

# How Nonconsumption Shapes Desire

XIANCHI DAI  
AYELET FISHBACH

How does nonconsumption shape desire? The proposed model suggests that desire depends on the length of nonconsumption of a good and the presence of salient alternatives, and that desire is at least partially constructed. In the absence of salient alternatives, a longer nonconsumption period results in stronger desire for the unconsumed good. However, in the presence of salient alternatives, individuals infer that they have developed new tastes, and thus a longer nonconsumption period results in a weaker desire for the unconsumed good. Five studies support this model across nonconsumption of various goods: food from home when attending college (study 1); *chametz* food during the Passover holiday (study 2); social media (i.e., abstaining from Facebook; study 3); and cultural foods (i.e., forgoing Japanese food, study 4; and Thai food, study 5). We discuss implications of our findings for when and how the experience of desire is constructed and situationally determined.

When a product becomes temporarily unavailable, does desire for it increase or decrease over time? When, for example, college students attend school away from home, do they desire food that is only available at home more or less as the academic year progresses? And how does one's desire for social networking change over a period of no Internet access? People consume various products regularly, including, for example, one's favorite coffee brand or preferred social media. At times, however, these products become at least temporarily unavailable. Nonconsumption in turn could engender greater desire for the unconsumed product or could lead to consumers developing new tastes and eventually desiring the unconsumed product less.

This research explores the change in desire over a period of nonconsumption. We study situations in which products are temporarily unavailable either due to external circumstances (e.g., during an out-of-town trip) or because they

stand in the way of an overarching goal (e.g., the consumer wishes to adhere to medical advice or religious tradition). We further study the affective (i.e., feelings of missing), evaluative (i.e., liking), and behavioral (i.e., consumption intentions) aspects of desire, and we explore the possibility that desire is constructed.

Common wisdom may suggest that desire increases with the length of nonconsumption—a relationship captured in the popular idiom “absence makes the heart grow fonder.” Indeed, in our pilot study, 90 undergraduates and online participants predicted that their desire for both food items (apples and chocolate) and activities (jogging and going to the movies) would increase with the length of a nonconsumption period (from 2 to 90 days; see table 1). However, desire also might decrease with the length of nonconsumption, as people learn about substitutes and develop new tastes. Indeed, another popular idiom is “out of sight, out of mind.”

We propose that desire is a function of (a) the length of the nonconsumption period and (b) the presence of salient substitutes for the original focal item, which we define as alternative ways of satisfying the need or goal. We further propose that desire can be constructed: it results from a judgment that people make based on these factors. Specifically, in the presence of salient substitutes that people consume, they experience weaker desire from a longer nonconsumption period, because they assume they have developed new tastes. By contrast, in the absence of such substitutes, people experience stronger desire from a longer nonconsumption period, because they recognize an unfulfilled need.

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Xianchi Dai is an assistant professor of marketing, CUHK Business School, Chinese University of Hong Kong, Shatin, Hong Kong (xianchi@baf.msmail.cuhk.edu.hk). Ayelet Fishbach is Jeffrey Breakenridge Keller Professor of Behavioral Science and Marketing, Booth School of Business, University of Chicago, 5807 S. Woodlawn Ave., Chicago IL 60637 (ayelet.fishbach@chicagobooth.edu). The authors would like to thank Tea Chan, Esther Chau, Tal Eyal, and Canice Kwan for their help with data collection. This research was supported by Research Grants Council of Hong Kong Grants CUHK 443012 to Xianchi Dai and by a grant from the Templeton Foundation to Ayelet Fishbach.

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TABLE 1

MEAN (SD) OF PREDICTED DESIRE (LIKING) AS A FUNCTION OF NONCONSUMPTION LENGTH ACROSS DIFFERENT PRODUCT AND ACTIVITY CATEGORIES (SCALE: -100 TO +100)

Product/activity	Day 2	Day 5	Day 15	Day 30	Day 90
Apple	16.01 (41.92)	24.70 (39.18)	33.11 (39.59)	41.76 (43.45)	51.73 (48.50)
Cake	15.90 (51.58)	23.53 (50.36)	34.57 (47.98)	45.18 (45.88)	58.03 (45.65)
Jogging	-5.23 (53.86)	-.20 (55.69)	4.01 (57.25)	8.41 (59.44)	12.43 (64.69)
Movie	11.69 (40.47)	20.83 (40.17)	30.67 (41.02)	47.07 (43.30)	60.31 (46.68)

In what follows, we elaborate on what people infer about themselves from watching themselves not consuming something. We then provide empirical support for our model in a series of studies that manipulated the length of nonconsumption periods and the presence of salient alternatives.

## THEORETICAL BACKGROUND

Existing research on intertemporal choice explored the impact of anticipated nonconsumption and identified the conditions under which people impose on themselves a lengthier nonconsumption period (i.e., wait for a reward) in order to receive a larger amount of the product at a later time (Frederick, Loewenstein, and O'Donoghue 2002; Hoch and Loewenstein 1991; Kivetz and Simonson 2002; Zauberman et al. 2009; Zauberman and Lynch 2005). More recent research on intertemporal choice found that after waiting to choose between larger-later and smaller-sooner rewards, people become more patient to continue to wait for a larger-later (over a smaller-sooner) reward, because they infer something about themselves from waiting to consume: that they value the type of product they are waiting for and hence are willing to continue waiting for it. For example, after waiting to choose between two product rewards (smaller-sooner vs. larger-later), research participants exhibited greater patience, as indicated by the greater proportion of participants choosing the larger-later reward than if they had not waited to choose or before they had started to wait (Dai and Fishbach 2013). If waiting informs preference, then, more generally, nonconsumption might inform desire.

Both classic need theories (Cabanac 1971; Lewin 1935) and research on satiation (Epstein et al. 2009; McSweeney and Swindell 1999) would predict an increase in desire over the course of a nonconsumption period, such that people would miss, like, and intend to consume a product more over time. Based on need theories, for example, thirst and hunger will be stronger the longer a person has abstained from water and food, respectively. The reason basic needs increase with nonconsumption is that satisfying other needs cannot substitute for these basic needs. By contrast, other needs are more specific and serve as means for more basic needs. These means can be replaced by other means to the basic needs. For example, whereas thirst, hunger, and the need for social contact cannot be replaced, a specific morning beverage, lunch food, or social-networking website can all be replaced by other beverages, foods, or means of social networking.

Indeed, research on means-end relationships refers to consumption as a means to satisfy a need or a goal (Kruglanski 1996; Zhang, Fishbach, and Kruglanski 2007). Multiple means can lead to the same end, and they are all substitutable with regard to each other. For example, water, apple juice, and iced tea are substitutable means for quenching one's thirst. Thus, when consumption of any specific item gets disrupted, and assuming the basic need is still fulfilled, people can make several potentially incongruent inferences from their lack of consumption of how much they desire the foregone means.

From a learning perspective, people learn about their desire in a way similar to how they learn about others: by observing and explaining their own consumption (Belk 1988; Bem 1972; Khan and Dhar 2006; Kleine, Kleine, and Kernan 1993; Koo and Fishbach 2010). This is true even when the limited availability of options restricts consumption (Arkes and Ayton 1999; Arkes and Blumer 1985; Finkelstein and Fishbach 2010). Similarly, we suggest that people learn from lack of consumption; what people do not consume can inform their desire. Specifically, a person that has not consumed a product infers either stronger or weaker desire, which in turn determines consumption when the product becomes available. For example, when an old-time favorite breakfast cereal becomes unavailable, over time a person may experience more or less desire for it; these opposite effects on desire further have opposite implications for her consumption of that breakfast food once it becomes available again.

## THE ROLE OF SUBSTITUTES IN EXPERIENCING DESIRE

What people infer about their desire from nonconsumption may depend on the presence of salient substitutes when making the inference. We identify substitution within a means-end relationship. When two or more means serve the same end, they are substitutable (Etkin and Ratner 2012; Kruglanski et al. 2002). For example, a traveler may find her favorite breakfast food is unavailable during a trip and would seek something else instead. We refer to that new breakfast food as her substitute. Substitutes exist for every consumption goal, broadly defined. Thus, not only can a variety of products substitute for each other but activities and social interactions can also form substitutes in means-end relationships. Moreover, the same two products may substitute for each other with respect to one end goal but

not with respect to another different goal. For example, two food items—pizza and sushi—are often substitutable lunch options, but they are not substitutable in fulfilling the desire to experience the Japanese culture (where only sushi fits) or the goal to maintain a vegetarian diet (where pizza might fit better).

