

The different roads not taken:

Considering dissimilar foregone alternatives motivates future goal persistence.

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Abstract

Decisions are rarely made in isolation. Instead, deliberation often occurs in the context of prior related choices. This paper finds that goal-inconsistent foregone alternatives, options that were previously considered but not chosen, shape how consumers subsequently pursue their goals. Going beyond previous research on foregone alternatives and consumer satisfaction, the current research suggests that how consumers mentally construe foregone goal-inconsistent alternatives impacts how they evaluate their prior goal-consistent choices, which will in turn impact their motivation to continue goal-directed behaviors and subsequent choices. Specifically, we find that when consumers consider having foregone diverse (vs. similar) goal-inconsistent alternatives in favor of a goal-consistent action, they believe that they have made a greater sacrifice, which had more of an impact on their focal goal. As a result, they are then more likely to subsequently make goal-consistent choices. Our findings hold across different types of goals (exercise: Studies 1 and 5, healthy eating: Studies 2–4, saving: Supplemental studies A4–5), and both real and hypothetical choices. We also identify theoretically motivated boundary conditions for the observed effect of considering foregone alternatives.

Keywords: goals, motivation, foregone alternatives, variety

Imagine that you've recently set a goal to eat healthier, and you are now deciding which to have for dinner, either a spring salad with tofu or deep-fried chicken. You think back to your snack this afternoon, when you had chosen a healthy option, a green apple. How would you interpret this prior goal-consistent choice, and how would that interpretation affect the current decision?

We propose that how the previous healthy choice is assessed depends on which foregone alternatives to the choice are actively considered. You might look back and see the green apple as a healthy choice over a diverse set of alternatives, such as a chocolate chip cookie, a glazed donut, or a banana nut muffin. Alternatively, you might view the same choice in light of a narrow range of foregone alternatives that are similar to each other, such as a set consisting of a chocolate chip cookie, a peanut butter cookie, or a M&M cookie. The situation in which only a few goal-consistent options are available in a broader set of mostly goal-inconsistent options is not uncommon. Vegetarians will commonly find only a few options available on a menu of meat-based options. Dieters might be presented with one fruit option among many high-fat desserts. Movie goers might find one thoughtful drama among superhero and action movies. A goal-consistent choice objectively constitutes one step of progress towards the goal, regardless of the unchosen alternatives. However, we propose that whether people construe the same goal consistent choice as either passing up a diverse or similar set of alternatives will affect how they subjectively assess the prior choice, with consequences for subsequent goal-relevant choices that they face.

A large body of goal research has investigated how previous goal-relevant choices can affect subsequent motivation (e.g., recall of self-control success or failure: Mukhopadhyay, Sengupta, & Ramanathan, 2008, Nikolova, Lambertson, & Haws, 2016; sequences of past

behaviors or “streaks”; Silverman & Barasch, 2022), but how previous “unchosen” alternatives impacts consumers’ ongoing goal pursuit remains an open question. Consumer research has demonstrated that how people think about unchosen options can shape how they experience what they did choose (Carmon, Wertenbroch, & Zeelenberg 2003; Dhar & Wertenbroch 2012; Sagi & Friedland 2007). However, in a goal pursuit context, where making consistent, repeated choices to forego goal-inconsistent alternatives in favor of a goal-consistent option is a key strategy for successful goal attainment, it is critical to understand whether and how considering different types of foregone alternatives influences subsequent decisions, beyond how it affects the evaluations of the current choice.

The current paper suggests the diversity of foregone alternatives as a novel and potentially pervasive factor affecting consumer’s motivation to continue making goal-consistent choices. Previous research has largely explored how the presence or absence of goal-inconsistent alternatives in a current choice affects how people make that current choice and their post-choice evaluation. Presenting alternatives that fulfill a competing goal in a choice set reduces commitment to the focal goal, decreasing purchase intention for a target (Friedman, Savary & Dhar, 2018). Making a goal-consistent choice despite the presence of a goal-inconsistent alternative (e.g., when choosing a virtuous option from a set that includes vice options) can also increase consumers’ satisfaction with their choice (Dhar & Wertenbroch, 2012). This prior research only studies goal-inconsistency of concurrent alternatives. Going beyond these findings, we investigate the effect of *diversity* among the goal-inconsistent alternatives (i.e., not the mere presence of these alternatives) on *subsequent* motivation and goal-related decisions.

In addition, in contrast to prior research that explored the effect of multiple means for goal attainment, which constitute goal-consistent alternatives (e.g., protein bars with different

flavors in pursuit of a fitness goal; Etkin & Ratner, 2012; 2013; Han & Gershoff, 2019), our research focuses on the variety among *goal-inconsistent* alternatives that might have hindered goal attainment if chosen (e.g., unhealthy snacks with different flavors). We suggest that diversity of foregone goal-inconsistent alternatives influences perception of how much impact a prior goal-consistent choice has made on the overall goal pursuit, because people feel they have passed over and sacrificed more when they resisted temptations with diverse, rather than similar, attributes. To the degree that people perceive their prior goal-consistent choice as having made a greater sacrifice to follow a goal, we predict they will see that choice as having made more of an impact on the goal, which increases motivation to persist in goal pursuit and make subsequent goal-consistent choices.

This research provides implications for consumers as well as for marketers, particularly in goal-relevant industries for which commercial success depends on consumers' ongoing motivation to persist in continuing to make goal-consistent choices, ranging from physical health and financial well-being to personal growth and learning. These companies, through products, services and apps designed to support goal pursuit, often focus on tracking and communicating consumers' past behaviors (e.g., sending push notifications when a daily exercise goal has been completed, graphically displaying the consecutive days in which learners finished a lesson, or encouraging users to log what they have eaten). However, the current research suggests emphasizing what has gone unchosen. Specifically, prompting consumers to consider diverse goal-inconsistent alternatives that have been foregone while sticking to the goal can help motivate consumers to continue pursuing that goal.

THEORETICAL DEVELOPMENT

Foregone alternatives and perceived sacrifice

The structure and composition of a choice set impacts how consumers evaluate the current choice (e.g., choice satisfaction or regret; Carmon et al., 2003; Kim, Shin, & Han, 2014; Schrift & Parker, 2014). In particular, as the number of alternatives in a choice set increases, consumers feel greater loss after choosing between the alternatives (Carmon et al., 2003). This is because people choosing one option from a choice set tend to feel as if they are foregoing *all* the other possible alternatives that were available, not just foregoing the *one* next-best alternative that would have been chosen instead (Schwartz, 2004). For instance, when consumers make a choice and forego other options due to an external constraint (i.e., budget or time) the illusion that they could have utilized all of the foregone options leads them to perceive their choice as missing out on multiple options, inflating the perceived loss caused by the choice (Weiss & Kivetz, 2019).

The prior literature has demonstrated that not only the number of alternatives under consideration, but the degree and nature of shared vs. unique features of a given number of alternatives can systematically impact decision-making (see Sherman, Houston, & Eddy, 1999 for a review). For example, when evaluating alternatives, shared features among alternatives are underweighted whereas unique features receive greater attention (Dhar & Sherman, 1996). Because unique features tend to be overweighted relative to shared features, consumers would feel greater loss when foregoing diverse alternatives with distinct types of desirable features compared to when foregoing a set of identical or similar alternatives.

For example, in one study from Sagi and Freidland (2007), participants made a blind choice without knowing what the alternatives were, and all participants were informed they had chosen a \$50 bill. The participants who discovered that the unchosen alternatives were dissimilar items with few overlapping features (e.g., mini-stereo set and microwave oven) regretted their choice more than participants who found out the unchosen items were more similar to each other (e.g., mini-stereo set and videotape player/recorder). These results suggest that diversity of the foregone alternatives affects the perception of the sacrifice involved in making a choice—“how much” has been foregone.

Building on this literature, we predict that the nature of foregone goal-inconsistent options will impact goal pursuit. Specifically, we predict that choosing a goal-consistent option over goal-inconsistent alternatives when the foregone temptations are all similar to one another will feel like having given up one type of consumption (e.g., cookies). By contrast, when consumers instead consider having foregone diverse alternatives, as long as each of the distinct positive features associated with each alternative are sufficiently salient, the prior choice will be experienced as having passed over more (e.g., in terms of the number or scope of foregone options). As a result, people will feel that they have made a greater sacrifice, giving up multiple types of consumption (e.g., cookies, donuts and muffins). We theorize that this higher level of perceived sacrifice, in turn, will increase perceptions of how much impact the past goal-consistent choice had on overall goal pursuit.

Perceived sacrifice and subjective goal impact

Goal pursuit often involves conflict between goal-consistent options (i.e., “virtues”, which yield progress towards the goal) and goal-inconsistent options (“vices”). Crucially for our argument, the degree of actual goal progress is determined by the chosen option, regardless of

the alternatives. For example, objective progress towards achieving a weight loss goal is determined by calories actually consumed, and progress towards a savings goal is determined by the amount of money actually saved, regardless of what the alternatives were in either case.

However, without clear objective markers, it can be difficult for people to assess how much actual progress towards the goal has been caused by a single goal-consistent decision. Instead, people may monitor their goal pursuit using other available cues, including invested effort (Zhang et al., 2011) and salient counterfactual actions (Dhar & Wertenbroch, 2012). Further, the goal pursuit literature has suggested that perceptions of progress outweigh the effects of actual progress on consumers' motivation and decision making (Kivetz, Urminsky, & Zheng, 2006; Huang, Zhang, & Broniarczyk, 2012; Soman & Shi, 2003). Therefore, we propose that people will be affected by the diversity of foregone temptations, representing greater effort and sacrifice in making a prior goal-consistent choice, as an important cue to evaluate how much impact the prior choice has made on overall goal pursuit.

