.44$, $p = .002$, $\eta^2 = .04$).

[1] For participants' purchase intention at Time 1 and Time 2 in Studies 1, 2, and 3, see Web appendix B.

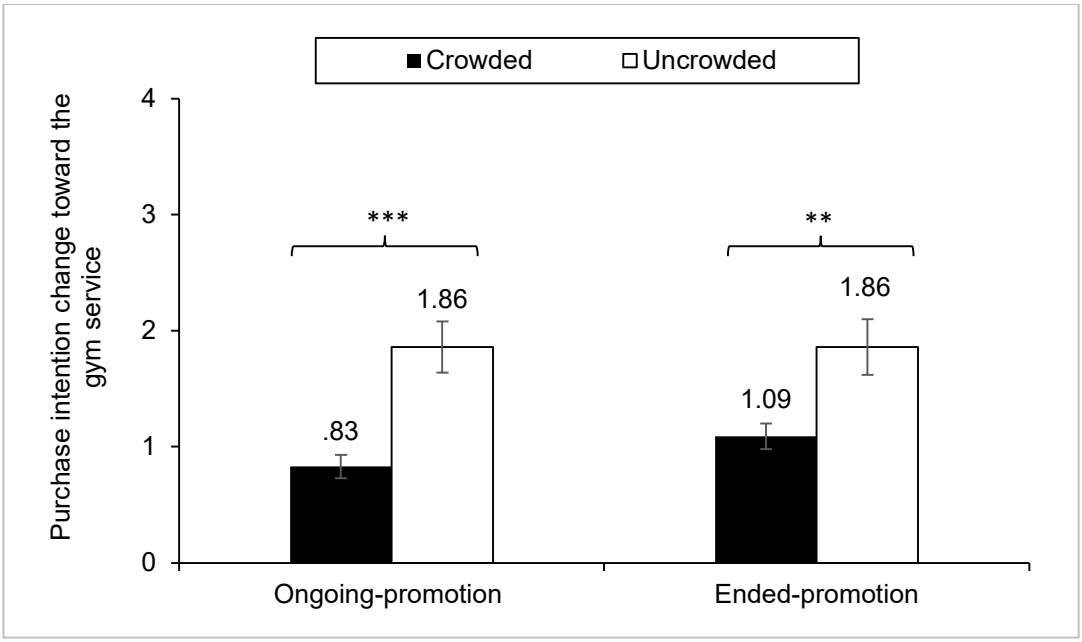

Fig. 1 Effects of crowding and promotion information on the impact of sales promotion (Study 1)
Notes: Error bars = ±1 SE.
$^{**}p < .01$, $^{***}p < .001$

Discussion

Consistent with our hypothesis, Study 1 showed that purchase intention is less affected by exposure to sales promotion information for consumers experiencing crowdedness. This study further revealed that this effect occurs when consumers learn about an ongoing sales promotion (which should increase their purchase intention) *or* the end of a promotion (which may decrease their purchase intention). Crowding can give rise to a negative affect (Maeng and Tanner 2013; Xu et al. 2012), so one may wonder whether crowding reduces the impact of a sales promotion because the negative affective states it triggers lower the desirability of the sales promotion. However, if this were the case, crowding should have led to an even lower purchase intention when participants learned that the promotion had just ended. This alternative account based on negative affect was refuted by the observation that purchase intention changed to a lesser extent

regardless of the type of promotion information.

Study 2

Study 2 aimed to shed light on the underlying process of our observed effect. Our proposition is that crowding shifts consumers' attention from the external environment to their internal feelings and thoughts, which reduces the extent to which purchase intention changes upon exposure to sales promotion information. To validate these assumptions, this study directly tested the mediating role of relative internal focus.

Design, participants and procedure

One hundred and eighty-nine undergraduates from a large university participated in this study for a nominal payment. Three participants who indicated that they had been heavily distracted during the study were excluded,[2] leaving 186 participants for later data analyses (133 women, M_{age} = 22.22). Participants were randomly assigned to one of the two conditions (crowded vs. uncrowded).

Participants first completed a mental simulation task in which we manipulated perceived crowdedness. Following past research (Hock and Bagchi 2018; Huang et al. 2018; Maeng and Tanner 2013), we presented participants with a picture of either a crowded (i.e., the *crowded* condition) or uncrowded shopping environment (i.e., the *uncrowded* condition). Participants then imagined themselves in the pictured scene and described how they would feel in it (see Web

[2] For studies conducted with simulated imagination of crowding (Studies 2, 3, 4 and 5), participants who reported that they had been heavily distracted during the study (e.g., Baskin et al. 2014; Oppenheimer et al. 2009) were excluded from later analyses: three participants in Study 2, two participants in Study 3, nine participants in Study 4, and four participants in Study 5. The exclusion of these participants does not alter the result patterns we reported (see Web appendix C for alternative analyses with the full data sample).

appendix D for details). This manipulation was validated through a pretest with an independent sample of 100 participants (41 women, M_{age} = 36.25). After completing the same mental-simulation task (crowded vs. uncrowded), pretest participants indicted how crowded they felt along a 9-point scale (1 = "not crowded at all" and 9 = "very crowded;" e.g., Hock and Bagchi 2018; Huang et al. 2018). The results showed that our manipulation significantly changed participants' perceptions of crowdedness. Participants in the crowded condition felt more crowded (M = 8.17, SD = 1.52) than did those in the uncrowded condition (M = 3.54, SD = 2.38; $F(1, 98) = 131.78$, $p < .001$, $\eta^2 = .57$).

Next, as a measure of change in consumers' purchase intention in response to promotions, participants read two advertisements and reported their purchase intention toward the product after reading each ad. Specifically, as in the ended-promotion condition in Study 1, participants first read a headphone advertisement featuring a sales promotion (i.e., consumers will receive a smart watch as a free gift) and indicated their purchase intention toward the headphone set with the same four items used in Study 1 (Time 1 purchase intention, α = .94). Then the advertisement without the promotion was presented on the next page, and participants were told that the promotion was over (see Web appendix E for the two ads) before they reported their purchase intention toward the headphone set again with the same four items (Time 2 purchase intention, α = .95).