When substitutes are not salient, a longer nonconsumption period implies a need has been suspended for a longer time, and the resulting inference is of stronger desire for that product or experience. By contrast, when substitutes are salient, a longer nonconsumption period implies greater pursuit of substitutes, development of new tastes, and thus weaker desire for the original product or experience. For example, a person who has not had a favorite breakfast food for a long versus short time will want it more if no alternatives were made salient at the point of making the judgment. However, if the person is aware of alternatives (e.g., by prompting her to report what she had for breakfast), a long versus short period of nonconsumption could imply she has developed other means (new tastes) to satisfy the need. Consequently, she wants the original option less.

Importantly, although substitutes are common, they are not always brought to mind at the point of evaluating desire, because the focal attention is on the unavailable item. Thus, when people ask themselves, “How much do I desire X?” they do not necessarily bring to mind alternatives (e.g., “How much do I desire X now that I consume Y?”). The result is that unless substitutes are chronically salient or people are directly prompted to consider substitutes, people evaluate their desire based on a deprivation model. Similar to the lay theory expressed by our pilot study participants, they infer that the longer the nonconsumption period is, the stronger the desire. Only when substitutes are chronically salient or people are prompted to consider alternatives do people consider the possibility that they have developed a new taste and infer that the longer they have been consuming substitutes for the original consumption, the weaker their desire for it is.

This prediction builds on the perspective of constructed preference (Bettman, Luce, and Payne 1998; Simonson and Tversky 1992), according to which people’s judgments of their preferences are malleable, and the information most accessible in their mind at the point of making the judgment has greater impact than less salient information (Weber and Johnson 2009). This view suggests stronger effects for context when people do not have well-defined and strong preferences (Simonson 2008). For example, the desire for everyday consumer goods such as foods or popular websites is malleable and subject to construal more than the desire for a loved one, or alternatively, for an addictive substance. In addition, perceived as well as actual nonconsumption should influence desire such that the feeling of not having something for a period of time would have similar effects as actually not having it.

## THE CURRENT RESEARCH

We explore how length of nonconsumption and the presence of salient substitutes influence the experience of desire. We focus on constructed desire and on everyday consumption (e.g., of food) where desire for products is common yet sufficiently moderate to be subject to contextual variables and be constructed. We study the emotional, motivational, and behavioral aspects of desire. Thus, desire implies the feelings of missing something, which is similar to the experience of nostalgia and longing (e.g., homesickness) and is neither completely positive nor negative (Sedikides et al. 2008). In addition, desire involves positive evaluation (liking) and behavioral intentions (wanting). We assess the strength of desire by how much people miss, like, and plan to consume an item when it becomes available.

Five studies test the hypothesis that a longer period of nonconsumption results in a stronger experience of desire for a product, unless salient substitutes are present, in which case a longer period of nonconsumption results in a weaker experience of desire. We further predict that in the presence of substitutes, the development of new tastes (for substitutes) mediates the impact of nonconsumption on desire.

Our first study is a survey study that assessed out-of-town college students’ desire for foods that are only available in their hometown. Study 2 tested Jewish participants’ desire for *chametz* foods (i.e., leavened foods that have been baked to rise) over the 7 days of Passover, when Jewish tradition prohibits consumption of such foods. Study 3 similarly tested how abstaining from a popular social media website (Facebook) influences the desire to use it again. Study 4 manipulated the breadth of the goal frame and thus whether an alternative consumption could be considered a substitute for a focal one. Specifically, it assessed desire for Japanese food over a period of nonconsumption and as a function of whether alternative consumption was seen as substitutable. Finally, to assess the consequences of desire for consumption, study 5 assessed choice of a Thai restaurant as a function of length of nonconsumption and as the salience of substitutes for Thai food when making the choice.

### STUDY 1: DESIRE FOR HOMETOWN FOOD

Study 1 is a survey study that assessed the combined effect of natural variations in length of nonconsumption and presence of salient substitutes on desire for food. In this study, undergraduates who attend college away from home reported their desire for food that is available for them only in their hometown. We assessed the emotional (missing), evaluative (liking), and behavioral (consumption intentions) manifestations of desire and hypothesized that length of nonconsumption would positively predict desire for those who do not have accessible substitutes but would negatively predict desire for those who have accessible substitutes.

TABLE 2  
STUDY 1: CORRELATIONS BETWEEN NONCONSUMPTION LENGTH AND DESIRE VARIABLES

	Nonconsumption length and missing	Nonconsumption length and liking	Nonconsumption length and consumption intention
Substitutes absent ( $N = 52$ )	.369 <sup>a</sup>	.308 <sup>b</sup>	.407 <sup>a</sup>
Substitutes present ( $N = 53$ )	-.296 <sup>b</sup>	-.397 <sup>a</sup>	-.398 <sup>a</sup>

<sup>a</sup>Correlation is significant at the .01 level (two-tailed).

<sup>b</sup>Correlation is significant at the .05 level (two-tailed).

## Method

One hundred and five undergraduate students at the Chinese University of Hong Kong completed an online study on food consumption in return for entering into a lottery for HK\$300 (around US\$37.50) in cash. These participants were attending college away from their hometowns, and thus certain foods were available to them in their hometowns but not at college. To conceal the purpose of the study in advertisement (which could bias the sample), we opened the survey also to local students but did not include their data in the analyses.

We conducted the study during the second week of fall semester, when the variation in the time that had elapsed since college students were at home was at its maximum, with some students just returning to school while others had been in Hong Kong for at least several months (e.g., they had stayed in town during the summer). Participants first indicated whether they were attending college away from home and then listed a food item they consumed in their hometown but could not locate while at college. Participants listed, for example, hometown-style dumplings, ginger milk curd, and orange tea. The rest of the survey referred to each person's listed food item.

To assess length of nonconsumption, participants listed how much time had elapsed since they had consumed the listed food item (in days). They then rated their desire for the food, including how much they (1) missed and (2) liked that food (two scales: 1 = not at all, 7 = very much), and their consumption intentions: whether they would get the food item when it became available (1 = absolutely no, 7 = absolutely yes), and how soon they would get it when it became available (1 = eventually, 7 = as soon as possible).

Because our model posits that reminders of substitutes could influence desire in a similar way as having naturally salient substitutes, only after rating their desire did participants indicate whether they had consumed substitutes for their listed food item. Specifically, they indicated whether they had substitutes during the period of time when they did not consume this food item (yes vs. no). They read that "substitutes" are food items that satisfy the same need for them (e.g., tiramisu could substitute for chocolate cake as a dessert).

## Results and Discussion

Length of nonconsumption varied from 0 to 400 days ( $M = 88.50$ ,  $SD = 112.30$ ). In addition, 49.5% (52/105) of

the participants reported having no substitutes, and 50.5% (53/105) reported having substitutes for their listed food item.

We collapsed the two measures of consumption intention (whether and how soon;  $r = .617$ ,  $p < .001$ ) and regressed each of the three desire variables—missing, liking, and consumption intention—on the presence of substitutes (0 = yes, 1 = no), length of nonconsumption, and the interaction between these variables. We obtained the predicted interaction for missing ( $\beta = .49$ ,  $p < .001$ ), liking ( $\beta = .54$ ,  $p < .001$ ), and consumption intentions ( $\beta = .59$ ,  $p < .001$ ). These analyses further yielded main effects for length of nonconsumption on all three variables and a main effect for the presence of substitutes on consumption intentions. We do not elaborate on the main effects, which are less meaningful given the interaction effects.

To explore the interactions, we calculated the relationship between nonconsumption length and each of the desire measures as a function of the presence of substitutes (table 2). We find that in the absence of substitutes, nonconsumption length positively predicts missing ( $r = .369$ ,  $p = .007$ ), liking ( $r = .308$ ,  $p = .026$ ), and consumption intentions ( $r = .407$ ,  $p = .003$ ). By contrast, in the presence of substitutes, nonconsumption length negatively predicts missing ( $r = -.296$ ,  $p = .031$ ), liking ( $r = -.397$ ,  $p = .003$ ), and consumption intentions ( $r = -.398$ ,  $p = .003$ ). We note that the desire measures are positively correlated (all  $r > .52$ ), and we obtained similar results for each of them, which is consistent with our assumption that these measures are all different manifestations of desire. We analyzed the results separately across all studies, because these measures are conceptually different aspects of desire: emotional (missing), evaluative (liking), and behavioral (consumption intention).

Study 1 provides initial evidence that the presence of substitutes moderates the relationship between nonconsumption and desire. However, our survey method does not allow testing for causality, that is, that substitutes reverse the relationship between nonconsumption and experienced desire. Moreover, it is hard to know to which extent reported desire was construed versus spontaneously elicited. We predict that merely reminding people of substitutes they consume will have a similar impact on the relationship between length of nonconsumption and desire (which will be constructed). Hence, our next study manipulated the salience of substitutes.