Choices involving sacrifice are effortful, and effort is one of the primary heuristics people use for outcome judgments. Consumers often show enhanced evaluations about items after they have invested their own effort (Kim & Labroo, 2011; Norton, Mochon, & Ariely, 2012), and they infer higher quality from a product and pay more when they believe that greater effort was invested in the process (Cho & Schwarz, 2008; Kruger et al., 2004; Morales, 2005). As people often draw a potentially illusory causal link between invested effort and resulting outcomes, they also tend to believe even "pointless" effort can lead to a more favorable outcome. Therefore, they often overcomplicate a decision process (i.e., increase their own effort) to bolster the possibility of a positive outcome (Schrift, Kivetz, & Netzer, 2016).

Further, goal research has documented an effort-outcome link, such that people perceive effort as a signal of the impact of target means or action in fulfilling their goal. Consumers may perceive they have made more progress on their goal when they exerted more effort to initiate a goal-consistent action, for example, when it took more time to get to the gym or when they were not in the mood for exercise (Rafieian & Sharif, 2021). Also, a target object is viewed as more useful to achieve a certain goal when it is associated with more effort, even when the effort is not directly relevant to goal pursuit (Labroo & Kim, 2009). For example, people perceived a chocolate as more instrumental in fulfilling their hedonic goal when the ad for the chocolate was more difficult to visually process, requiring more effort.

Another stream of research more directly shows the relationship between foregone-alternative diversity and subjective goal impact. Consumers perceive foregoing multiple food types as helping a weight-related health goal more than just foregoing a single type of food with the same amount of calories (Haws & Liu, 2016). Similarly, consumers are relatively insensitive to reducing consumption of the same food, but perceive changes to a different food type as affecting their health goal more (Liu et al., 2019). Building on these findings, we suggest that among people making the same goal-consistent choice, which yields the same *objective* impact on goal pursuit, greater variety among the foregone goal-inconsistent alternatives will make people perceive their choice as involving greater sacrifice (by foregoing different types of desirable consumption they could have enjoyed) and would make them feel that their efforts have yielded a greater impact on their goal-pursuit.

Motivational consequences of subjective goal impact

Perceived impact is one of the central drivers of goal pursuit. Initial research in animal behavior (Hull 1932; Miller 1944) and more recent research on human decision-making (Cheema

& Bagchi 2011; Kivetz, Urminsky, & Zheng, 2006; Nunes & Drèze 2006) has demonstrated a goal gradient, such that motivation increases with progress towards a goal. In particular, Kivetz et al. (2006) demonstrated that consumers invest more effort in goal pursuit (repurchasing coffee sooner, investing more effort and persisting longer in an evaluative task) with greater progress toward the goal, and even cues signaling an illusion of goal progress (e.g., providing free loyalty program stamps while holding total requirements constant) boost motivation.

Goal researchers have suggested that proximity toward a goal increases motivation because the perceived marginal impact of actions increases with each consecutive action (Heath, Larrick, & Wu, 1999; Bonezzi, Brendl, & De Angelis 2011). For example, people tend to use the desired end-state of their goal as a reference point to monitor their goal progress when nearing the goal. Therefore, the perceived marginal impact of the same goal-consistent action is greater when it is the last action to achieve the goal (100% contribution toward the goal's end) than when it is the second-to-last action (50% contribution), resulting in greater motivation toward the goal's end.

During goal-pursuit, therefore, people are more motivated when their attention is directed to cues that make the marginal impact of their action appear relatively larger (Bullard & Manchanda, 2017; Koo & Fishbach, 2012). In contrast, people tend to lose their motivation when the perceived marginal impact becomes less salient. For instance, people show decreased motivation when they are midway through goal pursuit (i.e., "stuck in the middle" between the two salient reference points (initial vs. end-state), Bonezzi et al., 2011; Touré-Tillery & Fishbach, 2011; Wiebenga & Fennis, 2014). Thus, we predict that even when making the same goal-consistent choice, considering diverse (vs. similar) foregone alternatives will increase subsequent motivation, due to greater perceived impact on goal pursuit.

Whereas our account incorporates past findings on behavioral consistency, in which seeing past behavior as having more goal impact leads individuals to do more of the same behavior, some contrasting findings exist in the literature. In particular, licensing and coasting effects have been documented, in which a positive initial behavior and resulting positive affect can sometimes liberate individuals to behave in the opposite direction subsequently (Carver, 2003; Effron, Miller & Monin, 2012; Khan & Dhar, 2006; Krishna & Hagen, 2019; Seo & Patall, 2021). This raises the question of whether considering diverse foregone alternatives might sometimes instead lead to less goal persistence, due to higher perceived impact on goal pursuit, licensing a goal-inconsistent behavior.

Recent research has suggested moderators that may predict when past goal-consistent behavior will promote either consistency and further engagement, or licensing and disengagement from the initial action. For example, consistency with (vs. change from) past choices is more likely to occur when the target behavior has stronger relevance to one's values or identity (Clot, Grolleau, & Ibanez, 2016; Effron, Cameron, & Monin, 2009), when people draw inferences from their initial action that they value the target behavior (Fishbach & Dhar, 2005; Gneezy et al., 2012; Kristofferson, White, & Pelozo, 2014), when no competing goals are salient (Orehek et al., 2011), and when prior outcomes make people optimistic about future outcomes (Yang & Urminsky, 2015).

In particular, Gneezy et al. (2012) suggests costliness of initial goal-consistent action as a critical moderator determining behavioral consistency or licensing. People are more likely to show another goal-consistent behavior when the initial action incurred actual personal cost (e.g., monetary donation deducted from their payment), but rather reduce their effort toward the goal when it was costless (e.g., monetary donation on behalf of participants without deduction in their

payment). Extending this notion to our framework, consideration of either similar or diverse foregone alternatives highlights the costliness of the initial goal-consistent action by making salient what has been given up to remain consistent with a goal. Therefore, in the context of “costly” initial action, we predict that people will be more likely to show goal persistence, instead of being licensed to neglect the goal, when they feel the initial goal-consistent action was more costly, by considering having foregone diverse (vs. similar) temptations.

We summarize the discussion thus far by the following hypotheses:

H1: Considering diverse (vs. similar) foregone goal-inconsistent alternatives in a past goal-consistent choice increases subsequent motivation to make an additional goal-consistent choice.

H2: Considering diverse (vs. similar) foregone goal-inconsistent alternatives increases perceptions of sacrifice from a prior goal-consistent choice.

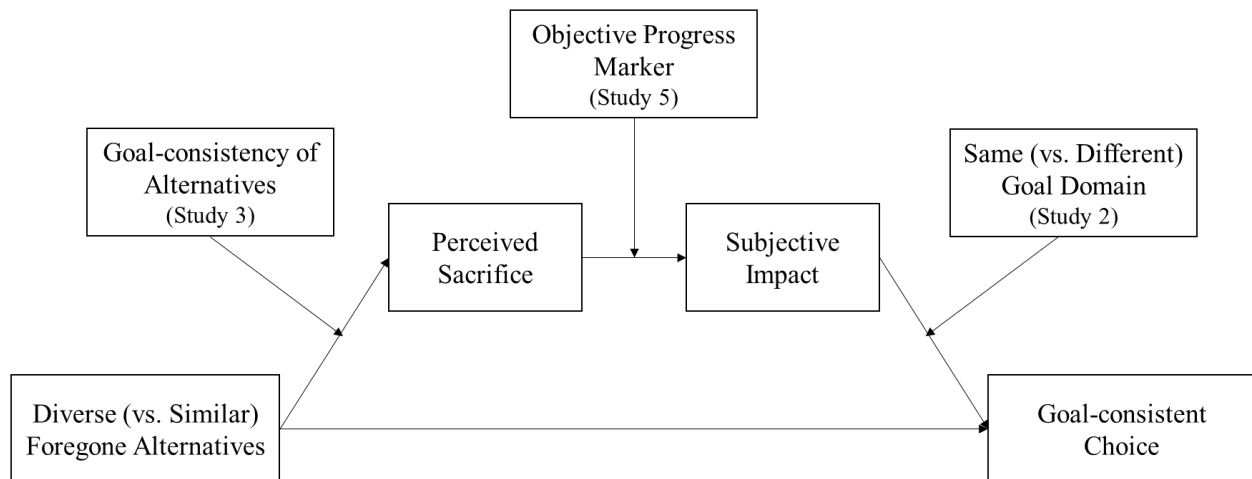
H3: Considering diverse (vs. similar) foregone goal-inconsistent alternatives increases the subjective impact of a prior goal-consistent choice on overall goal pursuit.

H4: Perceived sacrifice and subjective impact of a prior goal-consistent choice mediates the effect of foregone-alternative diversity on subsequent motivation.

These goal-based hypotheses are premised on the consumer having adopted a goal that is relevant to the choices in question. For a consumer who is not pursuing a weight-loss goal, for example, a choice of a lower calorie option instead of higher-calorie foods does not necessarily represent goal-consistency. Our pilot studies confirm this assumption, finding that diversity of foregone alternatives increases subjective goal impact only among people who endorse the focal goal (see Study A1 and A2 in Online Appendix I). Therefore, in our studies, we employed widely shared goals that most people currently endorse (e.g., savings, healthy eating; Online

Appendix A). Furthermore, given that licensing is less likely when the relevant goal is perceived as one's own (vs. imposed by others; Zhang et al., 2010), our focus on choices involving active goals implies a lower likelihood of licensing effects.