Afterward, to measure participants' internal focus, we asked them to indicate the extent to which they agreed with the following five statements about their thoughts and feelings when they were imagining the shopping scene ("I would like to shift my attention to my inner feelings if I were in this scene," "I would like to focus more on my own feelings and thoughts for doing things if I were shopping in this scene," "I would like to pay more attention to myself if I were in

this scene," "I would like to focus on my own motives if I were in this scene," and "I would like to know better the way my mind works when I work through a problem in this scene;" to better capture consumers' state of internal focus, we revised and adapted the items from Fenigstein et al. 1975; Gibbons 1990; Weiss and Johar 2013; 1 = "strongly disagree" and 9 = "strongly agree;" $\alpha = .92$).

Finally, to rule out several alternative explanations for the proposed effect, we asked participants to report whether their product choices were based on rational thoughts or emotional reactions (1 = "rational thoughts" and 9 = "emotional reactions"; Hock and Bagchi 2018), their mood (i.e., "Good," "Bad," "Happy," "Sad;" 1 = "not at all" and 9 = "very much;" $\alpha = .85$; Su et al. 2017), and their involvement in this study ("How much were you involved in these tasks?" and "How much were you engaged in these tasks;" 1 = "not at all" and 9 = "very much;" $r = .90$, $p < .001$; Aiello et al. 1977).

Results

We built an index of the impact of sales promotion by calculating the absolute value of the difference between participants' Time 1 and Time 2 purchase intentions. A lower score indicates a smaller change in purchase intention in response to sales promotions. Replicating the results of Study 1, participants in the crowded condition showed less change in purchase intention ($M = 1.23$, SD = 1.07) toward the advertised headphones after viewing the sales promotion information than did those in the uncrowded condition ($M = 2.09$, SD = 1.98; $F(1, 184) = 13.43$, $p < .001$, $\eta^2 = .07$).

Consistent with our prediction, we also found a significant effect of crowding on relative internal focus. Participants in the crowded condition reported a greater relative internal focus (*M*

= 6.01, SD = 1.31) compared to those in the uncrowded condition (M = 5.48[3], SD = 1.81; F(1, 184) = 5.13, p = .025, η^2 = .03). Next, we conducted a mediation analysis using the bootstrapping procedure (with 5,000 resamples, PROCESS Model 4; Hayes 2018), with crowding as the independent variable, relative internal focus as the mediator, and change in purchase intention as the dependent variable. The results showed that relative internal focus significantly mediated the effect of crowding on the change in purchase intention in response to sales promotions (B = -.26, SE = .14; 95% CI = -.5757 to -.0304, excluding zero).

We also tested alternative explanations based on decision style, mood, and involvement. Consistent with the finding of Hock and Bagchi (2018), we observed that participants in the crowded condition reported a greater relative feeling-based processing (M = 5.82, SD = 1.86) compared to those in the uncrowded condition (M = 5.22, SD = 2.15; F(1, 184) = 4.18, p = .042, η^2 = .02). However, the relative feeling-based processing did not mediate the observed effect of crowding on change in purchase intention in response to sales promotion (B = .03; SE = .05; 95% CI = -.0526 to .1369, including zero). We did not find significant effects of crowding on mood (F(1, 184) = 3.47, p = .064) or involvement (F(1, 184) = 1.53, p > .20), suggesting that the observed effect is unlikely to be driven by the affective states or depletion triggered by crowding.

Discussion

Study 2 provided direct evidence for our proposed underlying mechanism. That is, when experiencing crowdedness, consumers tend to shift their attention from the external environment to their internal feelings and thoughts, which in turn leads to the reduced impact of promotion, as

[3] The high levels of internal-focus in our sample overall is not surprising, since it is consistent with previous research showing that people in general have a natural and innate propensity to focus more on internal feelings and thoughts (than external information) when they make a decision (e.g., Fazio and Zanna 1978; Tormala and Rucker 2007).

evidenced by smaller change in purchase intention.

This study rules out several alternative explanations of our observed effect. First, Hock and Bagchi (2018) found that crowding can trigger more affective processing, which in turn increases consumers' calorie consumption. We observed that participants in the crowded condition relied more on feeling-based (vs. reason-based) processing. However, affective processing did not mediate the linkage between crowding and the impact of sales promotion. Second, one might argue that crowding is an aversive state (Maeng and Tanner 2013), and it may trigger a negative mood, make consumers less involved in processing sales promotions, and consequently reduce the impact of sales promotion. Conversely, the non-significant effects of crowding on these factors speak against the alternative explanations that the observed effect of crowding on the impact of sales promotion is driven by negative mood or lessened involvement.

Study 3

Study 2 supported our conceptualization that crowding reduces the change in purchase intention in response to sales promotions because consumers experiencing crowdedness tend to have a greater relative internal focus and rely on their internal thoughts and feelings rather than external cues for product judgments. However, there are situations in which an enhanced relative internal focus may not reduce the impact of sales promotion information on purchase intention. For example, in the context of interpersonal gifting, givers usually need to consider various aspects (e.g., gift recipient's preference, symbolic meanings of the gift to the recipient, etc.) from the perspective of the gift recipient, with the clear knowledge that their own preference may not be diagnostic for predicting receivers' reactions (Cavanaugh et al. 2015; Zhang and Epley 2012), which suggests that they may not have clearly defined preferences for gifts as they do for self-

purchases. We predict that when choosing a product for themselves, consumers who experience crowdedness will show a smaller change in purchase intention in response to sales promotions. However, this effect will be weakened when consumers choose a gift for others—a process in which the gift recipient's preferences and needs are prioritized, and a consumer's relative internal focus and perceived certainty about his or her own preferences are not diagnostic.

Design, participants, and procedure

Two hundred forty US adults recruited from Amazon Mechanical Turk took part in this study for a small payment. Two participants who indicated that they had been heavily distracted during the study were excluded, leaving 238 for later data analyses (105 women, M_{age} = 39.60). Participants were randomly assigned to the conditions of a 2 (crowding: crowded vs. uncrowded) × 2 (decision context: self-purchasing vs. gifting) between-subjects design.