## STUDY 2: DESIRE FOR *CHAMETZ* FOOD DURING THE PASSOVER WEEK

The Jewish holiday of Passover provides a natural setting to test our hypothesis. Observant Jews abstain from leavened foods (*chametz*) for a period of 7 days; thus we were able to measure how much they desired these foods at two points during the week and as a function of whether they considered substitutes when making these judgments. Specifically, we manipulated the salience of substitutes by prompting half of the participants to consider some popular substitutes for several *chametz* foods, and manipulated nonconsumption by approaching participants at two different points in time: on day 2 and day 5 of a 7-day period of abstinence. We expected desire to increase from time 1 to time 2 when substitutes were not salient but to decrease from time 1 to time 2 when substitutes were salient.

We compared the pattern obtained from those who, according to their own testimonies, observe the Jewish tradition with pattern obtained from nonobservant participants, who presumably could (and did) eat *chametz* foods during that week. The nonobservant participants provided a natural control condition, which allowed us to rule out the possibility that desire changes just as a function of completing the experimental survey at two points in time.

### Method

One hundred seventy-five undergraduate students from Ben-Gurion University in Israel completed the study online on the second and fifth days of the week of Passover in return for entering a lottery for \$50 in cash. Sixteen of them failed to complete the second survey and thus we excluded their data from our analyses. The study used a 2 (length of nonconsumption: short [day 2] vs. long [day 5])  $\times$  2 (salience of substitutes: low vs. high)  $\times$  2 (observance: yes vs. no) mixed design. The length of the nonconsumption period was manipulated within subjects; the salience of substitutes was manipulated between subjects; and the status of the participants as observant or not (and hence as consuming leavened food or not) was measured between subjects.

Participants completed a "food survey" on days 2 and 5 of Passover. The survey presented a list of food items, and for each item, participants first rated how much they missed having it at that point in time (9-point scale: 1 = not at all, 9 = very much). They then rated how much they liked it (7-point scale: 1 = not at all, 7 = very much; we changed the scale here and in some other studies to minimize mindless response patterns). Those in the low-salience-of-substitutes conditions answered these questions with regard to each of the following three *chametz* food items: bread, flour cake, and pasta (in this order). Observant Jews (and thus, our observant participants) abstain from these three types of *chametz* foods during the week of Passover. Those in the high-salience condition rated several substitute foods, including matzah (which substitutes for bread), flourless cake (which substitutes for flour cake), and potato dishes (which substitute for pasta dishes), before completing the above

ratings for the three focal food items. Using this manipulation, we encouraged participants in the high-salience condition to make their desire judgments in the context of substitutes they were likely consuming. Moreover, this manipulation enabled us to also assess desire for the substitutes. We predicted that in the presence of substitutes, desire for the unavailable products would decrease while desire for the substitutes would increase. Notably, we did not measure consumption intentions, because most people have *chametz* foods (e.g., bread) in the traditional meal that ends the 7-day Passover holiday.

After completing their ratings, participants reported (a) whether they kept kosher and (b) whether they abstained from eating bread during the Passover period (binary scales: yes vs. no). These two questions helped us categorize participants as observant or not. We included both items because keeping kosher in general involves adhering to a different set of food restrictions than abstaining from *chametz* foods during Passover (though most observant Jews follow both) and because people might abstain from bread for other reasons (e.g., dietary constraints).

### Results and Discussion

Those who reported they (1) kept kosher and (2) did not eat bread during Passover constituted the observant group ( $n = 64$ ). Those who reported they (1) did not keep kosher and (2) ate bread during Passover constituted the nonobservant group ( $n = 76$ ). Some participants ( $n = 19$ ) did not keep kosher but abstained from *chametz* during the week of Passover. Interpreting the pattern of results from these participants is difficult because the participants might simply not like these foods; hence we excluded them from further analysis (including these participants in either the observant or nonobservant group does not affect the conclusion of the analysis). After excluding these participants and the participants who did not complete the second part of the survey, a total of 140 participants were included in the analyses. We summarize the results in table 3.

Beginning with the missing rating (collapsed across food type), a repeated-measure ANOVA on length of nonconsumption, salience of substitutes, and observance revealed the predicted nonconsumption  $\times$  substitutes  $\times$  observance, three-way-interaction ( $F(1, 136) = 15.75, p < .001$ ; a similar analysis with food type as a fourth factor revealed a similar pattern and no four-way interaction,  $F < 1.40, p > .20$ ). We next conducted separate analyses for observant and nonobservant participants. For observant participants who abstained from *chametz* foods, we found a nonconsumption  $\times$  substitutes interaction ( $F(1, 62) = 32.99, p < .001$ ). When substitutes were not salient, longer nonconsumption increased missing ( $M_{\text{day } 2} = 6.69, SD = 1.41; M_{\text{day } 5} = 7.34, SD = 1.25; F(1, 29) = 8.31, p = .007$ ), whereas when the substitutes were salient, longer nonconsumption decreased missing ( $M_{\text{day } 2} = 6.78, SD = 1.48; M_{\text{day } 5} = 5.66, SD = 1.51; F(1, 33) = 28.40, p < .001$ ). Among nonobservant participants who did not abstain from *chametz*

TABLE 3  
STUDY 2: MEAN (SD) OF DESIRE AS A FUNCTION OF SALIENCE OF SUBSTITUTE  
AND LENGTH OF NONCONSUMPTION

		Observant participants		Nonobservant participants	
		Day 2	Day 5	Day 2	Day 5
Desire for <i>chametz</i> food items					
Low salience of substitute	Missing	6.69 (1.41)	7.34 (1.25)	7.46 (1.61)	7.17 (1.57)
	Liking	3.24 (1.04)	3.82 (1.06)	2.80 (1.36)	2.97 (1.44)
High salience of substitute	Missing	6.78 (1.48)	5.66 (1.51)	6.75 (1.50)	6.54 (1.74)
	Liking	3.26 (.92)	2.88 (.95)	2.66 (1.00)	2.74 (1.07)
Desire for substitutes of <i>chametz</i> food items in the high-salience condition					
	Missing	6.94 (1.20)	7.61 (.92)	7.31 (1.30)	7.31 (1.25)
	Liking	4.24 (1.01)	4.71 (.86)	4.38 (.93)	4.50 (.87)

foods, the nonconsumption  $\times$  substitute interaction was nonsignificant ( $F(1, 74) = .065, p = .80$ ).

An analysis of the liking ratings (collapsed) yielded a similar pattern. Again, we found no impact for the type of food (i.e., when adding food type as another factor, there was no four-way interaction;  $F < 1$ ). A repeated-measure ANOVA yielded the predicted nonconsumption  $\times$  substitutes  $\times$  observance three-way-interaction ( $F(1, 136) = 13.87, p < .001$ ) and a marginal main effect for substitutes ( $F(1, 136) = 3.15, p = .078$ ). For observant participants, we found a nonconsumption  $\times$  substitutes interaction ( $F(1, 62) = 24.54, p < .001$ ). When the substitutes were not salient, longer nonconsumption increased liking ( $M_{\text{day } 2} = 3.24, SD = 1.04; M_{\text{day } 5} = 3.82, SD = 1.06; F(1, 29) = 19.24, p < .001$ ), whereas when the substitutes were salient, longer nonconsumption decreased liking ( $M_{\text{day } 2} = 3.26, SD = .92; M_{\text{day } 5} = 2.88, SD = .95; F(1, 33) = 7.45, p = .01$ ). Among nonobservant participants, the nonconsumption  $\times$  substitutes interaction was nonsignificant ( $F(1, 74) = .50, p = .48$ ).

Recall that participants in the salient-substitutes condition further reported their desire (missing and liking) for each of the substitutes, which we analyzed to complement our main analyses. A repeated-measure ANOVA of missing (ratings collapsed) revealed a nonconsumption  $\times$  observance interaction ( $F(1, 70) = 4.84, p = .031$ ). For observant participants, longer nonconsumption increased missing for the substitutes ( $M_{\text{day } 2} = 6.94, SD = 1.20, M_{\text{day } 5} = 7.61, SD = .92; F(1, 33) = 9.09, p = .005$ ). For nonobservant participants, missing did not change much over time ( $F < 1, NS$ ). Similarly, a repeated-measure ANOVA of the liking ratings (collapsed) revealed a directional nonconsumption  $\times$  observance interaction ( $F(1, 70) = 2.29, p = .135$ ). For observant participants, longer nonconsumption increased liking for the substitutes ( $M_{\text{day } 2} = 4.24, SD = 1.01, M_{\text{day } 5} = 4.71, SD = .86; F(1, 33) = 5.85, p = .021$ ). For nonobservant participants, liking did not change much over time ( $F < 1, NS$ ).