FIGURE 1: CONCEPTUAL FRAMEWORK



Next, we present six experimental studies (four pre-registered, see links for pre-registrations in Online Appendix B) that collectively test the entire proposed conceptual framework (Figure 1). Study 1 demonstrates that greater diversity of actual foregone alternatives to a goal-consistent behavior (exercise) increased related goal-consistent consequential snack choices in a field setting. Study 2 tests a boundary condition predicted by our framework, showing that considering diverse foregone alternatives increases subsequent motivation only when the subsequent decision is in the same domain as the initial goal-consistent action, because it is only then that the subjective impact of the initial action is relevant. Study 3 provides more complete evidence for the suggested mechanism by demonstrating a three-step process: foregone alternative diversity increases perceived sacrifice, which leads to increased subjective impact, which in turn increases goal persistence. Studies 4 and 5 provide further tests of the proposed mechanism. Study 4 looks into why more diversity among foregone alternatives results in greater perceived sacrifice. Study 5 demonstrates that the foregone diversity effect is mitigated when an

objective progress marker (e.g., subgoal completion) exists, which decouples the relationship between perceived sacrifice and subjective impact. Across the studies, we rule out multiple alternative explanations involving changes in perceptions of own self-control ability and inferred goal commitment. Full survey stimuli for all studies and all data are available via OSF (https://osf.io/5y9wt/?view_only=861e3af5c59648d1aa40293e80bd0d78).

STUDY 1: THE EFFECT OF PROMPTING CONSIDERATION OF DIVERSE FOREGONE ALTERNATIVES IN THE FIELD

Study 1 tests the foregone diversity effect: whether consumers are more motivated to maintain goal pursuit by making a goal-consistent choice if they consider *diverse* (as opposed to *similar*) goal-inconsistent alternatives they could have chosen instead of the goal-consistent choice they had previously made. We tested the effect in a natural setting, at a school gym, among people who had spontaneously made an actual prior goal-consistent choice to exercise. This study tests the foregone diversity effect on a real, incentive-compatible goal-relevant choice.

The current study includes a control condition in which people did not consider any alternative activities they could have done instead of exercising. This was to test the proposition that considering diverse options enhances subsequent motivation, as opposed to consideration of similar options reducing people's motivation. The study also provides an initial test of the effect of foregone alternative diversity on subjective impact.

Method

We recruited 234 participants (121 male, $M_{\text{age}} = 24.51$) who were leaving the gym on the campus of a large Midwestern university after exercising. Prior to analysis, we excluded 24 participants who were at the gym for pre-scheduled activities (taking physical education classes or training for varsity teams), and whose decision to go to the gym therefore reflected a long-standing commitment, rather than a specific discretionary choice. After this exclusion, we had 210 participants for analysis. This study employed a between-subjects design with three foregone-alternatives conditions (considering similar alternatives vs. diverse alternatives vs. no-alternatives control).

In the foregone-alternative conditions, participants first wrote down one activity they could have done instead of exercising. On the next page, they were asked to write down two additional ways they could have spent their time, instead of exercising, either very similar to or very different from the first. Participants then explained why the three ways of spending their time were either similar or dissimilar to each other, depending on the condition. Notably, participants in both foregone-alternative conditions (but not the control condition) were prompted to consider personally relevant alternatives, and therefore considered their prior use of self-control in both conditions. This design enables us to distinguish between general effects of considering foregone alternatives requiring self-control versus our proposed effect of considering specifically diverse foregone alternatives.

On the next page, participants rated three measures of subjective impact on their exercise goal: how much of (1) an achievement, (2) contribution, and (3) progress they think they had made towards their exercise goal (1 = *Not at all*, 7 = *A lot*). Participants in the control condition answered the subjective impact measures without being prompted to consider any alternatives.

After the subjective impact measures, participants were told that they would receive an energy bar as a “thank-you” gift for completing the survey. The participants indicated which of two energy bars (“wholesome mix of healthiness: KIND almond, walnut & macadamia” vs. “sweet and salty indulgence: KIND dark chocolate & peanut butter”) they would like to receive. A pre-test confirmed that the first energy bar was perceived as healthier and more congruent with pursuing a health goal than the second (see Online Appendix C).

On the final page, participants described briefly what they had done at the gym and, as control measures, they indicated how long they had worked out (in minutes), how often they worked out (1 = *Less than 1 time a month*, 5 = *Almost every day*), how much they enjoyed working out, how committed they were to working out, and how important it was to them to work out regularly (1 = *Not at all*, 7 = *Very much*). They reported their gender and age for demographic information. Upon the completion of the survey, each participant was given the energy bar they had selected in the survey.

Results

Subjective impact on an exercising goal. A one-way ANOVA on the subjective impact measure ($\alpha = .68$) revealed a significant main effect of the experimental condition ($F(2, 207) = 5.05, p = .01, \eta_p^2 = .02$). Participants in the diverse foregone-alternatives condition felt their decision to go to the gym had made a greater impact on their exercise goal than either (1) those in the similar foregone-alternatives condition ($M_{\text{diverse}} = 4.86, SD_{\text{diverse}} = 1.03, M_{\text{similar}} = 4.50, SD_{\text{similar}} = 1.07; t(141) = 2.04, p = .04, d = .35$) or (2) than those in the control condition ($M_{\text{control}} = 4.27, SD_{\text{control}} = 1.22; t(139) = 3.09, p = .002, d = .53$). Participants in the similar foregone-alternatives condition did not significantly differ in their assessments of the subjective impact from those in the control condition ($b = .23, t(134) = 1.15, p = .25$).

These results rule out the possibility that considering similar alternatives reduces the subjective impact of the prior goal-consistent choice on the overall goal. Instead, the results suggest that considering diverse foregone alternatives enhances subjective impact. The effect of foregone-alternative diversity on subjective impact remained significant after including control measures, including exercise duration, frequency of gym visit, enjoyment, goal commitment, and goal importance ($F(2, 193) = 4.47, p = .01, \eta_p^2 = .01$). Further, we found no difference across conditions in participants' goal commitment and goal importance perceptions (p 's $> .18$).

Effect of foregone diversity on subsequent food choice. A logistic regression analysis on the subsequent energy bar choice revealed significant differences between (1) the diverse and similar foregone-alternatives condition ($b = 1.00, z = 2.89, p = .004$), and (2) the diverse foregone-alternatives and control condition ($b = .76, z = 2.22, p = .03$). Specifically, participants who were prompted to consider diverse foregone alternatives were significantly more likely to select the healthier option than those asked to recall similar alternative activities they could have chosen instead of exercising (64% vs. 39%, $\chi^2 = 7.55, p = .01, \phi = 0.23$). Likewise, participants in the diverse condition were more likely to select the healthier bar than those in the control condition, who were not prompted to consider any alternatives at all (64% vs. 45%, $\chi^2 = 4.25, p = .04, \phi = 0.18$). Choices of the healthy option did not differ between the similar foregone-alternative and control conditions ($p = .62$).

Discussion

Study 1 provides initial evidence consistent with the foregone diversity effect: considering diverse foregone goal-inconsistent alternatives *increases* subsequent motivation to make a choice consistent with the relevant health goal. The current study also found that

diversity of foregone alternatives increased subjective impact of the prior goal-consistent choice on the means-specific (exercise) aspect of the broader health goal.

In the current study, participants generated alternatives to the past goal-consistent choice retrospectively, not involving actual rejection of the alternatives. Therefore, these results suggest that the type of foregone alternatives constructed *post hoc* can affect the evaluation of the past choice and motivation to make subsequent goal-consistent choices.

In addition, to control for any potential confounding effects due to the different composition of alternatives across conditions, we conducted a follow-up study (Study A3 in Online Appendix I), in which we used a fixed set of foregone alternatives and instead manipulated the perceived diversity using categorization (i.e., a single category in the similar or multiple categories in the diverse condition). The follow-up study replicated the foregone diversity effect: when the foregone alternatives were grouped into multiple categories, and thereby seen as more different from each other, consumers were more motivated to persist in goal pursuit.

Two supplemental pre-registered studies (Study A4 and A5 in Online Appendix I) also replicated the foregone diversity effect in a different goal context, a savings goal. In particular, in supplemental study A5, people freely generated how they could have spent the money they had saved. Consumers who spontaneously considered a more diverse set of foregone alternatives were subsequently more motivated to save instead of spend and indicated a lower amount they were willing to spend. These results further suggest that without any implicit or explicit cues to direct consumers' attention to the diversity among alternatives, perceiving greater diversity among the foregone temptations can lead to goal persistence.

STUDY 2: SUBJECTIVE IMPACT MEDIATES THE FOREGONE DIVERSITY EFFECT

In Study 1, subjective impact was measured narrowly, in relation to specific exercise goals, instead of in terms of the impact on the general health goal for which the snack choice was most relevant. For this reason, the study design was not well suited to test mediation. In Study 2, we directly test subjective goal impact as the proposed mechanism, in two ways, by measuring a sufficiently general mediator and by manipulating a predicted boundary condition. Specifically, we manipulated the goal domain of the subsequent choice, having participants make a choice either in the same domain or in a different goal domain from the prior goal-consistent choice. The proposed goal impact mechanism predicts that the increase in current goal-consistent choices from considering diverse (vs. similar) alternatives to a prior goal-consistent choice will replicate only when the current choice is in the same goal domain, but not when the choice involves a goal unrelated to the prior choice.

Moreover, the current design allows us to examine a potential alternative explanation—*inferred ability to exercise self-control in general*. Considering having foregone diverse (vs. similar) temptations might increase perceptions of oneself as being able to exercise self-control in general. The *inferred self-control* account would then predict that people would be more likely to subsequently make a virtuous choice (i.e., one that requires exerting self-control) even in a new domain, unrelated to the initial domain of goal pursuit. However, our suggested mechanism, involving the subjective impact on a specific goal, predicts goal persistence only in the same goal domain.