Participants first completed the same crowding mental-simulation task as in the previous studies. After that, to measure the impact of sales promotion, we asked participants to read two advertisements for a backpack (one regular ad and the other with a sales promotion, see Web appendix F) and to report their purchase intention toward the product after reading each ad. Specifically, participants first read a regular backpack advertisement. Participants in the *self-purchasing* condition were further asked to imagine that they were choosing a backpack for themselves, whereas those in the *gifting* condition were further asked to imagine that they were choosing a backpack for a friend. Participants in both decision-context conditions indicated their purchase intention toward the backpack with the same four items used in previous studies (Time 1 purchase intention, α = .96). They were then presented with a second advertisement showing that the backpack they just saw was now on sale (with a 50% discount) and were asked to report

their purchase intention toward the backpack again with the same four items (Time 2 purchase intention, α = .97).

Results

As in previous studies, the impact of sales promotion is indexed by the absolute value of the difference between participants' Time 1 and Time 2 purchase intentions. A lower score indicates a smaller change in purchase intention in response to sales promotions. A 2 × 2 ANOVA revealed a significant main effect of crowding ($F(1, 234) = 3.99$, $p = .047$, $\eta_p^2 = .02$), qualified by a significant crowding × decision context interaction ($F(1, 234) = 4.92$, $p = .028$, $\eta_p^2 = .02$; see Fig. 2). In the self-purchasing condition, replicating findings from our previous studies, participants in the crowded condition showed less change in purchase intention toward sales promotion ($M = 1.02$, SD = 1.04) than their counterparts in the uncrowded condition ($M = 1.86$, SD = 1.88; $F(1, 234) = 9.03$, $p = .003$, $\eta^2 = .04$). However, this effect diminished when participants were thinking about purchasing the product for their friend as a gift ($M_{crowded} = 1.61$, SD = 1.57 vs. $M_{uncrowded} = 1.56$, SD = 1.61, $F < 1$, NS).

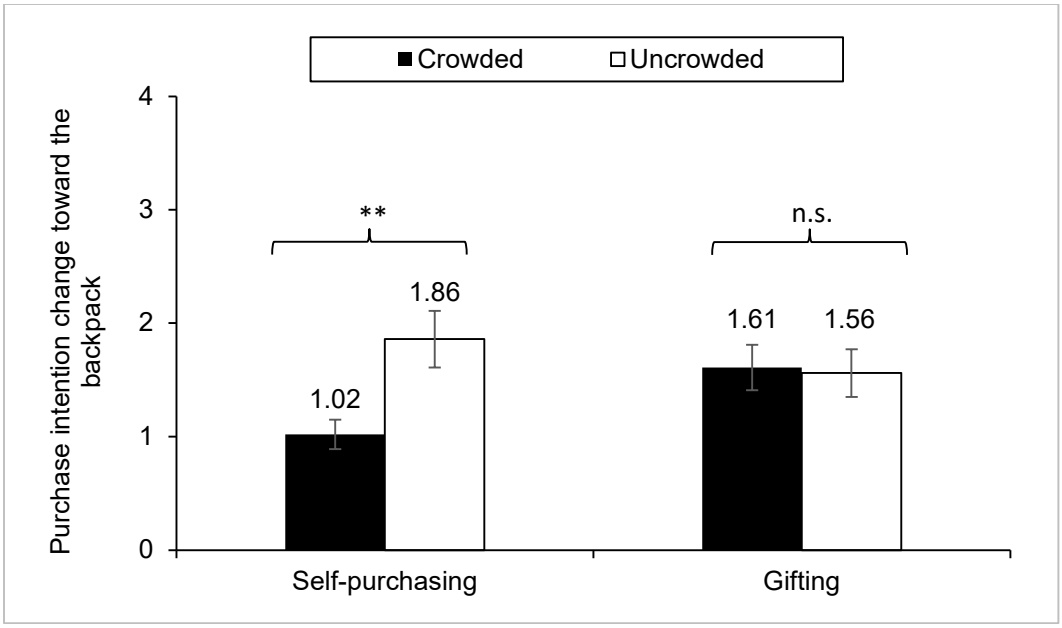

Fig. 2 Effects of crowding and decision context on the impact of sales promotion (Study 3).
Notes: Error bars = ±1 SE
$^{n.s.}p > .10$, $^{**}p < .01$

Discussion

Study 3 shed further light on our proposed underlying mechanism. When consumers are purchasing a product not for themselves but for others (e.g., as a gift for a friend), their own preference for the product is less diagnostic because they need to take their friend's preferences and needs into consideration. In this case of choosing gifts for *others*, although crowding can promote a relative internal focus that strengthens consumers' certainty about their *own* preference, it did not influence the impact of sales promotions.

Study 4

In previous studies, consumers' responsiveness to sales promotions was measured by the changes in their purchase intention before and after exposure to sales promotion information. To further attest to the robustness of the effect and prevent biases in responses that might exist in a within-subject design, Study 4 adopted an alternative design in which the availability of promotion information was manipulated between subjects. Specifically, only half of the participants received new information about a sales promotion to process, whereas the other half were simply exposed again to the same product information they had seen earlier. This design allowed us to show that crowdedness indeed reduces the impact of a sales promotion on consumers' purchase intention. In addition, we used an incentive-compatible measure to validate our prediction through consumers' actual purchase behavior. Finally, we demonstrated that the observed effect is less likely to be explained by prevention focus or consumers' involvement in

the purchase decision.

Design, participants, and procedure

A total of 377 undergraduates from a large public university participated in this preregistered study (https://aspredicted.org/DPX_GKY) for a small payment. Nine participants who indicated that they had been heavily distracted during the study were excluded, leaving 368 participants for later data analyses (264 women, M_{age} = 21.31). Participants were randomly assigned to the conditions of a 2 (crowding: crowded vs. uncrowded) × 2 (promotion: promotion vs. no promotion) between-subjects design.