Interestingly, observant participants desired (missed and

liked) substitutes on day 5 more than on day 2, even though these substitutes were similarly available to them at both times (e.g., they potentially had them only a few hours prior to each measurement). When a focal consumption is absent, the desire for substitutes appears to increase over time such that people miss and want them more even if the actual time that elapsed since they had the substitutes is similar (because these substitutes are similarly available in time 1 and time 2). For example, a person who did not have matzah for half a day both on day 2 and on day 5 might miss matzah more on day 5 than day 2. The same abstinence (of half a day in our example) causes greater feelings of missing because the substituting product is more desirable.

We also find that for observant participants, the change (i.e., time 2 minus time 1) in missing the substitutes negatively predicted the change in missing the focal options ( $r = -.34, p = .05$ ); the change in liking for the substitutes also negatively predicted the change in liking for the focal options ( $r = -.35, p = .04$ ). Those results suggest that those who show a greater increase in desire for substitutes over time (i.e., developed new tastes) also show a greater decline in desire for the focal, *chametz* food. Consistent with our hypothesis, the decrease in desire for the abstained food-item options during nonconsumption is associated with new-tastes development—in this context, the desire for the substitutes.

Overall, we find that when substitutes are less salient in mind, people infer and experience a stronger desire for food items during a longer nonconsumption period. By contrast, when substitutes are salient, people infer and experience a weaker desire during a longer nonconsumption period. We further find that the development of new tastes (i.e., desire for substitutes) is associated with reduced desire for the focal items, which provides initial evidence that new-tastes development underlies the effect on reduced desire.

Our salience manipulation in this study inevitably introduced information asymmetry between the salient- and non-salient-substitute conditions, because in the salient condition, participants could have evaluated their desire for

*chametz* foods relative to their desire for substitutes. However, if the presence of comparison standards influenced evaluation of *chametz* foods, we should expect a main effect: those who considered substitutes should generally desire *chametz* food more (i.e., contrast effect) or less (i.e., anchoring effect) than those who did not consider substitutes. Because we do not find a main effect for salience of substitutes, we assume desire estimates were less influenced by the comparison standard. Importantly, we note that our focus is not on comparing salience with nonsalience conditions. Instead, we compare the change in desire over a period of nonconsumption within each substitute condition.

In our next study, we more directly explore whether people infer they have developed new tastes the longer they have not consumed a focal item and whether inferred new taste mediates the impact of nonconsumption on desire.

### STUDY 3: DEVELOPING NEW TASTES WHILE ABSTAINING FROM FACEBOOK

We conducted study 3 to test whether the development of new tastes over periods of nonconsumption accounts for the decrease in desire for the unavailable alternatives when substitutes are salient. We tested our predictions in a new domain: consumption of social media on Facebook. We predicted that participants who (per our request) abstained from using Facebook for 3 days would desire Facebook less over this period if we prompted them to consider substitutes they use, but would desire Facebook more over this period if we did not prompt them to consider these substitutes. We further predicted that over the three-day abstinence, those participants whom we reminded of substitutes they used would infer they had developed new tastes for social media, which, in turn, would mediate the effect on decreased desire when alternatives were salient.

#### Method

One hundred sixty-seven undergraduate students at the Chinese University of Hong Kong participated in the study for HK\$60 (around US\$7.50). We selected participants who indicated in a screening survey (one week before the study) that they visit Facebook at least once a day. Participants had to abstain from Facebook for 3 days. Thirty-seven participants reported failing to abstain from Facebook (18 in the high-salience condition and 19 in the low-salience condition), leaving us a total of 130 in our analyses. Including these violators in the analyses does not change the conclusions of the results.

The study employed a 2 (length of nonconsumption: 1 vs. 3 days)  $\times$  2 (salience of substitute: low vs. high) design, with length manipulated within subjects and substitutes manipulated between subjects. We ran the study during two separate weeks, during the weekdays.

Participants completed the study online, in response to an email invitation, which we sent on two evenings. We only recruited participants who replied on the same evening that they received the invitation. These participants had to

log off of their Facebook account on all electronic devices and agree to quit Facebook for the next 3 days. On the night of the following day (one day into their abstinence) and the last night (3 days into their abstinence), participants received a link to a survey and completed it between 10:00 p.m. and 2:00 a.m. that night. We used the same survey on both nights. Participants could resume using Facebook after they completed the second survey.

To manipulate the salience of substitutes, the survey had participants in the high-salience condition list their most frequently used substitute during the time they had quit Facebook, and rate how much they liked this substitute (1 = not at all, 9 = very much). Participants listed, for example, Instagram, Whatsapp, and Wechat. Participants in the low-salience-of-substitutes condition did not answer these questions. The rest of the survey was identical for the low- and high-salience conditions. We assessed desire by having participants rate how much they (1) missed using Facebook (1 = not at all, 9 = very much), (2) liked using Facebook (1 = not at all, 9 = very much), and (3) how soon they would resume using Facebook once the experiment was over (consumption intentions: 1 = eventually, 7 = as soon as possible).

Next, the survey assessed the development of new tastes as well as some additional, potential process variables. Because completion of this part of the survey could increase the accessibility of substitutes, we only presented these items after participants completed the above desire items on a separate page. Specifically, using the most face valid measure, we had participants rate (1) whether they had developed a new taste during the time that elapsed since they had used Facebook (1 = definitely no, 7 = definitely yes). This rating question was followed by (2) an open-ended question encouraging participants to elaborate on their new tastes. Participants further rated (3) whether their social-networking need was satisfied during that period (1 = definitely no, 7 = definitely yes), (4) how many substitutes they had (1 = no substitute, 7 = many substitutes), (5) the ease or difficulty of naming substitutes (1 = very easy, 7 = very difficult), and (6) the quality of substitutes (1 = very bad, 7 = very good).

On the second survey (on the last night), we added a question asking participants to honestly indicate whether they had visited the Facebook website during the study period (yes/no). Participants learned that their answer would not influence their compensation and were encouraged to be honest.

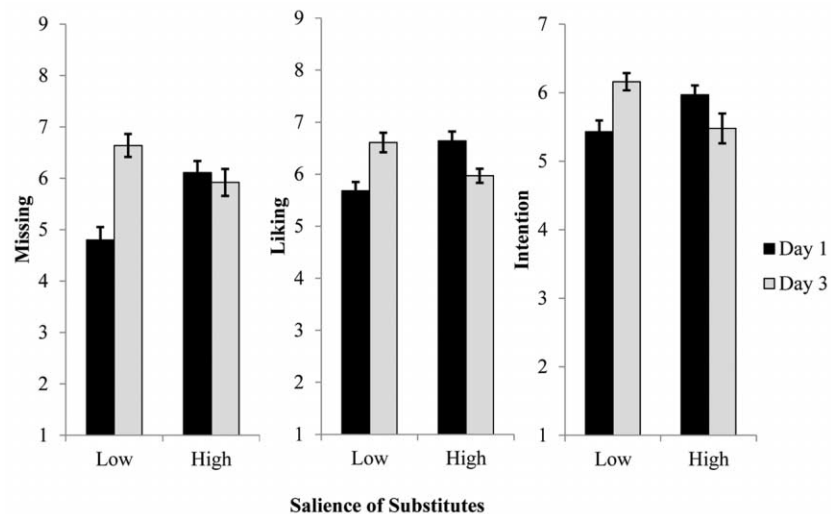
#### Results and Discussion

As in earlier studies, the desire measures (missing, liking, and consumption intention) were positively correlated (all  $r > .46$ ), and we obtained similar results for each. We present the separate analyses below (see fig. 1).

A repeated-measure ANOVA of the missing ratings revealed a main effect of length of nonconsumption, indicating missing of Facebook increased over time ( $M_{\text{day 1}} = 5.42$ ,  $SD = 2.05$ ;  $M_{\text{day 3}} = 6.30$ ,  $SD = 1.98$ ;  $F(1, 128) = 17.58$ ,

FIGURE 1

DESIRE FOR FACEBOOK AS A FUNCTION OF SALIENCE OF SUBSTITUTES AND NONCONSUMPTION IN STUDY 3



$p < .001$ ), and the predicted length of nonconsumption  $\times$  salience of substitute interaction ( $F(1, 128) = 27.01, p < .001$ ). In the absence of salient substitutes, missing increased over time ( $M_{\text{day } 1} = 4.80, SD = 2.09; M_{\text{day } 3} = 6.64, SD = 1.86; F(1, 68) = 54.58, p < .001$ ). However, in the presence of salient substitutes, missing did not change over time ( $M_{\text{day } 1} = 6.11, SD = 1.77; M_{\text{day } 3} = 5.92, SD = 2.05; F(1, 60) = .41, p = .53$ ).