In particular, Rafieian & Sharif (2021) have theorized that great exercise of self-control during goal pursuit motivates future goal-consistent behavior, by increasing inferred commitment to the goal. Their analysis focuses on the presence vs. absence of effortful self-control in making a goal-consistent prior choice (e.g., via the salience of alternatives), as opposed to our focus on diversity of foregone options. Nevertheless, this could present a potential alternative explanation of our findings, if greater diversity of foregone alternatives increases inferred commitment to the goal. To test this, we measure inferred goal commitment in Study 2 using an established measure.

Method

Study 2 employed healthy eating as a widely shared goal. A separate pretest confirmed that 89% of people (126 out of 142) were pursuing healthy eating as an active goal (see Online Appendix A). This pre-registered study employed a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (subsequent goal domain: same vs. different) between-subjects design. We recruited 600 participants from Prolific in the United States (164 male, $M_{\text{age}} = 35.22$), and excluded 4 records with duplicate IP addresses or from participants who failed an attention check and didn't follow instructions, prior to analysis, remaining 596 valid surveys for analysis. The same exclusion criteria were applied to all the online studies conducted in this paper unless noted.

We asked people to participate if they were currently pursuing a healthy eating goal, and confirmed their goal using agreement in two screener questions in the survey (“Healthy eating is one of my personal goals” and “I try to eat healthy as much as I can”).

Next, participants read a short description of what a “healthy diet” means (e.g., high consumption of plant-based foods, low consumptions of animal-based foods, and low consumption of sugar). Then, we asked participants to recall and write about a recent experience

when they had made a healthy food choice that met at least one of the criteria stated above. Depending on the condition, participants then generated either three similar or three diverse unhealthy alternatives they could have chosen instead of the healthy food that they did choose. After describing how the three alternatives were similar or dissimilar to one another, participants rated three measures of subjective impact: how much of (1) an achievement, (2) impact, and (3) progress they think their goal-consistent choice made towards their health goal (1 = *None*, 7 = *A great deal*). Participants also rated five measures of inferred goal commitment (Klein et al., 2001) regarding the healthy eating goal. Sample items included “I am strongly committed to pursuing this goal” and “It wouldn’t take much to make me abandon this goal” (reverse-coded) (1 = *Strongly disagree*, 7 = *Strongly agree*).

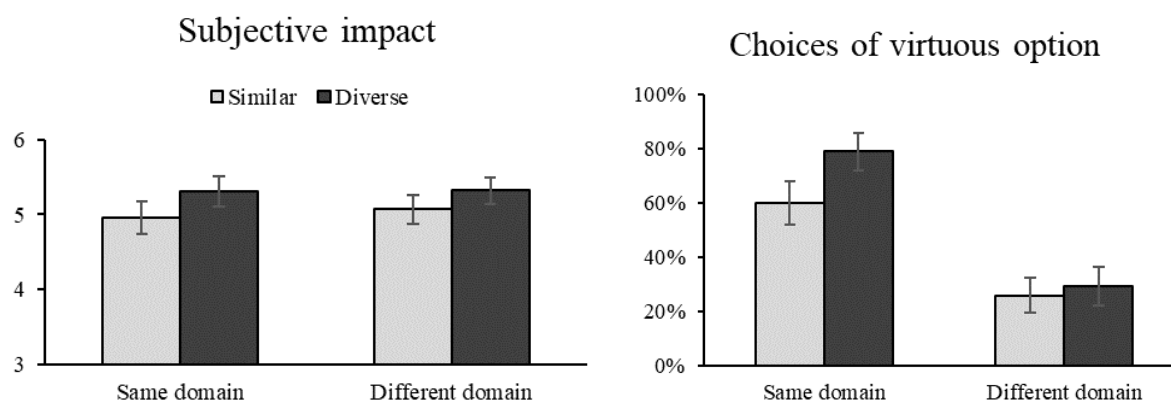
Participants were then told about an opportunity to participate in another (hypothetical) study. In the same goal domain condition, they were told that it would be a food tasting survey and asked whether they would prefer to evaluate either a pack of snacks or salad cups. In the different goal domain condition, we employed a savings goal as a widely shared goal that was irrelevant to the “healthy eating” goal implicated in the prior choice. Participants were asked to choose between evaluating either a new shopping app or a new banking app for installment savings. After making the choice, participants rated the attractiveness of foregone alternatives they had generated earlier on a 7-point scale (1 = *Not at all*, 7 = *Very much*) and reported their gender and age for demographic information.

Results

Subjective impact. Because we manipulated the subsequent goal domain after participants had already reported subjective impact, we collapsed the goal domain conditions and conducted a t-test on the composite score of subjective impact ($\alpha = .87$). Replicating the results of the prior

studies, participants who were prompted to consider diverse (vs. similar) unhealthy alternatives to their prior choice felt that they had achieved greater impact on their healthy eating goal ($M_{\text{diverse}} = 5.31$, $SD_{\text{diverse}} = 1.17$, $M_{\text{similar}} = 5.01$, $SD_{\text{similar}} = 1.28$; $t(594) = 3.02$, $p = .003$, $d = .25$; Figure 2).

FIGURE 2: THE EFFECT OF FOREGONE-ALTERNATIVE DIVERSITY ON SUBJECTIVE IMPACT AND SUBSEQUENT CHOICE (STUDY 2)



Note: Error bars depict 95% Confidence Intervals.

Subsequent choice. A logistic regression analysis predicting the subsequent choice revealed a borderline significant interaction between foregone-alternative diversity and subsequent goal domain ($b = -.75$, $z = -2.04$, $p = .04$; $b = -.74$, $z = -1.98$, $p = .048$ when controlling for the attractiveness of the foregone alternatives and inferred goal commitment). Supporting our predictions, in the same goal domain conditions, participants who were prompted to consider diverse (vs. similar) unhealthy alternatives to their prior healthy choice were subsequently more likely to choose the goal-consistent healthy option (79% vs. 60%, $\chi^2 = 11.87$, $p = .001$, $\phi = 0.20$). By contrast, in the different goal domain conditions, the diversity of foregone unhealthy alternatives had no effect on subsequent choices of the higher self-control savings-related option (29% vs. 26%, $\chi^2 = .28$, $p = .60$).

In addition, a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (subsequent goal domain: same vs. different) ANOVA on the composite measure of inferred goal commitment ($\alpha = .81$) revealed no significant interaction ($p = .60$), suggesting that the foregone diversity effect is not driven by higher inferred goal commitment when considering diverse foregone alternatives.

Mediation analyses. We conducted a moderated mediation analysis to test our proposed framework. Specifically, we test whether subjective impact on goal progress mediated the effect of foregone-alternative diversity on goal-consistent choice, only when making a subsequent choice in the same goal domain but not for a choice in a different goal domain (PROCESS, Model 14). The analysis revealed a significant moderated mediation via subjective impact ($b = -.12$, $se = .07$, $CI = [-.2835, -.0151]$). The indirect effect was significant only when making a choice for the same domain ($b = .12$, $se = .05$, $CI = [.0371, .2480]$), but not when making a choice for the different domain ($b = .005$, $se = .04$, $CI = [-.0797, .0821]$).

We conducted another moderated mediation analysis to address a potential alternative mechanism, that the foregone diversity effect might occur due to inferred goal commitment (PROCESS, Model 14). In contrast to the significant mediation by subjective impact, inferred goal commitment did not significantly mediate ($b = -.05$, $se = .05$, $CI = [-.1598, .0186]$).

Discussion

Study 2 demonstrated that thinking about diverse (vs. similar) foregone alternatives increases people's perception of the impact their goal-consistent choice had on goal pursuit, which in turn increases subsequent motivation to persist. Importantly, the foregone diversity effect occurred only for a subsequent choice in the same goal domain as the prior goal-consistent

choice, but not when the subsequent choice involved a goal unrelated to the prior goal-consistent choice.

The results of the current study also tested and ruled out two alternative explanations, involving perceptions of self-control ability and inferred goal commitment. In particular, if the foregone diversity effect was due to consideration of foregone diverse alternatives boosting perceptions of general self-control ability, the effect should occur for any subsequent choice requiring self-control (e.g., both for savings and healthy eating). Instead, consistent with our proposed framework and inconsistent with the inferred self-control explanation, the foregone diversity effect did not occur in the unrelated goal domain (savings). Furthermore, foregone option diversity did not affect inferred goal commitment, and only perceived impact on goal progress, but not inferred goal commitment, mediated the foregone diversity effect. These results are consistent with our proposed account, that the diversity of foregone alternatives increases consumers' motivation to make another virtuous choice specifically for the same goal, because they perceive they have made greater impact on a specific goal, not because of inferences about general self-control ability or goal commitment.

STUDY 3: PERCEIVED SACRIFICE AND SUBJECTIVE IMPACT AS SERIAL MEDIATORS

In Study 3, we test the proposed underlying mechanism for why diversity of foregone alternatives increases subjective impact. According to the conceptual framework, foregone diverse (vs. similar) goal-inconsistent alternatives will make people feel they have made more sacrifice to make a goal-consistent choice, which would increase perceptions of how much

impact the prior goal-consistent choice has had on overall goal pursuit. The higher subjective goal impact would in turn lead to greater motivation to continue making subsequent goal-consistent choices. To test the full conceptual framework, we measure perceived sacrifice in Study 3 as the proposed link between foregone-alternative diversity and subjective impact.

In addition, Study 3 also tests the necessity of perceived sacrifice for the foregone diversity effect. If perceived sacrifice underlies the effect, as our framework suggests, the diversity of foregone alternatives should not have an effect when the alternatives considered are instead goal-*consistent*. Because choosing between goal-consistent alternatives does not involve as much of a tradeoff (Dhar & Wertenbroch, 2012), considering these alternatives would not prompt a sense of having sacrificed to stick to the goal, and the diversity of foregone goal-consistent alternatives should not affect subjective goal impact or subsequent goal-related choices.