All participants first imagined that they were choosing some stationery for themselves and were asked to think about their attitude toward a box of six assorted color highlighters (approximately US$4, see Web appendix G). Next, participants completed a similar crowding mental-simulation task as in the previous studies (see Web appendix H). Afterward, to examine the impact of a sales promotion, participants in the *promotion* condition were further asked to imagine that the highlighters they just saw were now on sale (with a 50% discount, i.e., price after discount was approximately US$2), whereas those in the *no promotion* condition were presented with the same product information they saw earlier (without a discount, i.e., the price was still approximately US$4). Participants were informed that they could use part of their participation payment (approximately US$5) to purchase this product. If they chose to purchase these highlighters, they would receive the product and their remaining payment (approximately US$3 in the *promotion* condition or US$1 in the *no promotion* condition). If they chose not to purchase these highlighters, they would receive the full amount of the participation payment (approximately US$5). Finally, participants indicated whether they would like to purchase this

product (yes or no) and received the payment (and the highlighters if they chose to purchase them) accordingly (Study 6, Fan, Rucker, and Jiang in press). To assess alternative explanations for the proposed effect, we also measured prevention focus by using seven items adopted from prior research (Maeng et al. 2013; see Web appendix I for the full scale). We measured their involvement in this study by asking them to recall the exact number of the highlighters in the package (Norris and Colman 1992).

Results

Participants' responsiveness to the sales promotion was indicated by the difference in their actual purchase decision when promotion information was available versus when it was not. A binary logistic regression was conducted in which we regressed participants' purchase decision (1 = yes, 0 = no) on crowding, promotion, and their interaction. We found a significant main effect of promotion (B = 1.71, SE = .51, $\chi^2(1) = 11.20$, p = .001, OR = 5.51), which is further qualified by a crowding × promotion interaction (B = -1.56, SE = .72, $\chi^2(1) = 4.68$, p = .031, OR = .21, see Fig. 3). In particular, when promotion information was present, participants in the crowded condition were less likely to purchase the product (10.3%) than were those in the uncrowded condition (26.6%; $\chi^2(1) = 7.66$, p = .006, OR = .32). However, this effect disappeared when there was no promotion (9.0% vs. 6.2% in the crowded and uncrowded conditions, respectively; $\chi^2(1) < 1$, NS).

In addition, for the participants in the uncrowded condition, the presence of promotion information significantly increased consumers purchase intention (26.6%) than when there was no promotion (6.2%; $\chi^2(1) = 13.20$, $p < .001$, OR = 5.51). However, this difference was not evident in the crowded condition (10.3% vs. 9.0 % in the promotion present and promotion

absent conditions, respectively; $\chi^2(1) < 1$, NS).

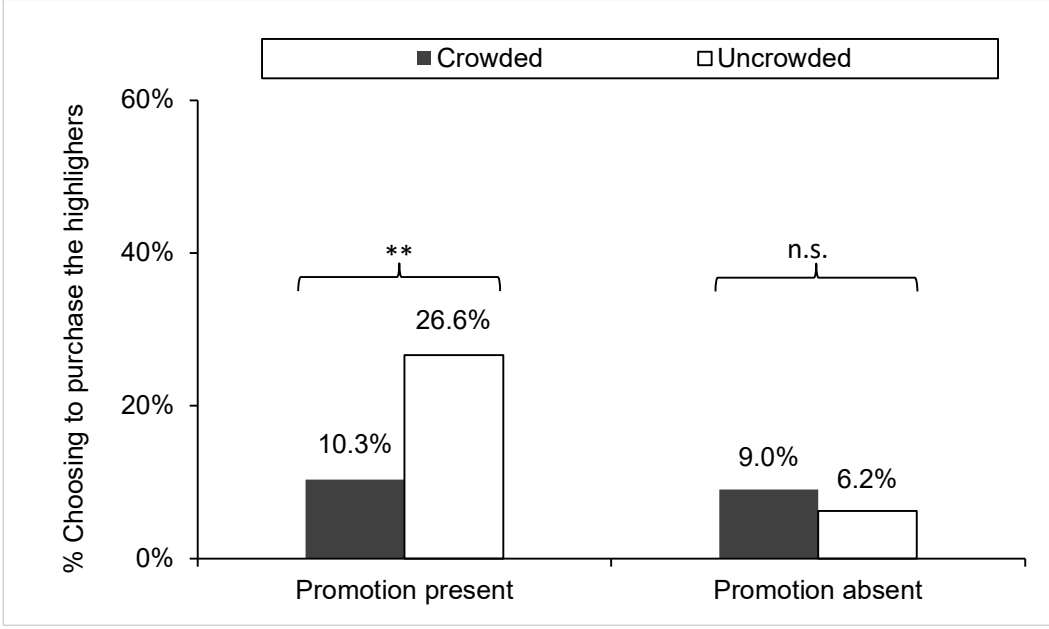

Fig. 3 Effects of crowding and promotion on consumers' purchase decision (Study 4). $^{n.s.}p > .10$, $^{**}p < .01$

We also tested alternative explanations based on prevention focus and involvement. In line with the findings of Maeng and colleagues (2013), we observed that participants in the crowded condition reported a trend of greater prevention focus ($M = 5.85$, SD = 1.61) compared to those in the uncrowded condition ($M = 5.60$, SD = 1.58; $F(1, 366) = 2.26$, $p = .133$). Prevention focus did not mediate the observed effect of crowding on change in purchase decision in response to the sales promotion ($B = -.08$, SE = .07; 95% CI = -.2833 to .0123, including zero). Replicating what we found in Study 2, we did not find significant effects of crowding on involvement (percentage of participants who answered the recall question correctly: 73.0% vs. 78.9% in the crowded and uncrowded conditions, respectively, $p > .10$). These results suggest that the observed effect is unlikely to be driven by prevention focus or reduced involvement triggered by crowding.

Discussion

Using participants' actual purchase decision as the measurement for their responsiveness to a sales promotion, this study supported our prediction that feelings of crowding indeed decrease consumers' purchase intention toward products with a sales promotion. The findings of this study also speak against several alternative explanations. First, we observed the null effect of crowding on participants' purchase decision regarding products without a promotion, suggesting that observed effect of the decreased change in purchase intention (before and after exposure to sales promotion) in the previous studies is unlikely to be driven by crowding increasing consumers' desire for products at first glance (i.e., already a higher purchase intention in Time 1 before exposure to the sales promotion). Second, prevention focus and involvement do not appear to explain the relationship between crowding and consumers' responsiveness to sales promotions.