A repeated-measure ANOVA of the liking ratings revealed no main effects, only the predicted length of nonconsumption  $\times$  salience of substitute interaction ( $F(1, 128) = 29.45, p < .001$ ). In the absence of salient substitutes, participants' liking increased over time ( $M_{\text{day } 1} = 5.68, SD = 1.42; M_{\text{day } 3} = 6.61, SD = 1.55; F(1, 68) = 29.54, p < .001$ ). In the presence of salient substitutes, liking decreased over time ( $M_{\text{day } 1} = 6.64, SD = 1.41; M_{\text{day } 3} = 5.97, SD = 1.64; F(1, 60) = 7.40, p = .009$ ). We note that whereas the decrease in missing did not reach significance, the decrease in liking did.

A repeated-measure ANOVA of consumption intention revealed no main effects, only the predicted length of nonconsumption  $\times$  salience of substitute interaction ( $F(1, 128) = 22.46, p < .001$ ). In the absence of substitutes, consumption intentions increased over time ( $M_{\text{day } 1} = 5.43, SD = 1.37; M_{\text{day } 3} = 6.16, SD = 1.04; F(1, 68) = 20.92, p < .001$ ); in the presence of substitutes, consumption intentions decreased over time ( $M_{\text{day } 1} = 5.97, SD = 1.06; M_{\text{day } 3} = 5.48, SD = 1.70; F(1, 60) = 5.70, p = .02$ ).

**Process Measures.** A repeated-measure ANOVA of the extent to which participants reported developing new tastes revealed a main effect of nonconsumption (new tastes were developed over time;  $M_{\text{day } 1} = 2.72, SD = 1.61; M_{\text{day } 3} =$

$3.31, SD = 1.73; F(1, 128) = 12.96, p < .001$ ) and the predicted nonconsumption  $\times$  salience of substitute interaction ( $F(1, 128) = 4.66, p = .03$ ). In the presence of salient substitutes, participants developed new tastes over time ( $M_{\text{day } 1} = 2.57, SD = 1.42; M_{\text{day } 3} = 3.56, SD = 1.69; F(1, 60) = 14.57, p < .001$ ); in the absence of salient substitutes, new-tastes development did not change over time ( $M_{\text{day } 1} = 2.84, SD = 1.75; M_{\text{day } 3} = 3.09, SD = 1.76; F(1, 68) = 1.18, p = .28$ ).

Participants who listed substitutes (i.e., those in the high-salience condition) further rated their liking for their most salient substitute. Further supporting our hypothesis on new-tastes development, these participants' liking for their substitute increased over time ( $M_{\text{day } 1} = 6.13, SD = 1.44; M_{\text{day } 3} = 6.80, SD = 1.54; t(60) = -3.40, p = .001$ ). For these participants, the change in liking for their substitute (i.e., difference between day 1 and day 3) negatively predicted the change in missing Facebook ( $r = -.26, p = .047$ ), liking Facebook ( $r = -.33, p = .01$ ), and directionally, the change in consumption intention ( $r = -.17, p = .20$ ). Thus, the more participants grew fond of their substitute, the greater the negative impact on their desire for Facebook.

We summarize the results for the other measures in table 4. The social-networking need and the features of the substitutes were similar across conditions (all interaction  $p > .20$ ). Interestingly, on the first day of abstinence, reminding participants of substitutes made them desire Facebook more (for miss:  $M_{\text{low salience}} = 4.80, SD = 2.09; M_{\text{high salience}} = 6.11, SD = 1.77; F(1, 128) = 14.83, p < .001$ ; for like:  $M_{\text{low salience}} = 5.68, SD = 1.42; M_{\text{high salience}} = 6.64, SD = 1.41; F(1, 128) = 14.80, p < .001$ ; for consumption intention:  $M_{\text{low salience}} = 5.43, SD = 1.37; M_{\text{high salience}} = 5.97, SD = 1.06; F(1,$



**TABLE 4**  
STUDY 3: MEAN (SD) OF DESIRE AND PROCESS MEASURES AS A FUNCTION OF SALIENCE OF SUBSTITUTE AND LENGTH OF NONCONSUMPTION

Variable type	Variable question	Low salience		High salience	
		Day 1	Day 3	Day 1	Day 3
Desire	Missing	4.80 (2.09)	6.64 (1.86)	6.11 (1.77)	5.92 (2.05)
	Liking	5.68 (1.42)	6.61 (1.55)	6.64 (1.41)	5.97 (1.64)
	How soon to use	5.43 (1.37)	6.16 (1.04)	5.97 (1.06)	5.48 (1.70)
New taste	Developed new taste?	2.84 (1.75)	3.09 (1.76)	2.57 (1.42)	3.56 (1.69)
Substitutes	Liking for substitute	NA	NA	6.13 (1.44)	6.80 (1.54)
	Elaboration <sup>a</sup> (completing open-ended question)	66.67%	69.56%	54.10%	67.20%
Additional questions	Was the need satisfied?	4.35 (1.19)	4.14 (1.42)	4.23 (1.22)	4.18 (1.32)
	How many substitutes?	3.70 (1.52)	3.87 (1.68)	3.11 (1.23)	3.18 (1.44)
	Ease of naming substitutes	3.28 (1.32)	3.62 (1.57)	3.57 (1.55)	3.56 (1.75)
	Quality of substitutes	4.93 (1.13)	4.67 (1.32)	4.77 (1.12)	4.69 (1.10)

<sup>a</sup>Percentage of participants who mentioned they had developed new taste during this period of time.

128) = 6.03,  $p = .015$ ). Although our core comparison is between time 1 and time 2, we note that when substitutes seem inferior to the focal option (as in the case of Facebook), we find that reminding people of substitutes makes them initially desire the focal option more, possibly because they compare it to inferior options. However, by time 2, reminding participants of substitutes no longer increased their desire for Facebook, because by then they had gained experience with substitutes and developed new tastes for them.

**Mediation Analyses.** We predict that only when substitutes are salient does the development of new tastes mediate the negative impact of length of nonconsumption on desire for the unconsumed products. No such effect should emerge when substitutes are not salient. We tested our prediction in a moderated mediation model, where we standardized and averaged the three desire measures, and followed the bootstrapping procedure developed by Hayes (2013). We treated our within-subject factor (i.e., time 1 vs. time 2) as a between-subject factor, and created a participant dummy variable (numbered 1 to 130), which linked data for time 1 and time 2 from the same participant. We included this dummy variable as a covariate in the subsequent moderated mediation analysis to take care of the within-subject nature of the design. A bootstrapping procedure (5,000 samples) with time (time 1 vs. time 2) as the independent variable, new taste development as the mediator, and desire as the dependent variable yielded a 95% confidence interval ( $-.3822$ ,  $-.0023$ ;  $SE = .0944$ ) that excluded 0, suggesting a significant moderated mediation.

Focusing only on the condition when substitutes are salient, we further test the mediating role of new-tastes development. Following a procedure suggested by Judd, Kenny, and McClelland (2001) for within-participant mediation, we find that desire differed significantly across the two time points ( $M_{\text{day } 1} = .18$ ,  $SD = .70$ ;  $M_{\text{day } 3} = -.12$ ,  $SD = .96$ ;  $t(60) = 2.34$ ,  $p = .023$ ). Similarly, new-tastes development also differed significantly across the two time points ( $M_{\text{day } 1} = 2.57$ ,  $SD = 1.42$ ;  $M_{\text{day } 3} = 3.56$ ,  $SD = 1.69$ ;

$t(60) = -3.82$ ,  $p < .001$ ). Second, day 1 desire was negatively correlated with day 1 new-tastes development ( $r = -.25$ ,  $p = .05$ ); day 3 desire was also negatively correlated with day 3 new-tastes development ( $r = -.32$ ,  $p = .012$ ). Finally, we regressed changes in desire (day 3 minus day 1) on changes in desire for substitutes (i.e., new-tastes development on day 3 minus day 1) and the centered sum of the new-tastes-development scores (to avoid biased estimation). An increase in desire for substitutes (i.e., new-tastes development) negatively predicted an increase in desire for Facebook ( $b = -.192$ ,  $p = .002$ ). The resulting intercept of this regression was not significant ( $b = -.107$ ,  $p = .42$ ), which indicated no desire difference existed that was unaccounted for by new-tastes development. These circumstances satisfy the criteria for full within-participants mediation of change in desire by change in new-tastes development.

Study 3 again documents that the interaction between length of nonconsumption and the salience of substitutes when making a desire judgment, influences the experience of desire. Our studies have thus far tested the effect of substitutable consumption but have not yet explored what renders some consumption items substitutable in the first place. In our next study, we explore one factor that influences whether consumption (specifically, of ethnic foods) appears substitutable. We suggest that when people think about their goals more broadly, a larger set of activities or goods may appear to serve the same goal and hence substitute for each other.