Study 3 also tested another potential alternative explanation, based on cognitive dissonance (Festinger, 1957; Brehm & Cohen, 1959). A more diverse set of alternatives could increase the degree of dissonance, and resolving that dissonance may result in greater liking of the chosen option and reduced liking of the unchosen alternatives, compared to the lower-dissonance similar-alternatives condition. To test this account, and to enable us to control for the potential dissonance-induced differences in liking of the options, we measured attractiveness of both chosen and foregone options in the prior choice at the end of the survey.

Method

Study 3 employed a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (goal-inconsistent vs. goal-consistent alternatives) between-subjects design. Applying the same

exclusion criteria as in Study 2, we collected 457 valid complete surveys from Mturk participants in the United States (206 male, $M_{\text{age}} = 40.04$).

First, to confirm the endorsement of the healthy eating goal among participants, we asked them to indicate the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “I am highly conscious of what I am eating,” (2) “I try to eat healthy as much as I can.”

Next, participants considered a prior healthy choice they had made (as in Study 2) and then generated three similar or three diverse alternatives that were either unhealthy (in the goal-inconsistent condition) or healthy (in the goal-consistent condition). Participants rated the subjective impact of their prior goal-consistent choice using the same measures in Study 2, and also indicated the perceived sacrifice by answering the following questions on a 7-point scale (1 = *None*, 7 = *A great deal*): how much (1) sacrifice they think they made, (2) enjoyment they think they gave up, and (3) temptation they think they overcame. To further test for the effect of self-control ability perception in the focal goal domain, as an alternative explanation, we collected the following measures: (1) “In general, I am good at controlling myself to pursue a health goal,” (2) “In general, I am the type of person who indulges when it comes to food” (reverse-coded) (1 = *Strongly disagree*, 7 = *Strongly agree*).

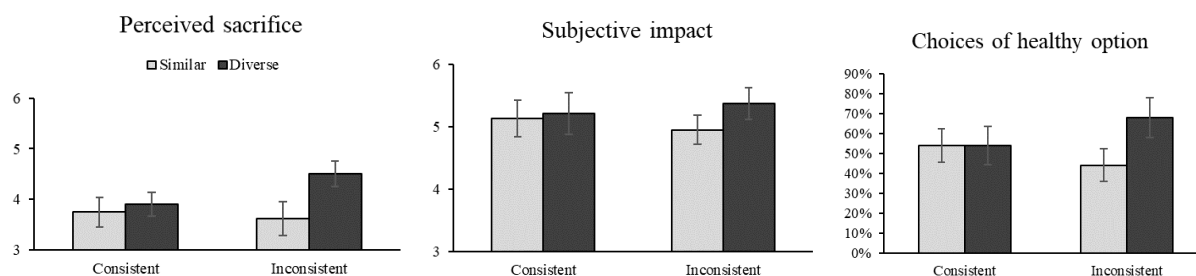
Participants were then informed that once the data collection was finished, the research team would randomly select participants of the survey and send them an e-voucher for a box of KIND bars. The participants indicated which flavor (“Wholesome mix of healthiness: KIND almond, walnut & macadamia” vs. “Sweet and salty indulgence: KIND dark chocolate & peanut butter”) they would like to receive if they are selected. After the choice, participants rated the attractiveness of each food option (both the chosen and the foregone alternatives) they had

generated earlier on a 7-point scale (1 = *Not at all*, 7 = *Very much*) and reported their gender and age. After the survey was completed, five participants were selected as winners and sent the e-vouchers.

Results

Goal endorsement. Confirming our pretest result, the composite score of healthy eating goal importance ($\alpha = .80$) revealed that, on average, participants were pursuing eating healthy as an important and active goal ($M = 5.37$, $SD = 1.23$; $t(456) = 23.89$, $p < .001$, compared to 4, the midpoint of the scale). A 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (goal-consistent vs. goal-inconsistent alternatives) ANOVA found no difference in participants' goal endorsement across conditions (all p 's $> .50$). Participants in all subsequent studies indicated they were pursuing a focal goal, so we present the results confirming goal endorsement for those studies in Online Appendix E.

FIGURE 3: THE EFFECT OF FOREGONE-ALTERNATIVE DIVERSITY AND GOAL-CONSISTENCY OF ALTERNATIVES (STUDY 3)



Perceived sacrifice. A 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (goal-inconsistent vs. goal-consistent alternatives) ANOVA was conducted on the composite score of perceived sacrifice ($\alpha = .84$). Results indicated a significant interaction ($F(1, 453) = 6.30$, $p = .01$, $\eta_p^2 = .01$), as well as main effects of foregone-alternative diversity ($F(1, 453) = 3.82$, $p = .05$, $\eta_p^2 = .01$) and goal-consistency of the alternatives ($F(1, 453) = 12.92$, $p < .001$, $\eta_p^2 = .03$;

Figure 3). The main effect of goal-consistency of the alternatives confirms that participants perceived less sacrifice when they have given up goal-consistent alternatives ($M = 3.68$, $SD = 1.63$) than when they have given up goal-inconsistent alternatives ($M = 4.19$, $SD = 1.46$).

Importantly, confirming our prediction, a simple-effect analysis revealed that when participants considered unhealthy (goal-inconsistent) foregone alternatives, they reported greater sacrifice when thinking about diverse alternatives than when thinking about similar alternatives ($M_{\text{diverse}} = 4.50$, $SD_{\text{diverse}} = 1.43$, $M_{\text{similar}} = 3.90$, $SD_{\text{similar}} = 1.43$; $t(453) = 3.13$, $p = .002$, $d = .42$). By contrast, when participants considered healthy (goal-consistent) alternatives, the diversity of the considered alternatives did not affect the consistently lower level of perceived sacrifice ($M_{\text{diverse}} = 3.61$, $SD_{\text{diverse}} = 1.70$, $M_{\text{similar}} = 3.74$, $SD_{\text{similar}} = 1.57$; $t(453) = -.58$, $p = .56$).

Subjective impact. We then examined whether the diversity of the foregone goal-consistent alternatives increased the subjective impact of the prior goal-consistent choice. The same 2×2 ANOVA on the subjective impact revealed a significant main effect of foregone-alternative diversity ($F(1, 453) = 4.42$, $p = .04$, $\eta_p^2 = .01$). Replicating our previous findings, participants who considered unhealthy (goal-inconsistent) alternatives felt that they had achieved greater impact on their healthy eating goal when considering diverse alternatives compared to similar alternatives ($M_{\text{diverse}} = 5.27$, $SD_{\text{diverse}} = 1.30$, $M_{\text{similar}} = 4.95$, $SD_{\text{similar}} = 1.42$; $t(453) = 2.48$, $p = .01$, $d = .24$). In contrast, when participants considered which healthy (goal-consistent) alternatives they could have chosen instead, there was no difference between the similar vs. diverse condition ($M_{\text{diverse}} = 5.14$, $SD_{\text{diverse}} = 1.30$, $M_{\text{similar}} = 5.21$, $SD_{\text{similar}} = 1.35$; $t(453) = .37$, $p = .71$).

Subsequent choice. A logistic regression analysis predicting the subsequent choice revealed a significant interaction between foregone-alternative diversity and goal-consistency of

the alternatives ($b = .81, z = 2.12, p = .03$). Supporting our predictions, when participants were prompted to consider unhealthy alternatives they had foregone (i.e., in the goal-inconsistent conditions), considering diverse unhealthy alternatives to a prior healthy choice yielded more choices of a healthy option, compared to considering similar unhealthy alternatives (68% vs. 54%, $\chi^2 = 4.43, p = .04, \phi = 0.13$). By contrast, the diversity of foregone alternatives had no effect on choices when participants instead were prompted to consider healthy alternatives, in the goal-consistent conditions (48% vs. 54%, $\chi^2 = .48, p = .49$). The interaction between foregone-alternative diversity and goal-consistency of the alternatives remained significant after controlling for perceptions of self-control ability and the attractiveness of the alternatives ($b = .80, z = 2.01, p = .04$).

Alternative explanations. We conducted the same 2×2 ANOVAs separately on the composite score of self-perception measures ($r = .64$), the average attractiveness of the foregone alternatives, and attractiveness rating of the prior choice. We did not find any significant interactions on these measures (all p 's $> .41$), suggesting that the foregone diversity effect (and its moderation by goal-consistency of the current choice) cannot be explained by either the inferred self-control ability or cognitive dissonance accounts. In addition, the significant effects predicted by our account on perceived sacrifice, subjective impact, and subsequent choice remained significant when controlling for these alternative explanation process measures.

Serial mediation analyses. We conducted a moderated serial mediation analysis to test our proposed framework. Specifically, we predict that greater diversity of forgone goal-*inconsistent* (but not goal-consistent) alternatives results in more perceived sacrifice and thereby greater subjective impact of the goal-consistent choice, leading to greater motivation to make further goal-consistent choices. The moderated mediation model (PROCESS, Model 83)

included foregone-alternative diversity as the independent variable (0 = similar, 1 = diverse alternatives), goal-consistency as the moderator (0 = inconsistent, 1 = consistent), perceived sacrifice and subjective impact as two serial mediators, and food choice as the dependent variable. The analysis confirmed a significant conditional indirect effect of the interaction between option diversity and goal-consistency on choice through perceived sacrifice (mediator 1) and subjective impact (mediator 2) ($b = -.04$, $se = .03$, $CI = [-.1028, -.0060]$). Specifically, consistent with our predictions, participants prompted to consider more diverse foregone goal-inconsistent alternatives were more likely to choose the healthy option, via higher perceived sacrifice and subjective impact on goal progress ($b = .04$, $se = .02$, $CI = [.0085, .0800]$). However, when considering goal-consistent alternatives, perceived sacrifice and subjective impact did not mediate an effect of alternative diversity on the subsequent goal-related choice ($b = -.01$, $se = .02$, $CI = [-.0405, .0218]$).