Study 5

We theorize that consumers in a crowded environment are exposed to an overwhelming quantity of sensory experiences. In order to block out undesirable overstimulation from their surroundings, consumers in a crowd tend to shift their attention inward in an effort to filter out external stimuli (e.g., Andrews et al. 2015; Huang et al. 2018). Although crowding is generally regarded as an aversive experience, it is less aversive when consumers voluntarily join in the crowd (Xu et al. 2012). In such cases, consumers may even expect crowding to enhance their experience. For example, consumers enjoy being in a crowded environment when watching an exciting football game in a bar (Huang et al. 2018). We predict that, under such circumstances

when crowding is not perceived to be aversive, crowding will not influence consumers' responsiveness to sales promotions.

Design, participants, and procedure

Three hundred and sixty British adults participated in this preregistered study (https://aspredicted.org/K1S_13Y) on Prolific for a small payment. Four participants who indicated that they had been heavily distracted during the study were excluded, leaving 356 participants for later data analyses (262 women, M_{age} = 39.28). This study adopted a 3 (crowding: aversively crowded vs. non-aversively crowded vs. uncrowded) × 2 (promotion: promotion vs. no promotion) between-subjects design.

All participants first imagined that a new bar had just opened in their neighborhood and were asked to think about their attitude toward the special drinks available in this new bar (Web appendix J). Next, similar to what we used in the previous studies, participants completed the crowding mental-simulation task (Huang et al. 2018). We presented participants with a picture of either a crowded (i.e., the *crowded* condition) or uncrowded bar (i.e., the *uncrowded* condition, Web appendix K). In *aversively crowded* conditions, they imagined that they wanted to enjoy a relaxing piano performance in the bar. By contrast, in *non-aversively crowded* conditions, they imagined that wanted to watch an exciting football game in the bar. No additional information was provided in the uncrowded conditions. Participants then imagined themselves in the pictured scene and described how they would feel in it.

Afterward, participants in *promotion* conditions were further asked to imagine that the special drinks they just saw were now on sale (with a 50% discount) and whereas those in *no promotion* conditions were presented the same product information they saw earlier (i.e., without

discount information). Finally, all participants were asked to report their purchase intention likelihood on a 9-point scale (1 = “unlikely at all” and 9 = “very likely”).

Results

Consistent with our predictions, a 3 × 2 ANOVA revealed a significant main effect of crowding ($F(2, 350) = 7.27$, $p < .001$, $\eta_p^2 = .04$) and a significant main effect of promotion ($F(2, 350) = 67.28$, $p < .001$, $\eta_p^2 = .16$), which were further qualified by a significant crowding × promotion interaction ($F(2, 350) = 5.36$, $p = .005$, $\eta_p^2 = .03$; see Fig. 4). In the *promotion* condition, crowding significantly affected the participants’ purchase intention ($F(2, 350) = 13.22$, $p < .001$, $\eta_p^2 = .07$). Specifically, participants in the *aversively crowded* condition reported a significantly lower purchase intention ($M = 5.86$, SD = 2.64) than did their counterparts in the *non-aversively crowded* condition ($M = 7.60$, SD = 2.31; $F(1, 350) = 13.97$, $p < .001$, $\eta^2 = .06$) and the *uncrowded* condition ($M = 8.06$, SD = 1.21; $F(1, 350) = 24.35$, $p < .001$, $\eta^2 = .09$). The latter two conditions did not differ significantly ($F(1, 350) = 1.06$, $p = .302$). However, these differences were not evident in the *no promotion* condition ($M_{aversively\ crowded} = 4.91$, SD = 2.74 vs. $M_{non\text{-}aversively\ crowded} = 5.05$, SD = 2.87 vs. $M_{uncrowded} = 5.07$, SD = 2.85, $F < 1$, NS).

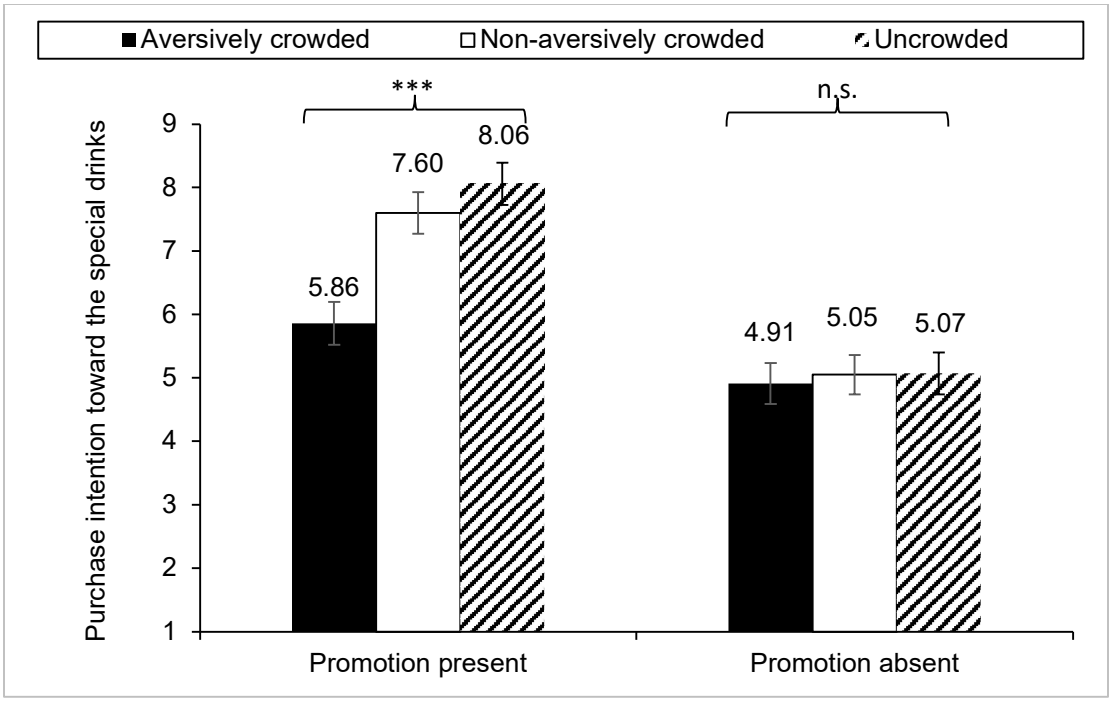

Fig. 4 Effects of crowding nature and promotion on consumers' purchase intention (Study 5).
Notes: Error bars = ±1 SE
$^{n.s.}p > .10$, $^{***}p < .001$

Discussion

Generally, consumers find crowding to be an aversive experience and try to block external stimuli by shifting their attention inward. However, there are situations in which crowding is less aversive, or even desirable. That is, consumers may enjoy being in a crowd under certain circumstances. In this case, as consumers are not motivated to direct attention away from external stimulation, their relative internal focus will not be activated. As a result, the impact of crowding on consumers' responsiveness to sales promotions is mitigated.