#### STUDY 4: BROAD GOALS ALLOW FOR SUBSTITUTION AND WEAKEN DESIRE

The same consumption experience, for example, of Japanese food for non-Japanese diners, can serve a specific goal—having Japanese food—or a broader one—having a cultural experience. What constitutes a legitimate substitute will accordingly vary as a function of the specificity of the

goal, with broader goals allowing for more substitution. For example, Indian food would substitute for Japanese food with respect to the goal of having a different cultural experience but not with respect to the goal of having a Japanese experience. In study 4, we accordingly tested whether the breadth of the goal, which should influence whether some foods substitute for each other, influences judgments of desire for a focal type of food over a period of nonconsumption.

Specifically, we used a photo collage to prompt participants to consider either a broad goal of experiencing different cultures or a narrow goal of experiencing the Japanese culture. We then asked all participants to list several ethnic foods they would like to try in the coming year, before we manipulated the perceived time that had elapsed since they last had Japanese food. We assumed that activating a broad goal of experiencing different cultures would render any ethnic food they had substitutable for Japanese food. This condition is thus similar to the high-salience-of-substitutes condition in the previous studies. Activating a narrow goal of experiencing Japanese culture renders other ethnic foods they had irrelevant to the active goal, and thus participants would not see them as substitutes. This narrow-goal condition is similar to the low-salience-of-substitutes conditions in the previous studies. We predicted that longer nonconsumption would increase desire for Japanese food in the narrow-goal but not in the broad-goal condition.

Our second goal was to further test whether the experience of desire is constructed at the point of evaluation. We expected that perceived lengths of nonconsumption would have an effect similar to actual length of nonconsumption. In this study, we accordingly manipulated perceived (rather than actual) length of nonconsumption. Specifically, we adopted a manipulation of perceived length of nonconsumption from Monga and Bagchi (2012) and Zhang and Schwarz (2012): we asked participants to color the length of their nonconsumption of Japanese food along a thick line, starting with “now” (on the right end of the line) and ending when they last consumed the food. Participants colored the part of the line that represented the amount of time that had elapsed since they had consumed Japanese food. We manipulated the anchor on the left end of the line, which was either close or far away in time (7 days vs. 365 days). For a given length of nonconsumption that participants reported, if the anchored time was near, the participants perceived the period of nonconsumption to be longer than if the anchor were far (e.g., a person who had Japanese food one week ago would color the entire 7-day scale and a very small proportion of the 365-day scale). Near anchors thus created a subjective feeling that the participants had not consumed Japanese food for a longer time (see app. A for a demonstration).

## Method

One hundred ninety-four undergraduate students at the Chinese University of Hong Kong took part in the study for a payment of HK\$30 (around US\$3.75). This study used a 2 (goal: broad vs. narrow)  $\times$  2 (length of nonconsumption: short vs. long) between-subjects design.

Participants completed a series of supposedly unrelated surveys, the first of which presented participants with a photo collage of several cultural experiences. In the broad-goal condition, participants saw a collage composed of events taken from different cultures (see app. B) titled “Cultural Experience Survey.” In the narrow-goal condition, participants saw a collage composed of events related to the Japanese culture, titled “Japanese Experience Survey.” Participants’ task was to elaborate on the kind of things they would do and the kind of foods they would eat to experience “different cultures” (or, in the narrow condition, “Japanese culture”). This elaboration task activated either the goal of experiencing different cultures or the goal of experiencing the Japanese culture.

The next, “food consumption survey,” had participants list a few familiar ethnic foods (e.g., cuisines) they wanted to have in the coming year. Participants listed between two and four items that were familiar to them (i.e., regularly consumed). The most frequent responses were Indian, Mexican, Thai, and Korean food. Some participants listed Japanese food in addition to one to three other ethnic foods; thus they still had at least one non-Japanese food as a salient substitute. Using this elicitation paradigm, all participants had accessible ethnic foods they often consume and that could have substituted for Japanese food for those in the broad-culture condition. Next, participants read a brief essay on sushi and indicated whether they had had sushi before (they all had) and when they had last eaten it.

To manipulate perceived length of nonconsumption, participants then colored the length of their nonconsumption along a line with the right end anchored with “now” and the left end anchored with either “7 days” (for long perceived nonconsumption) or “365 days” (for short perceived nonconsumption). Participants were also instructed that if their reported time was longer than the anchor, they should color the entire scale length. As a manipulation check, participants rated how much time had elapsed since they had had sushi (1 = very short, 9 = very long). Finally, as the main dependent variables, participants rated their feelings of missing (1: how much they missed having sushi; and 2: how much they missed having Japanese food) and liking (3: how much they liked sushi; and 4: how much they liked Japanese food in general; for all questions: 1 = not at all, 9 = very much). We did not assess consumption intentions in this study.

## Results and Discussion

In support of the nonconsumption manipulation, participants who used a close anchor (7 days) in the coloring task perceived they had not had sushi for a longer period of time ( $M = 5.00$ ,  $SD = 2.22$ ) than those who used a far anchor (365 days;  $M = 4.08$ ,  $SD = 2.15$ ;  $F(1, 190) = 8.52$ ,  $p = .004$ ). The actual length of nonconsumption ( $M = 24.57$  days,  $SD = 32.76$ ) did not differ across conditions (all  $F < 1$  for main effects and interaction).

We averaged missing sushi and missing Japanese food ( $r = .81$ ,  $p < .001$ ), and averaged liking for sushi and liking

for Japanese food ( $r = .77, p < .001$ ). As in previous studies, missing and liking were positively correlated ( $r = .697, p < .001$ ). An ANOVA of missing yielded the predicted goal framing  $\times$  perceived length of nonconsumption interaction ( $F(1, 190) = 8.77, p = .003$ ) and no main effects (all  $F < 1$ ). Participants in the narrow goal frame (“experiencing Japanese culture”) missed Japanese food more when the perceived length of nonconsumption was long ( $M = 5.93, SD = 1.93$ ) than when it was short ( $M = 5.21, SD = 1.84; F(1, 100) = 3.74, p = .056$ ; marginally significant). Conversely, participants in the broad goal frame (“experiencing different cultures”) missed Japanese food less when the perceived length of nonconsumption was long ( $M = 4.99, SD = 1.98$ ) than when it was short ( $M = 5.87, SD = 1.77; F(1, 90) = 5.05, p = .027$ ; see FIG. 2).

An ANOVA of liking yielded a similar goal framing  $\times$  perceived length of nonconsumption interaction ( $F(1, 190) = 12.95, p < .001$ ) and no main effects (all  $F < 1$ ). Participants in the narrow goal frame liked Japanese food more when the perceived length of nonconsumption was long ( $M = 7.21, SD = 1.28$ ) than when it was short ( $M = 6.35, SD = 1.58; F(1, 100) = 9.19, p = .003$ ). Conversely, participants in the broad goal frame liked Japanese food less when the perceived length of nonconsumption was long ( $M = 6.22, SD = 1.75$ ) than when it was short ( $M = 6.97, SD = 1.62; F(1, 90) = 4.57, p = .035$ ).

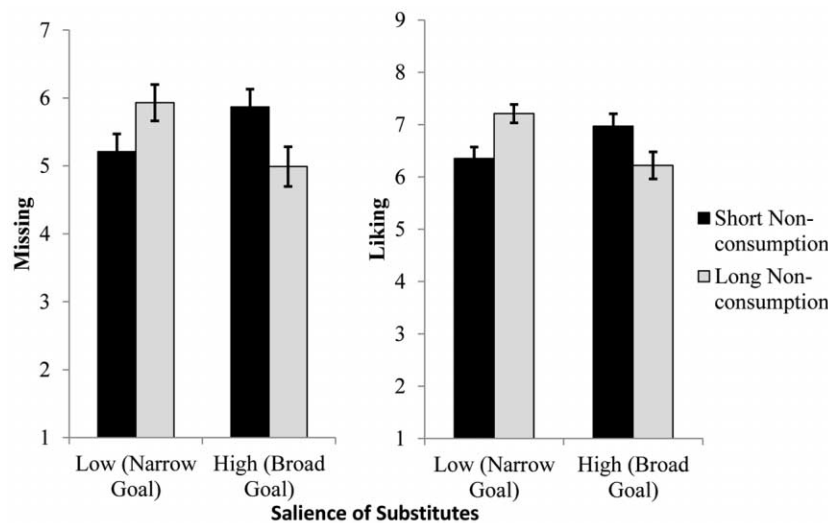
Study 4 manipulated the perceived length of the abstinence period and documented similar patterns as in previous studies, in which the actual length of the abstinence period was manipulated. Because participants in in the perceived long (vs. short) abstinence did not actually have more time, we can rule out an explanation based on the learning that

occurs over a longer period of nonconsumption. Thus, we can conclude that people infer their desire at the point of evaluating it, rather than learn about it during the abstinence periods. Moreover, study 4 extends the effect of nonconsumption on desire to situations in which the information on the options is constant but people adopt a broad or narrow goal frame that renders available experiences substitutable or not. This study thus illustrates the malleability of the perception of substitutes. It suggests that marketers can potentially manipulate whether consumers perceive a focal consumption with or without substitutes by manipulating the scope of the goal consumers wish to satisfy.