Discussion

The detailed process findings in Study 3 provide evidence consistent with the proposed framework for how foregone-alternative diversity impacts goal persistence, and inconsistent with alternative explanations, including the inferred self-control ability and cognitive dissonance accounts. Study 3 confirmed that thinking about diverse (vs. similar) foregone goal-inconsistent alternatives increases people's perception of their sacrifice when making a prior goal-consistent choice and the impact that sacrifice had on goal pursuit. The current study further demonstrated that this effect of foregone alternatives on perceived sacrifice and subjective goal impact in turn leads people to make more goal-consistent choices in a subsequent decision.

Further supporting the framework, we confirm a theory-based moderator. The effect of foregone-alternative diversity was observed only when participants considered having foregone

goal-*inconsistent* alternatives that could have hindered goal progress. When they instead considered foregone goal-*consistent* alternatives, they perceived little sacrifice regardless of the diversity of alternatives, and the diversity of the foregone alternatives did not affect subjective impact or subsequent goal-related choices.

STUDIES 4A-B: FOREGOING DIVERSE ALTERNATIVES IS PERCEIVED AS PASSING UP MULTIPLE OPPORTUNITIES

Study 4 further investigates the link between diversity of foregone alternatives and perceived sacrifice. Our theorizing proposes that foregoing diverse (vs. similar) goal-inconsistent alternatives is perceived as greater sacrifice because giving up multiple, distinct types of attributes combined in a diverse set (as opposed to giving up similar attributes in a similar set) is perceived as passing over more. However, this could occur for two different reasons: because foregoing diverse options feels like passing over more opportunities or passing up a larger opportunity. Specifically, foregoing diverse options might be perceived as repeatedly giving up goal-inconsistent alternatives (e.g., “I’ve resisted temptations *three times*, by foregoing a donut, a cake, and a cup of ice cream”). Another possibility is that because diverse alternatives include a wider range of attributes, people may perceive foregoing diverse alternatives as foregoing a larger, superordinate category (e.g., “I’ve resisted eating *dessert*, not just donuts”).

To test by which account of foregone-alternative diversity explains perceptions of greater sacrifice, we tested theory-based boundary conditions of the effect. We employed six different scenarios of making a goal-consistent choice, in which participants imagined (1) foregoing similar vs. diverse alternatives in a choice set (base), (2) foregoing similar vs. diverse

alternatives sequentially (sequential-choice) or (3) foregoing a superordinate category and later finding out the included alternatives, either similar or diverse (superordinate-choice).

According to the sequential account (see Online Appendix F for predictions), the effect should be eliminated in both the sequential and superordinate conditions. The sequential manipulation would increase perceived sacrifice for the similar foregone-alternative condition to the level of the diverse foregone-alternative condition (by framing both as involving multiple choices). Conversely, the superordinate manipulation would reduce the perceived sacrifice for the diverse foregone-alternative condition to the level of the similar foregone-alternative condition (by framing both as involving a single choice).

The superordinate account, by contrast, predicts that the effect would only be eliminated in the superordinate condition. The superordinate manipulation would increase the perceived sacrifice for the similar condition to the level of the diverse condition (by framing both as involving a superordinate choice). However, the sequential manipulation would not shift perceived sacrifice relative to the base conditions, because foregoing similar alternatives would still involve a subordinate category while foregoing diverse alternatives would involve the superordinate category. We test these accounts in the following two studies, investigating subsequent goal pursuit in Study 4A and perceived sacrifice in Study 4B.

In addition, it has been suggested that after exerting greater self-control effort in a prior goal-consistent choice, people tend to expect the future goal pursuit would be easier, potentially contributing to goal persistence (Rafieian & Sharif, 2021). To test whether diversity of foregone alternatives changes people's expectations about future goal pursuit, thereby accounting for our foregone diversity effect, we measured the perceived ease of future goal pursuit in Study 4B.

Study 4A method

Study 4A employed a 2 (foregone-alternative diversity: similar vs. diverse) \times 3 (account: base vs. superordinate vs. sequential) between-subjects design. We recruited 100 participants from Prolific in the United States (491 male, $M_{\text{age}} = 36.96$; pre-registered). Prior to analysis, we excluded 63 records from participants who failed an attention check or who indicated dietary restrictions that had affected their answers, remaining 937 surveys for analysis.

To confirm the endorsement of healthy eating goal, among participants, we asked them to indicate the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “I am highly conscious of what I am eating,” (2) “I try to eat healthy as much as I can,” (3) “Eating healthy is one of my important personal goals.”

Participants were then asked to imagine that they had recently set a personal goal not to have unhealthy, high-sugar foods as much as possible. We used a scenario involving choosing a dessert among four options. In all conditions, participants imagined they had chosen a goal-consistent option, a fresh fruit cup, instead of one of the three other goal-inconsistent alternatives. In the similar alternatives condition, all three goal-inconsistent alternatives were the same kind of dessert (either all donuts, all ice cream, or all cakes, randomly assigned). By contrast, in the diverse alternatives condition, the alternatives were three different kinds of dessert (a donut, a cup of ice cream, and a cake).

We employed three different choice contexts. In the base conditions, participants imagined they had chosen the fruit cup while forgoing a set of either similar or diverse goal-inconsistent, high-sugar dessert options. In the sequential conditions, participants imagined they had chosen the fruit cup after repeatedly foregoing similar or diverse goal-inconsistent dessert options that had been offered sequentially. In the superordinate conditions, participants instead

imagined they had decided to have the fruit cup and not to see a dessert menu (i.e., making a single decision against dessert) but later found out which dessert options they could have chosen.

After an attention check question confirming the choice in the scenario, participants read the rest of the scenario, in which they were now at a restaurant for dinner and were to choose their side dish. Participants indicated which option they would choose, between a high-calorie default (i.e., “assorted fritters”) and a lower-calorie option. After the choice, participants rated the attractiveness of foregone alternatives on a 7-point scale (1 = *Not at all*, 7 = *Very much*) and reported their gender and age.

4B method

In study 4B, we recruited 1000 participants from Prolific in the United States (491 male, $M_{\text{age}} = 36.94$; pre-registered). Applying the same exclusion criteria as in Study 4A, we excluded 74 records, leaving 926 surveys for analysis. Study 4B used the same stimuli and procedure as Study 4A, except that we measured perceived sacrifice and ease of future goal pursuit (instead of having participants make choices, as in Study 4A).

After answering an attention check question about their prior goal-consistent choice in the scenario, participants indicated perceived sacrifice, using the same questions as in Study 3. Participants also indicated how easy they thought it would be to keep following their healthy eating goal on a 7-point scale (1 = *Not easy at all*, 7 = *Very easy*). They also reported dietary restrictions, if any, that affected their answers, gender and age.

Study 4A results

A logistic regression analysis comparing the effect of foregone alternatives on subsequent choice in the base vs. pooled treatment conditions found a significant interaction of (similar vs. diverse) \times (base vs. treatment) ($b = -.68$, $z = -2.08$, $p = .04$; Figure 4). Specifically, we replicated

the foregone diversity effect in the base conditions: participants who imagined having foregone diverse (vs. similar) alternatives were more likely to choose a goal-consistent option (82% vs. 68%, $\chi^2 = 7.54$, $p = .01$, $\phi = 0.16$). However, the effect was eliminated in both the sequential choice condition (82% vs. 82%, $\chi^2 = .003$, $p = .95$) and in the superordinate condition (72% vs. 71%, $\chi^2 = .07$, $p = .79$).

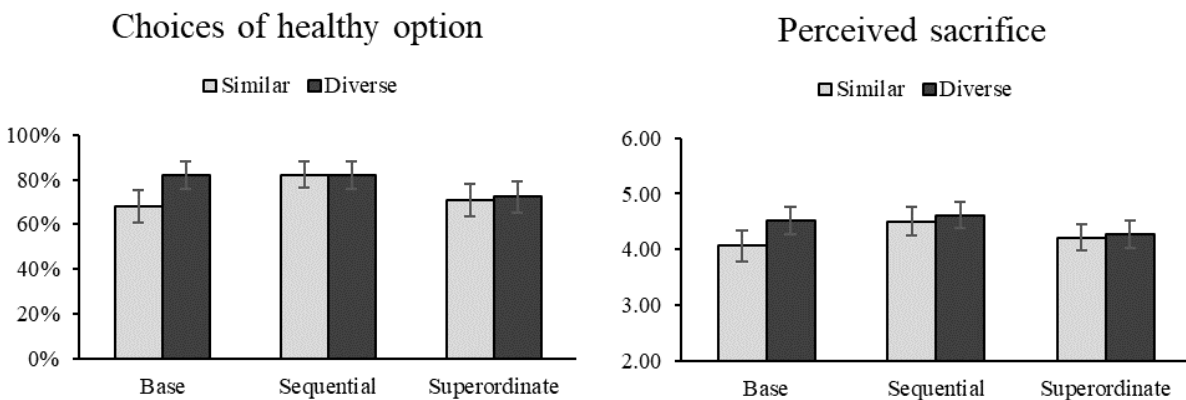
The elimination of the effect in both the sequential and superordinate conditions is consistent with the sequential account, but not the superordinate account, which predicts that the effect would only be eliminated in the superordinate (but not the sequential) conditions. Furthermore, in line with the sequential-choice account, when foregoing similar alternatives, participants in the sequential condition showed greater goal persistence than in the base condition (82% vs. 68%, $\chi^2 = 8.00$, $p = .005$, $\phi = 0.16$). By contrast, goal persistence in the superordinate and base condition did not differ when foregoing similar alternatives (71% vs. 68%, $\chi^2 = .20$, $p = .66$). Consistent with the sequential-choice account, the superordinate manipulation reduced goal-consistent choices in the diverse alternatives case, relative to the base condition (72% vs. 82%, $\chi^2 = 4.00$, $p = .045$, $\phi = 0.11$), presumably by making the diverse choice seem like one choice instead of multiple choices.