Study 6

Finally, we conducted a field study to enhance the external validity of the observed effect and test the generalizability of our findings to a real market setting. Past research suggests that

people who live in a place of high population density experience increased invasion of personal space, a lack of privacy, and a higher level of unwanted social interactions (Boots 1979; Stokols 1972). Thus, regional population density has been correlated with the crowdedness perceptions of local residents (Boots 1979; Jain 1987; Levy and Herzog 1974). Following this stream of research, in this study we used regional population density as an index of chronic experience of crowdedness in that area (Jain 1987; Levy and Herzog 1974). Past literature has suggested that experiencing crowdedness chronically can have a profound impact on people's behavior, even when crowdedness is not experienced presently (Evans et al. 1998; Evans et al. 2000).

As shown in our previous studies, when consumers have a stable purchase intention toward a product, they will be less affected by sales promotion information. On the aggregate level, the impact of promotions can be inferred by the fluctuation in sales due to promotions. Thus, to examine the impact of real-life sales promotions on the macro level, this study looked at the change in sales in response to sales promotions. We predicted that chronic crowdedness (induced by population density) alters people's internal-focus tendency and predisposes consumers to hold a stable attitude toward a product. As a result, they are less affected by sales promotion information. In other words, we expected a promotion to cause less of a change in sales in areas with a higher population density than in areas with a lower population density.

Design, participants, and procedure

We collaborated with an e-commerce firm selling cosmetic products on Taobao.com, China's biggest online B2C market. After our negotiations with executives of the firm, the company agreed to conduct this study on eight cosmetic facial masks (from the thirteen facial masks they were selling; see Web appendix L). This type of product is popular in Asia and

frequently purchased by not only female but also male customers (Smith 2018; Tsang 2016).

This field study was conducted from October 20 to October 31, 2018 (i.e., promotion period; 12 days in total). The time period was carefully selected to ensure that there were no concurrent national holidays or major marketing campaigns organized by the shopping platform (Taobao.com). During the field study, a sales promotion was carried out on the focal products (i.e., the eight cosmetic facial masks) such that these products were priced 40% off. Meanwhile, other facial-mask products on the company's website were not discounted or promoted.

To measure the impact of the promotion on the sales of our focal products, we need to know the baseline sales of the products when there was no promotion. Thus, we obtained facial-mask sales data from the firm for the same length of time right before the sales promotion, during which there was no promotion for facial masks, and no national holidays or platform-level promotions (12 days in total from October 8 through October 19, 2018; pre-promotion period).

Results

In this study, we used provincial-level population density (i.e., the ratio of population to land area in square kilometers; Deng et al. 2015; Haaland and Heath 1974) as the proxy for crowding. The population-density statistics for each Chinese province involved in our dataset were retrieved from China Statistical Yearbook (2018). From the pre-promotion period through the promotion period, a total of 1,478 consumers from 28 Chinese provincial-level divisions who made purchases of facial masks during this time (October 8 to October 31, 2018) were included in our final dataset. The 28 provincial-level divisions varied in their level of population density (ranging from Inner Mongolia at 46.2 people/per square kilometer to Shanghai with 1,300.41

people/per square kilometer).

We then looked at the provincial-level sales data in the pre-promotion and promotion periods. To control for fluctuations in store-level sales performance across time, we focused on the change of sales share, not the change of absolute sales volume. We first calculated the proportions of the sales of the focal facial masks among the sales of all facial masks of each province in both the pre-promotion and promotion periods. Specifically, the sales share of the focal products during the *promotion period* was calculated by dividing the sales volume of the promoted items by the sales volume of all facial-mask items within each provincial-level division. Similarly, the sales share of the focal products was calculated by dividing the sales volume of the focal items by the sales volume of all facial-mask items within each provincial-level division during the *pre-promotion period*. Then we calculated the difference in the sales share of the focal products between the pre-promotion period and the promotion period (i.e., promotion period – pre-promotion period) in each province, and used it as an index of sales promotion effectiveness. A less effective sales promotion is indicated by a smaller change in sales share of the focal products due to the sales promotion.

Not surprisingly, across different provinces, the sales promotion we conducted increased the focal products' sales share by 8.7% on average. Importantly, did consumers from different Chinese provinces, who experienced different levels of social crowdedness, react differently to the sales promotion? To answer this question, we regressed provincial-level change of focal-product sales share on provincial-level population density. To control for the variations in economic development and consumption expenditure across different provinces, we added annual discretionary income per capita and resident consumption expenditure, both on the provincial level (China Statistical Yearbook 2018), into the regression model as control variables.

The results show that greater population density predicts a smaller change in the sales share of focal products being promoted ($B = -4.81\times10^{-4}$, SE = 2.11×10^{-4}; $t(25) = 2.28$, $p = .032$; Table 1), supporting our prediction that sales promotions are less effective in more crowded regions.

Variable	*B*	SE	*t*	*p*
Population density	**-4.81×10^{-4}**	**2.11×10^{-4}**	**2.28**	**.032**
Annual discretionary income per capita	2.40×10^{-5}	8.00×10^{-6}	2.88	.008
Resident consumption expenditure	-1.42×10^{-5}	1.1×10^{-5}	1.28	.214
Intercept	-.21	.13	1.64	.113

Table 1. Effect of population density on the boosted proportion of promoted facial masks (Study 5)

As a robustness check, to confirm that our observed effects are not driven by any peculiarities associated with the pre-promotion period baseline sales data we selected, we also obtained facial-mask sales data one month prior to our field study period as an alternative pre-promotion period, during which there were no national holidays, sales promotion in the store, or platform-level promotions (12 days in total from September 19 to September 30, 2018). We conducted the same analyses. Again, the regression yielded a significant negative effect of population density on the change of focal-product sales share due to sales promotion ($B = -4.19\times10^{-4}$, SE = 1.74×10^{-4}; $t(25) = 2.41$, $p = .024$; Table 2), bolstering our hypothesis that sales promotions are less impactful in more crowded areas. No significant difference emerged between the two pre-promotion periods ($B = -2.2\times10^{-4}$, SE = 1.86×10^{-4}; $t(25) = 1.18$, $p > .20$).