We note that in order to construct the experience of desire, people ought to have a lay theory of how length of nonconsumption and substitutes interact. In table 1, we present data from a pilot study suggesting people do not intuitively consider substitutes when making predictions about desire, such that they assume desire will increase over nonconsumption. However, we assume people’s predictions will be more aligned with our theorizing and findings if we direct them to consider substitutes. Indeed, in a follow-up study, participants ( $N = 137$  MTurk workers) predicted their desire for their favorite fruit on three variables (missing, liking, and behavioral intention), assuming this fruit is unavailable in the local market for a short versus long period of time (“only recently” vs. “for a long time;” between subjects) and assuming they have (vs. have not, between participants) identified another desirable fruit. We found a nonconsumption time  $\times$  substitute interaction ( $F(1, 133) = 16.47, p < .001$ ). In the absence of substitutes, predicted desire was stronger after long ( $M = 5.94, SD = .92$ ; averaged across the three measures, similarly hereinafter) than short depri-

FIGURE 2

DESIRE FOR JAPANESE FOOD AS A FUNCTION OF SALIENCE OF SUBSTITUTES (GOAL FRAMING) AND NONCONSUMPTION IN STUDY 4



vation ( $M = 5.23$ ,  $SD = 1.01$ ;  $F(1, 63) = 8.71$ ,  $p = .004$ ). In the presence of substitutes, predicted desire was weaker after long ( $M = 4.86$ ,  $SD = .97$ ) than short deprivation ( $M = 5.47$ ,  $SD = .90$ ;  $F(1, 70) = 7.71$ ,  $p = .007$ ). Whereas people do not spontaneously consider substitutes, they have certain intuition about how length of nonconsumption and the presence of substitutes jointly affect desire, and they rely on this intuition in constructing desire.

Our studies so far asked people to rate their desire. To explore the consequences of constructing desire for choice, our last study tested for product choice, expecting that the length of nonconsumption and the presence of substitutes will influence which products people choose to consume.

## STUDY 5: FROM DESIRE TO CHOICE

Ultimately, desire informs choice, and factors that influence the strength of desire should also influence choice. We conducted study 5 to test for effects of choice, and by moving to choice with real consequences, we were further able to reduce a potential demand effect that could influence reported desire in previous studies. Specifically, study 5 used a survey methodology (similar to study 1) and assessed the combined effect of natural variations in length of nonconsumption and the presence of substitutes on choice. Participants reported the time that elapsed since they had had a specific ethnic (Thai) food and whether they had available substitutes during that time. They also reported whether the nonconsumption was imposed or self-selected, before choosing between a free meal at a Thai versus non-Thai restaurant. Their choices were binding and of real consequences.

We were mainly interested in those who attributed their lack of consumption to external circumstances. For these people, length of nonconsumption should positively predict choice of the Thai restaurant if they did not identify substitutes, and length of nonconsumption should negatively predict choice if they identified substitutes. We further assume that among those who self-selected not to consume, length of nonconsumption would negatively predict choice of a Thai restaurant, irrespective of whether they identified substitutes, because nonconsumption would indicate dislike.

## Method

Two hundred eighty-six students at the Chinese University of Hong Kong completed an online study on food consumption in return for entering into a lottery for a dinner for two at a restaurant, worth HK\$400 (around US\$50).

Participants first indicated whether they had eaten Thai food before; if not, they were automatically directed to complete another study. Next, participants listed how much time (in days) had elapsed since they had Thai food. On a different page, they then indicated why they did not consume Thai food during this period (1 = chose not to consume; 2 = Thai food is not available in the local area; 3 = did not have time or money). We categorize option 1 as self-

selected nonconsumption, and options 2 and 3 as imposed nonconsumption.

Next, participants indicated whether they had substitutes during the period of time when they did not consume Thai food (yes vs. no). They read that “substitutes” are food items that satisfy the same need for them (e.g., tiramisu could substitute for chocolate cake as a dessert). Finally, to assess choice, participants were presented with two options: (1) a dinner for two at a Thai restaurant and (2) a dinner for two at a local-style restaurant. Both options were said to be worth HK\$400 (around US\$50) and the restaurants were in the local area. Participants were informed that if they won the lottery, they would get a free dinner at their chosen restaurant, thus making a choice was of real consequence.

## Results and Discussion

Thirty-seven participants reported they had never had Thai food (hence, they were directed to a different study) and three participants failed to report the days of nonconsumption, leaving us with 246 participants who completed the study in full. Length of nonconsumption varied from 1 to 1,000 days ( $M = 101.62$ ,  $SD = 152.30$ ) and was not normally distributed; hence, we used a natural log transformation of this variable in our analyses (using untransformed data for lengths of nonconsumption yielded similar, significant results). Sixty-eight participants listed reason 1 (self-selected) for nonconsumption, whereas 106 listed reason 2 and 72 listed reason 3. The restaurant choice was similar among participants who listed reasons 2 and 3 as leading to their nonconsumption ( $p > .21$ ); hence we collapsed them into a single external-constraints-induced nonconsumption.

A binary logistic regression with choice (coded 0 = local style restaurant, and 1 = Thai restaurant) as the dependent variable showed the predicted substitute (yes vs. no)  $\times$  length of nonconsumption  $\times$  reason (internally selected vs. imposed) three-way interaction ( $B = 1.06$ ,  $Wald = 6.50$ ,  $p = .011$ ). Beginning with those for whom nonconsumption was imposed, a binary logistic regression revealed the predicted substitute  $\times$  time interaction ( $B = 1.11$ ,  $Wald = 19.65$ ,  $p < .001$ ). Specifically, when participants had no substitutes for Thai food ( $n = 78$ ), length of nonconsumption positively predicted choice of a Thai restaurant ( $B = .59$ ,  $Wald = 9.05$ ,  $p = .003$ ), whereas when participants reported having substitutes for Thai food ( $n = 100$ ), length of nonconsumption negatively predicted choice of a Thai restaurant ( $B = -.52$ ,  $Wald = 11.25$ ,  $p = .001$ ).

Also consistent with our prediction, among those who indicated their nonconsumption was self-selected, longer nonconsumption was associated with lower likelihood of choosing the Thai restaurant ( $B = -.49$ ,  $Wald = 9.45$ ,  $p = .002$ ), and this relationship did not interact with the presence of substitutes ( $p > .87$ ). Thus, when nonconsumption was self-selected, longer nonconsumption resulted in a weaker preference for the Thai restaurant, irrespective of substitutes.

These results on choice are consistent with our previous

results on reported desire. We find that when nonconsumption is imposed, the presence of substitutes matters. Specifically, in the presence of substitutes, people choose a product (i.e., Thai food) less over a lengthier nonconsumption period, whereas in the absence of substitutes, they choose this product more over a lengthier nonconsumption period. We further find that substitutes are not influential for those who choose not to consume an item (i.e., self-selected nonconsumption).

## GENERAL DISCUSSION

We propose that desire for goods depends on the length of nonconsumption and the presence of substitutes. In the absence of substitutes, longer nonconsumption increases desire (including, missing, liking, and consumption intention), whereas in the presence of salient substitutes, longer nonconsumption decreases desire. We further propose that desire is constructed: consumers desire products based on cues for the length of nonconsumption and the presence of substitutes, at the point of inferring their desire.

We support these predictions in five studies that document the effects on desire and choice across a variety of products, consumption domains, and with substitutes of both high quality (e.g., for *chametz* food, in study 2) and mediocre quality (e.g., for Facebook, in study 3). Although we would assume the effect on reduced desire diminishes for very low-quality salient substitutes, because people are basically facing a similar situation to when they have no salient substitutes at all, our effect seems to hold for substitutes that are clearly inferior to the original consumption.

We present evidence that the experience of desire can be a highly contextual judgment. Indeed, a main contribution of this work is showing that desire, including judgments of liking and missing, can be constructed. Notably, similar factors should influence constructed (i.e., top down) desire and the spontaneous (i.e., bottom up) activation of desire; these include the length of nonconsumption and the presence of substitutes. Indeed, in studies 1 and 5, we measured natural variations in nonconsumption and the presence of substitutes. It is possible that desire was partially constructed and partially spontaneous in these two studies, whereas the rest of the studies used situational cues to remind people of the length of nonconsumption and/or salient substitutes and desire was mostly constructed. We also note that to construct the experience of desire, people need to have a lay theory of how length of nonconsumption and substitutes interact (although people do not spontaneously consider substitutes when predicting their desire). We document such lay theory in the follow up to study 4.