Study 4B results

Perceived sacrifice. A 2 (foregone-alternative diversity: similar vs. diverse) \times 3 (account: base vs. sequential vs. superordinate) ANOVA on the composite score of perceived sacrifice ($\alpha = .86$) revealed a non-significant overall interaction ($F(1, 920) = 1.43$, $p = .24$). Planned contrasts revealed a replication of our prior findings only in the base condition: participants indicated greater perceived sacrifice when foregoing diverse (vs. similar) alternatives ($M_{\text{base div}} = 4.52$, $SD_{\text{base div}} = 1.60$, $M_{\text{base sim}} = 4.06$, $SD_{\text{base sim}} = 1.73$, $t(920) = 2.54$, $p = .01$, $d = .28$). Consistent

with the sequential-choice account, and contrary to the superordinate-choice account, perceived sacrifice did not significantly differ in either the sequential-choice ($M_{\text{seq div}} = 4.61$, $SD_{\text{seq div}} = 1.48$ vs. $M_{\text{seq sim}} = 4.51$, $SD_{\text{seq sim}} = 1.60$; $t(920) = .60$, $p = .55$) or superordinate-choice conditions ($M_{\text{sup div}} = 4.28$, $SD_{\text{sup div}} = 1.53$ vs. $M_{\text{sup sim}} = 4.21$, $SD_{\text{sup sim}} = 1.50$, $t(920) = .37$, $p = .72$).

FIGURE 4: SUBSEQUENT CHOICE (STUDY 4A) & PERCEIVED SACRIFICE (STUDY 4B)



Given that the overall ANOVA interaction was not significant, the conclusions thus far rely on the null effects in the sequential-choice and superordinate-choice conditions. To further evaluate the sequential account, we conduct tests of specific predicted comparisons from the two accounts. Consistent with the sequential-choice account, the sequential-choice manipulation increased the perceived sacrifice in the similar alternatives case, compared to the base condition ($M_{\text{seq sim}} = 4.51$, $SD_{\text{seq sim}} = 1.60$ vs. $M_{\text{base sim}} = 4.06$, $SD_{\text{base sim}} = 1.73$; $t(920) = 2.43$, $p = .02$, $d = .27$). Conversely, contrary to the superordinate-choice account, the superordinate-choice manipulation did not significantly increase the perceived sacrifice in the similar alternatives case, compared to the base condition ($M_{\text{sup sim}} = 4.21$, $SD_{\text{sup sim}} = 1.50$ vs. $M_{\text{base sim}} = 4.06$, $SD_{\text{base sim}} = 1.73$; $t(920) = -.82$, $p = .41$). Instead, consistent with the sequential-choice account, perceived sacrifice was higher in the pooled sequential conditions than in the pooled superordinate

conditions ($M_{\text{seq pooled}} = 4.56$, $SD_{\text{seq pooled}} = 1.53$ vs. $M_{\text{sup pooled}} = 4.24$, $SD_{\text{sup pooled}} = 1.52$, $t(923) = 2.51$, $p = .01$). These results provide additional empirical support for the sequential account.

Perceived ease of future goal pursuit. The same 2×3 ANOVA on the perceived ease revealed a significant main effect of foregone-alternative diversity ($F(1, 920) = 8.43$, $p = .004$, $\eta_p^2 = .01$). Participants indicated that future goal pursuit would be less easy in the diverse ($M = 3.70$, $SD = 1.45$) than in the similar ($M = 3.97$, $SD = 1.42$) conditions. In particular, diverse foregone alternatives significantly reduced perceived ease in the base condition ($M_{\text{div}} = 3.68$, $SD_{\text{div}} = 1.40$, $M_{\text{sim}} = 4.22$, $SD_{\text{sim}} = 1.42$, $t(920) = -3.30$, $p < .001$, $d = -.38$) although the directional differences were not significant in the sequential ($M_{\text{div}} = 3.75$, $SD_{\text{div}} = 1.43$, $M_{\text{sim}} = 3.86$, $SD_{\text{sim}} = 1.31$, $t(920) = -.66$, $p = .51$) and superordinate conditions ($M_{\text{div}} = 3.67$, $SD_{\text{div}} = 1.52$, $M_{\text{sim}} = 3.84$, $SD_{\text{sim}} = 1.49$, $t(920) = -1.05$, $p = .30$). This finding is the opposite of what would have been predicted by an alternative account, in which foregoing diverse alternatives leads to goal persistence because it *increases* perceived ease of future goal pursuit.

Studies 4A–B discussion

These studies specifically focused on the underlying psychological process of foregoing diverse goal-inconsistent alternatives. Two studies provide converging evidence that is consistent with the predictions of the sequential-choice account, and inconsistent with the superordinate-choice account. These results support the conclusion that foregoing diverse (vs. similar) alternatives is perceived as having passed up multiple opportunities, increasing both perceived sacrifice and subsequent goal-consistent choice. Accordingly, we identify an important theoretically derived boundary condition: when the context conveys the distinct number of choices involved in foregoing the alternatives (either multiple sequential choices or one

superordinate choice), consumers' sensitivity to the diversity of the foregone alternatives is eliminated.

STUDY 5: AN OBJECTIVE PROGRESS MARKER ATTENUATES THE FOREGONE DIVERSITY EFFECT

Study 5 tests an important boundary condition of the foregone diversity effect, predicted by our account. The studies thus far involved open-ended goals, and participants were not provided with either a specific target for goal completion or objective markers to track their degree of progress towards the goal. Our theorization suggests that in the absence of clear objective cues showing how much actual progress towards the goal has been made, people would be more likely to use their subjective feeling of how much sacrifice they had incurred as an alternative cue to assess the impact of the initial goal-consistent action. However, we predict that when the progress made by the goal-consistent action is easy to evaluate, people would no longer use perceived sacrifice as a cue, breaking the linkage between perceived sacrifice and subjective impact, and thereby attenuating the effect of foregone-alternative diversity on subsequent motivation.

Method

Study 5 employed exercise as a focal goal. This study employed a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (objective marker: absent vs. present) between-subjects design. We collected 663 valid complete surveys from Prolific participants in the United States and United Kingdom (253 male, $M_{\text{age}} = 39.97$; pre-registered).

To confirm the endorsement of an exercise goal among participants, we asked them to indicate the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “I am highly conscious of physical fitness,” (2) “I try to exercise regularly to keep my body fit and healthy,” (3) “Exercising is one of my important personal goals.”

Next, participants imagined that they had recently set and had been following an exercise goal to work out regularly. In the scenario, they had found unexpected free time today and had decided to go to the gym. Participants then wrote down either three similar or three diverse activities they could have enjoyed doing instead of exercising, depending on the condition. Participants wrote about why the three ways of spending their time were either similar to or different from each other.

Participants then rated the same perceived sacrifice and subjective impact measures used in Study 3. However, before answering the subjective impact measure, participants in the objective-marker-present conditions received additional information that when they visited the gym today they found out that they had achieved the body composition subgoal set for this month. No information about objective progress was provided in the objective-marker-absent condition.

Next, participants were told that they had received a message from the gym about an upcoming promotion week for personal training sessions. They could get training sessions at a discounted price if they book in advance, but there would be a penalty in the case of no-show. All participants were presented with a picture of calendar that marked “Today” on the last Monday of the current month and “Promotion Week” on the first week of the next month. An

image stating “mission accomplished” was overlaid on the current month calendar in the objective-marker-present condition, to visually signify that they had achieved a monthly subgoal. As the main dependent variable of subsequent goal-related decision, participants indicated their likelihood of booking the training sessions (1 = *Not at all*, 7 = *Very much*). As an exploratory variable, they also indicated how many sessions they would like to book (0 = *None*, 8 = *More than 7*). After making their decisions, participants rated the attractiveness of the foregone alternatives they had generated earlier on a 7-point scale (1 = *Not at all*, 7 = *Very much*) and reported their gender and age.

Results

Perceived sacrifice. Because we manipulated the presence of an objective marker after participants had already reported perceived sacrifice, we collapsed across objective marker conditions and conducted a t-test on the composite score of perceived sacrifice ($\alpha = .84$). Consistent with our findings in previous studies, participants in the diverse (vs. similar) foregone alternative conditions indicated greater perceived sacrifice from the initial goal-consistent choice to exercise ($M_{\text{diverse}} = 4.62$, $SD_{\text{diverse}} = 1.30$, $M_{\text{similar}} = 4.33$, $SD_{\text{similar}} = 1.36$, $t(659) = 2.82$, $p = .01$, $\eta_p^2 = .01$).

Subjective impact. A 2×2 ANOVA on subjective impact ($\alpha = .93$) revealed significant main effects of objective marker ($M_{\text{absent}} = 5.09$, $SD_{\text{absent}} = 1.22$, $M_{\text{present}} = 5.89$, $SD_{\text{present}} = 1.10$; $F(1, 659) = 80.33$, $p < .001$, $\eta_p^2 = .13$) and foregone-alternative diversity ($M_{\text{diverse}} = 5.61$, $SD_{\text{diverse}} = 1.16$, $M_{\text{similar}} = 5.36$, $SD_{\text{similar}} = 1.28$; $F(1, 659) = 7.83$, $p = .01$, $\eta_p^2 = .01$), but the interaction was not significant. However, as predicted, participants indicated greater subjective impact on their fitness goal when considering diverse (vs. similar) foregone alternatives when an objective marker was absent ($M_{\text{diverse}} = 5.27$, $SD_{\text{diverse}} = 1.10$, $M_{\text{similar}} = 4.90$, $SD_{\text{similar}} = 1.30$; $t(659) = 2.92$,

$p = .004, d = .31$) but not when an objective marker was present ($M_{\text{diverse}} = 5.97, SD_{\text{diverse}} = 1.10, M_{\text{similar}} = 5.81, SD_{\text{similar}} = 1.09; t(659) = 1.29, p = .20$).