Variable	B	SE	t	*p*
Population Density	**-4.19×10^{-4}**	**1.74×10^{-4}**	**2.41**	**.024**
Annual discretionary income per capita	2.07×10^{-6}	7.00×10^{-6}	.30	.770
Resident spending level	3.96×10^{-6}	9.00×10^{-6}	.42	.677
Intercept	-.10	.11	.91	.373

Table 2. Effect of population density on the boosted proportion of promoted facial masks (robustness check, Study 5)

Discussion

By examining actual sales data collected in a field study, Study 6 brings high external validity to its support for the proposition that crowding influences the impact of sales promotion. This study shows that the effect we observed is not limited to consumers' self-reported purchase intention or actual choice of product in the lab but is evident in their actual purchase behavior in the field. In addition, the results of Study 6 suggest that the experience of crowdedness at the aggregate level can be captured by population density in the geographic region, which provides useful implications for marketers to plan activities in different sub-markets based on their population density.

Limitations of the current study should be noted. Given that this study's measurement of crowding is based on the population density at the provincial level, confounding factors might exist. For example, it is possible that consumers from more populated provinces are less sensitive to promotions because they are surrounded by promotions in their local stores. Relatedly, consumers from more populated provinces might find alternative sales promotions more easily in their local stores if they miss the online promotion. In addition, given that we do not have

consumers' relative internal-focus data in this field study, one may argue that consumers from more populated provinces are less sensitive to promotions because of other mechanisms (e.g., high vigilance). Future field studies are needed to test these possibilities.

General discussion

Adding to the growing knowledge about how the experience of crowdedness influences consumer behavior (e.g., Hock and Bagchi 2018; Huang et al. 2018; Neuberg et al. 2011), our research examines the relationship between crowding and consumers' responsiveness to sales promotions. Across six studies, we found that consumers in a crowded environment are likely to shift their attention from external features to internal feelings and thoughts, and in turn rely on them rather than external cues as bases for product judgments. Such an enhanced relative internal focus lowers the impact of sales promotions in the marketplace. Specifically, this reduced impact of sales promotions manifests as smaller changes in purchase intention in response to sales promotions and a reduced surge in purchase intention in the presence of a sales promotion. We demonstrated these findings through online and lab experiments and a field study across a variety of contexts. We showed that sales promotion information displayed in a crowded environment is less effective in changing consumers' purchase intention (Studies 1, 3, 4 and 5). Learning that a sales promotion has ended also has less negative impact on consumers' purchase intention in a more crowded environment (Studies 1 and 2). The effect of crowding on consumers' responsiveness to sales promotions is mediated by relative internal focus (Study 2), and this effect is attenuated when consumers' own preferences are less diagnostic for product judgments, such as in the context of gifting (Study 3) or when crowding is not perceived as an undesirable experience (e.g., watching an exciting football game in a bar in Study 5). This effect of crowding

on consumers' responsiveness to sales promotions is also evident in a real marketing context that tests the responsiveness of sales volume to sales promotions (Study 6).

Theoretical contributions

The current research makes important theoretical contributions. First, existing consumer literature on crowding has largely focused on how crowding influences consumers' preferences for specific products and the use of crowding as cues for product evaluation, such as the favorability toward safety-related products (Maeng et al. 2013) and the valuation of products displayed in more crowded places (O'Guinn et al. 2015). To the best of our knowledge, this research is the first in marketing literature to demonstrate that the experience of crowdedness affects relative internal focus, with downstream consequences on consumers' dynamic change of purchase intention in response to sales promotions.

The nuances of the current findings compared to those of prior literature are worth considering. Hock and Bagchi (2018) found that crowding can trigger more affective processing, which in turn increases consumers' calorie consumption. Indeed, in Study 2, we replicated the finding that consumers in a crowded environment tend to rely more on feeling-based (vs. reason-based) processing. However, the non-significant mediation suggests that our observed effect on the impact of sales promotion cannot be explained by the affective processing triggered by crowding. This finding is in line with prior research concluding that consumers rely on feelings in product judgments only for certain types of products; specifically, affective processing is more relevant to judgments of hedonic products and less so to judgments of utilitarian products (Adaval 2001; Chang and Hung 2018; Pham 1998). To this extent, given that most of our experimental stimuli were utilitarian products (i.e., gym class, headphones, backpack, and facial

mask), the enhanced affective processing induced by crowding may not affect purchase intention of our participants. Moreover, the results in Studies 1, 2, and 4 speak against the alternative explanations that the observed effect is driven by dampened mood or decreased involvement.

The findings of this research extend our understanding of consumers' responsiveness to sales promotion from a socio-environmental perspective (Hock and Bagchi 2018). Previous research has largely emphasized how to leverage marketing tactics to influence consumers' purchase intention toward products, such as by adjusting consumers' current–future connection (Lee and Zhao 2014), changing consumers' goal-local identity perception (Gao et al. 2017), increasing exposure frequency (Hoeffler and Ariely 1999), or reducing patience (Shaddy and Lee 2020). Our research reveals that a socio-environmental factor, crowding, can also influence consumers' responsiveness to sales promotion. That is, promotions become less impactful in shifting purchase intention when consumers are in a crowded environment.