A follow-up question is when the experience of desire is constructed, that is, subject to inference processes that characterize system 2, and when desire is elicited spontaneously, out of control, and without involving inferences (i.e., system 1). Whereas most experiences of desire likely involve inferential processes and spontaneous activation simultaneously, the type of stimulus people desire may determine how much of their desire is constructed versus spontane-

ously elicited. In the context of most consumer products (e.g., specific foods), desire is relatively weak and under control; therefore, it is probably at least partially inferred. For example, when consumers state they desire some food, their desire likely reflects their judgment based on contextual cues. However, for other stimuli, for example, when one desires an addictive substance (e.g., tobacco) or alternatively, a lover, the desire might be mainly spontaneously elicited and less subject to inferences.

A related question is whether the experience of a constructed desire differs from the experience of a spontaneously elicited desire and whether it feels less “real.” We argue that whereas the desire for most consumer products is weaker than the desire for an addictive substance or a lover, it is no less real for the person experiencing it. Moreover, all desires might be partially influenced by situational cues; for example, a smoker’s desire for cigarettes is stronger in certain situations than in others (e.g., in the presence of cigarettes). Rather than distinguishing between two types of desire—constructed versus spontaneously elicited—we propose it is more useful to ask what proportion of the desire is constructed.

Another question refers to the distinction between self-selected and imposed nonconsumption. Our research explores consequences of nonconsumption that results from products’ unavailability or the presence of overarching motives (e.g., religious goals) that hinder consumption. In study 5, we also study situations in which people choose to avoid a product (food) because they are not interested in it, for example, because they discovered better alternatives on the market. Interestingly, when people choose to quit consumption, we predict and find that longer nonconsumption periods reduce desire by altering people’s perceptions of themselves and their identity as consumers of this product. Indeed, in study 5, participants who identified themselves as self-imposing their nonconsumption of Thai food were less likely to choose a Thai restaurant the longer they had avoided it, regardless of the presence of substitutes. In yet another, follow up study in which we assessed desire, we found that participants ( $n = 99$ ; students from a midwest university) who believed they had not had an out-of-state vacation out of choice (vs. necessity) desired an out-of-state vacation less over time. The opposite was true for participants ( $n = 100$ ; same sample) who believed they stayed home out of necessity (vs. choice) and who desired a vacation more the longer they had gone without one. Overall, a clear distinction seems to exist between selected and imposed nonconsumption, and in situations in which people are motivated not to consume some goods, they desire them less over time.

Our findings have notable practical implications. They go against the lay belief, expressed in our pilot data, that nonconsumption always increases desire. In this regard, our results question the validity of the common practice of prompting consumers to consider the time that has elapsed since they have consumed something. For example, advertising and promotional efforts often start their persuasive

messages by prompting the question of “when was the last time you had . . .?” The purpose of presenting this question is to increase consumers’ craving for goods. Based on our findings, such a strategy would be effective only when no salient substitutes are present and nonconsumption is imposed. In the presence of salient substitutes that are evoked by either the situation (e.g., the breadth of the goal frame) or the marketer, emphasizing a long period of nonconsumption can actually backfire and decrease desire.

These findings add to a growing literature on how nonaction affects attitudes, motivation, preference, and decision (Dai and Fishbach 2013; Koo and Fishbach 2010) and have further theoretical implications for consumer research. Indeed, a great deal of research on decisions that unfold over time examined people’s preferences under the (implicit) assumption that preferences remain relatively stable as decisions unfold (Ratner, Kahn, and Kahneman 1999; Simonson 1990). Incorporating the inference from nonconsumption could provide new insights into the study of decisions that unfold over time.

Our findings are further relevant for research on how preference changes over repeated consumption and as a function of consumption rate (Epstein et al. 2009; Galak, Kruger, and Loewenstein 2013; Kahneman and Snell 1992; Vohs and Baumeister 2008). For example, Kahneman and Snell (1992) studied how repeated consumption affects liking of an item over time. Our research complements their perspective by asking how the absence of consumption affects consumer preference over time. The study of nonconsumption could lead to new insights when coupled with previous research on repeated consumption. Indeed, in a conceptual paper, Vohs and Baumeister (2008) proposed that nonconsumption decreases wanting of an item within a short period but reinforces and increases wanting after a longer delay. Combining research on consumption and nonconsumption could lead to new insights on the development and change of preference over time, and inspire empirical investigation.

### Alternative Explanations, Boundary Conditions, and Future Directions

A potential alternative explanation, based on means-end relationships, would argue that reminding people of substitutes leads them to infer they have more means to a goal, and may decrease their desire to pursue any of these presumably less instrumental means (Zhang et al. 2007). We argue against this explanation because it predicts a similar reduction in desire for the unavailable product and the substitutes, whereas we find that desire for substitutes increases whenever desire for the focal item decreases. Another alternative explanation refers to the possibility that people infer from the mere presence of the substitutes that their need may have been fulfilled and thus desire the unavailable option less (Etkin and Ratner 2012). Again, this alternative does not account for the change in desire over time and predicts similar effects on desire for the unavailable and substitutable prod-

ucts, whereas we find a negative relationship between desire for unavailable products and the substitutes.

A potential boundary condition for our effects is the degree of satiation at the beginning of the nonconsumption period. We address situations in which people are not already satiated, as, for example, immediately after consumption. If a person is highly satiated, because of a natural recovery process (Epstein et al. 2009; Galak, Kruger, and Loewenstein 2013), her desire for the consumed item will increase over time regardless of the salience of substitutes, because it was unusually low at the first measurement. The effect of natural recovery on increasing preference over time may override the effects of learning that lead to either an increase or decrease in preference over time.

In terms of future directions, we have so far studied consumption that is regular yet not addictive (though some people use Facebook a lot), and future research could test whether construction of desire judgments further influences additive consumptions (Solomon and Corbit 1974). Another future direction refers to the durability of constructed desire (e.g., would people desire *chametz* food less after Passover, or desire Facebook less after completing our study and as long as substitutes are present?). In general, when a desire is constructed within a specific context, its durability can be very brief. However, to the extent that the environment consistently offers substitutes versus not, the effect on desire will endure because the context in which the judgment is made remains similar and no updating occurs. Regardless of the presence of substitutes, what is constantly changing is the time that has elapsed since the last consumption episodes, and thus desire is unlikely to ever remain constant; rather, it either increases or decreases.

Yet another venue for future research would compare the desire for unconsumed products with the desire for substitutes. We can reasonably assume that people initially do not desire the substitutes as much as the nonconsumed item. For example, when moving to a new town, people usually desire their old restaurants, friends, and so on more than the new substitutes. However, to the extent that over time, desire for the unconsumed items decreases and desire for the substitutes increases, we would predict that at one point the desire for substitutes is stronger than the desire for the unconsumed product. We would further predict that after some time, a person will not go back to a nonconsumed item even if the item becomes available again, because the person has developed new tastes and may prefer the substitutes. We saw initial evidence for such a switch in desire in study 2, where those who abstained from *chametz* and considered substitutes liked the substitutes less than *chametz* food on day 2, but liked them more on day 5.

As a final note, our study of desire based on nonconsumption suggests consumers learn about their preferences by thinking about what they have not consumed. Given changing trends and fashions and the reintroduction of consumer products every several years (e.g., fashion trends making a comeback), this study can shed light on what makes consumers welcome old favorites and see them as

nostalgic, and what makes consumers, at other times, reject these products as “old fashioned.”

### DATA COLLECTION INFORMATION

Data reported in this article were collected and analyzed by Xianchi Dai. Data in studies 1, 3, 4, and 5 were collected

at the Chinese University of Hong Kong in 2013–2014, with help from research assistants Tea Chan and Esther Chau. Data in study 2 were collected at the University of Chicago and Ben Gurion University (Israel; an online study) in 2008.

## APPENDIX A

AN EXAMPLE OF THE PERCEIVED NONCONSUMPTION LENGTH MANIPULATION (STUDY 4)

### If the reported days of non-consumption is 6 days.

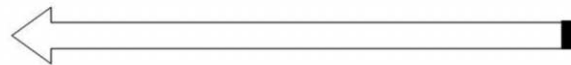
Long perceived non-consumption condition: because the anchor is near, the colored area that represents 6/7 days is long and creates a feeling of long non-consumption



7 Days ago

Now

Short perceived non-consumption condition: because the anchor is far, the colored area that represents 6/365 days is short and creates a feeling of short non-consumption.



365 Days ago

Now

## APPENDIX B

STIMULI IN STUDY 4: MULTICULTURAL AND JAPANESE COLLAGES





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