Different from previous research examining the impact of sales promotion either on the individual (i.e., micro) level (Fan, Li, and Jiang 2019; Cai et al. 2016; Shaddy and Lee 2020) or on the aggregated (i.e., macro) level (Chandon et al. 2000; Kwok and Uncles 2003), the current research captured it on both levels. We demonstrated that the experience of crowdedness makes consumers' purchase intention less susceptible to sales promotions and leads to less change in sales due to sales promotions in areas with higher population density. Given the importance of sales promotions in the real world, research should further examine the possible contingencies that lead to different impacts on the individual and the aggregated levels of promotion effectiveness. For example, it will be an interesting avenue to further examine the differences in the impacts of sales promotion in terms of breadth (e.g., the number of customers being attracted) versus depth (e.g., the number of purchases per customer).

Limitations and future research directions

Several limitations of this research should be acknowledged. First, the current research focuses primarily on the change in consumers' purchase intention before and after exposure to sales promotion information (i.e., *ex post* purchase intention–*ex ante* purchase intention). We speculate that if consumers in a crowded environment shift their attention inward and pay more attention to advertisements on their mobile phones (Andrews et al. 2015), they should develop a more certain attitude toward the advertised product and become less susceptible to subsequent persuasion attempts. Future research is needed to differentiate consumers' transitory allocation of attentional resources and their longitudinal behavioral changes in crowded situations.

Second, we found that consumers experiencing crowdedness tend to shift their attention from the external environment to their internal thoughts and feelings, and this enhanced relative internal focus strengthens attitude certainty, which then inhibits change in purchase intention in response to sales promotion information. The certainty of consumers' pre-existing attitude toward a brand might be another boundary condition for the observed effect. We speculate that consumers may already have a very certain attitude toward a familiar brand. Thus, a feeling of crowding and relative internal focus might not further enhance attitude certainty in this case. This possibility might be worth studying in the future.

Third, we limited our research scope to one socio-environmental factor (crowding) and studied its impacts on consumers' responsiveness to sales promotions. Given that the social milieu in which consumers live has a significant effect on their consumption (Dahl 2013), the present research opens up a fruitful avenue for future research to investigate additional socio-environmental factors (e.g., social relationships, social jetlag, etc.; Yin and Huang 2022) that

may affect changes in consumers' purchase intention in response to sales promotions.

Fourth, the studies in the paper are designed so that participants receive sales promotion information and decide whether to purchase the promoted item in a crowded/uncrowded situation. That is, participants experience crowding (vs. non-crowding) in both the information search and the decision making stages. However, in other situations, one may first receive the sales promotion in a crowded/uncrowded situation and then at a later time decide whether to leverage the promotion offer in a crowded/uncrowded situation. In other words, the crowdedness in these two stages could be different. Future research might further explore the dynamics of crowdedness across different stages of decision making, and their nuanced impacts on consumers' responses to sales promotions.

Fifth, types of marketing information might moderate the impact of crowding on consumers' decision making. For instance, it will be interesting to explore whether social crowding reduces consumers' sensitivity toward monetary incentives but does not impact sensitivity to other types of persuasion attempts (e.g., salesperson's demonstration). On the other hand, the characteristics of sales promotions may also affect consumers' purchase intentions in crowded areas. For example, consumers may be exposed to promotion information when the promotion is currently ongoing or after it has ended. It might be worth exploring whether exposure to promotion information at these different stages under crowding influences consumers' responses to future sales promotions. In addition, consumers may evaluate a promotion based on both its desirability and feasibility. It would be interesting to test whether crowding shifts the weights of desirability and feasibility when consumers respond to a sales promotion.

Finally, the current research demonstrates the impact of crowdedness on relative internal

focus and the downstream consequences on consumers' reaction toward sales promotions. As discussed earlier, relative internal focus, or private self-consciousness, is the extent to which individuals attend more to their internal psychological processes (e.g., thoughts, feelings, and attitudes) than to external information (Cramer 2000; Fenigstein et al.1975; Tang, Huang, and Su 2023). It should be noted that relative internal focus is not equivalent to public self-consciousness or social anxiety. In fact, prior literature has considered private self-consciousness, social anxiety, and public self-consciousness to be distinct and independent (Hope and Heimberg 1988; Scheier 1980). Relative internal focus is also different from self-awareness, which involves inspection of the alignment between one's actions, thoughts, or emotions and one's value standards (e.g., Duval and Wicklund 1972; Eurich 2018; Wicklund 1975). One relevant finding is that when people are embarrassed, self-consciousness can be influenced by group size and number of observers (Diener et al. 1980). In comparison, the present investigation focuses on relative internal focus under crowding conditions when embarrassment is not a concern. Future studies in this area may examine the impact of crowding on these other self-related factors (e.g., self-awareness, public self-consciousness, embarrassment).

Practical implications

The current research offers implementable managerial implications. In daily life, consumers often shop in busy malls, commute during rush hours, and dine in crowded restaurants. Marketers may make use of the current findings to optimize sales promotions in different shopping environments. Our research shows that consumers' purchase intention is less likely to be altered by the presence of a sales promotion in crowded areas. Thus, when conducting marketing activities in places with high population density, marketers might need to

launch more intensive promotions to offset the impact of crowding in order to effectively change consumers' purchase intention. At the same time, although crowding reduces consumers' responsiveness to sales promotions, it also alleviates the negativity of unfavorable marketing information (e.g., when a sales promotion has just ended). Our research suggests that companies should consider strategically the crowdedness of the environment when they deliver sales promotion information, whether favorable or unfavorable, to consumers.

However, at times companies may want to make consumers' purchase intention more malleable. For example, they may aim to improve consumers' purchase intention toward their marketing offering through a promotion. As found in Study 3, the effect of crowding on consumers' responsiveness to sales promotion is mitigated when consumers' product judgments are detached from their own attitudes and preferences, such as in the context of gifting. Thus, when companies are advertising a promotion campaign in crowded areas, they may consider highlighting scenarios in which consumers purchase for others; this may enhance the impact of promotions and change purchase intention to a greater extent.

Finally, as shown in Study 5, consumers might not find crowdedness aversive if they voluntarily enter a crowded environment (Xu et al. 2012). For example, consumers might enjoy being in a crowded environment when watching an exciting football game (Huang et al. 2018), or consumers might voluntarily choose a crowded restaurant to experience the local culture when traveling. Thus, for businesses that run under circumstances in which crowding is perceived to be positive, crowding should not weaken consumers' responsiveness to a sales promotion.

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Declaration

Conflict of interest

The authors declare that they have no conflict of interest.