Subsequent decision. The same ANOVA on intentions to get training sessions revealed a significant interaction ($F(1, 659) = 7.73, p = .006, \eta_p^2 = .01; F(1, 658) = 7.91, p = .005, \eta_p^2 = .01$ after controlling for foregone-alternative attractiveness) and a significant main effect of foregone-alternative diversity ($M_{\text{diverse}} = 4.15, SD_{\text{diverse}} = 1.93, M_{\text{similar}} = 3.72, SD_{\text{similar}} = 1.84; F(1, 659) = 8.49, p = .004, \eta_p^2 = .01; F(1, 658) = 8.49, p = .004, \eta_p^2 = .01$ after controlling for foregone-alternative attractiveness). Replicating our previous findings, in the absence of an objective marker, participants who considered diverse (vs. similar) goal-inconsistent alternatives reported a higher likelihood to get personal training sessions ($M_{\text{diverse}} = 4.27, SD_{\text{diverse}} = 1.89, M_{\text{similar}} = 3.43, SD_{\text{similar}} = 1.76; t(659) = 4.04, p < .001, d = .46$). No such effect of considering diverse goal-inconsistent alternatives was found when the objective marker to assess goal progress was provided ($M_{\text{diverse}} = 4.02, SD_{\text{diverse}} = 1.97, M_{\text{similar}} = 3.99, SD_{\text{similar}} = 1.89; t(659) = .12, p = .91$). The same pattern of results held on the alternative outcome measure, the number of personal training sessions participants chose to book (see Online Appendix G).

Serial mediation analyses. Finally, we conducted a moderated serial mediation analysis (PROCESS, Model 91). The model included foregone-alternative diversity as the independent variable (0 = similar, 1 = diverse alternatives), perceived sacrifice (mediator 1), subjective impact (mediator 2), objective marker (0 = absent, 1 = present) as the moderator between the two mediators, and subsequent fitness-related decision as the dependent variable. The analysis revealed a significant moderated mediation ($b = -.01, se = .01, CI = [-.0369, -.0003]$). The indirect effect was significant only when an objective marker was absent ($b = .02, se = .01, CI =$

[.0027, .0370]), but not when an objective marker was present ($b = .002$, $se = .004$, $CI = [-.0062, .0111]$).

Discussion

Study 5 provides converging evidence supporting the proposed framework. Study 5 again confirms the mediating role of perceived sacrifice and subjective impact in the effects of foregone option diversity enhancing subsequent motivation for goal pursuit. In addition, the current study tested a theory-based moderator, the presence of an objective marker (subgoal completion) to indicate goal progress. Our framework suggests that when there is no salient objective marker to monitor goal pursuit, people would instead rely on their subjective perceptions of how much they had sacrificed to make a goal-consistent action. Results of the current study demonstrated that diversity of foregone alternatives increases perceived sacrifice, but the greater sacrifice only leads to greater subjective impact, resulting in greater motivation for subsequent goal pursuit, in the absence of an objective progress marker. When provided with an objective marker to evaluate goal progress, participants' feeling of sacrifice due to the diversity of foregone alternatives no longer significantly impacted either their evaluation of how much impact they had made on the focal goal or their subsequent goal-related decisions.

GENERAL DISCUSSION

The present research suggests that even when people make the same goal-consistent choice, how they perceive the foregone goal-inconsistent options can influence their subsequent goal-related decisions. We demonstrated this foregone diversity effect in multiple different goal contexts, including exercise, healthy eating, and savings. Across five studies (and eight

supplemental studies reported in the Online Appendix I), we found that when consumers considered diverse (vs. similar) goal-inconsistent alternatives that they could have chosen instead of the goal-consistent choice they made, they believed that they had sacrificed more to be consistent with their goal and had made greater impact towards the goal. They were then more likely to stick to the goal in a subsequent real, consequential or hypothetical choice.

Our framework suggests that diversity among the foregone alternatives increases subjective impact of the prior goal-consistent choice in goal pursuit, because foregoing diverse (vs. similar) alternatives is perceived as involving greater sacrifice. Supporting our framework, we demonstrate that the foregone diversity effect is mitigated when perceptions of sacrifice is lessened by considering goal-consistent alternatives (Study 3), when the quantity of choices is made explicit, eliminating the effect on perceived sacrifice (Study 4) and when an objective marker makes perceptions of sacrifice irrelevant for assessing subjective impact (Study 5). Mediation models further provide process evidence that foregone-alternative diversity increases perceived sacrifice, which leads to greater subjective impact, which then boosts subsequent motivation to persist in goal pursuit.

Theoretical contributions

The current research makes multiple contributions to the literature on goals and motivation. First, this research contributes to the literature on the role of perceived impact in goal pursuit. A large body of research has demonstrated that motivation increases with a greater sense of impact and has suggested various cues that influence the perceived impact, including visual cues representing proximity to goal's end, reference points to monitor goal progress, and even spatial distance to a donation recipient in a prosocial goal context (Cheema & Bagchi, 2011; Kivetz et al 2006; Koo & Fishbach, 2012; Nunes & Dreze 2006; Touré-Tillery & Fishbach,

2018). Building on this research, we suggest the diversity of foregone alternatives as a novel factor that individuals may use to assess how much impact their goal-consistent action has made on overall goal pursuit process.

Second, this research advances our understanding of how choice sets impact goal-directed decisions. Considering that goal attainment requires repeated goal-consistent choices across time periods, not just a single success at a static snapshot in time, it is important to understand how one's past choices and the context of those past choices, such as foregone alternatives, influences people's subsequent motivation. Whereas previous research has primarily focused on how the composition of *current* choice alternatives affects evaluations of and preferences between those alternatives, we investigate the effect of choice sets in sequential choices, demonstrating that the type of foregone alternatives from a *prior* decision influences subsequent goal pursuit behavior.

In doing so, we also advance prior research on the effect of recall on goal persistence. Previous research has explored how the content of consumers' recollections of past goal-related decisions (e.g., self-control success or failure; Mukhopadhyay et al., 2008; ease or difficulty of retrieval; Nikolova et al., 2016) shape their subsequent decisions. For example, when people recall past self-control successes more easily, they are more likely to keep following the goal, subsequently showing consistency. Beyond the characteristics of what has been chosen, the current paper demonstrates that the diversity among the foregone alternatives, the characteristics of what has been not chosen, is an important contextual factor that influences consumers' perceptions of their prior choice, further affecting their motivation.

Moreover, the current findings shed new light on the role of memory in goal pursuit, how a past behavior is retrospectively constructed after the actual event. Whereas prior research

investigated the effect of the actual composition of alternatives in a choice set, the present research suggests that the *mental representation* of foregone alternatives can impact how consumers evaluate their past choice and change their future goal-related decisions. Specifically, in most of our studies, participants simply recalled alternatives they could have chosen, constructing the choice set retrospectively. This suggests that merely considering diverse goal-inconsistent alternatives afterwards, rather than actually foregoing more diverse options at the time of choice, can influence subsequent goal persistence. This finding is particularly meaningful from a practical perspective. Companies or organizations cannot directly influence which alternatives consumers actually consider and forego at the time of choice-making. However, they can encourage consumers to reconstruct their counterfactual alternatives afterwards, by direct messaging or framing, which our findings suggest will result in a positive boost in their motivation.

Supplemental studies (Studies A3, A6–7) further suggest one simple way to harness the forgone diversity effect by increasing perceived diversity among alternatives via categorization. According to Mogilner et al. (2008), splitting options into more categories signals greater variety among the available alternatives. In those supplemental studies, we used a fixed set of foregone alternatives and instead manipulated the perceived diversity using categorization (e.g., alternatives grouped into a single category vs. split into multiple categories). Multiple categorization increased participants' perceptions of the diversity of the same set of alternatives and, more importantly, enhanced their motivation for further goal pursuit. Marketers may be able to leverage this strategy to help consumers get over the “stuck in the middle” effect (e.g., Bonezzi et al., 2011), especially when the objective impact on goal progress of past choices is unclear.

Future Directions and Practical Implications

Our findings offer interesting possibilities for future research. First, the current studies have focused on the role of alternatives specifically when individuals have made a goal-*consistent* choice. It would be interesting to investigate the effect of foregone-alternative diversity when participants have made a goal-*inconsistent* choice, failing to follow their goal. After succumbing to a temptation, would the diversity among the foregone goal-consistent options impact the perceived severity of the goal-pursuit failure and influence subsequent decisions? Extending our theorizing in the current work, we would tentatively predict that when people choose a goal-inconsistent option over diverse goal-consistent alternatives, they would evaluate their previous failure as more of a setback to goal attainment.

Second, our framework raises the question of whether individuals might strategically employ diversity evaluation as a self-control device. Consumers often show motivated reasoning, selectively interpreting ambiguous information in ways that are consistent with their preferred future choice. Particularly in a goal-pursuit context, consumers exaggerate or downplay perceived progress depending on their goal status to increase motivation (Huang et al. 2012). In contrast, consumers also distort their memories about past indulgence to license the present indulgence such that they understate the past goal-inconsistent behavior (e.g., decreased calorie estimate of previous candy consumption; May & Irmak, 2014). Future research can examine whether consumers tend to construe foregone alternatives as more diverse or attempt to recall more diverse alternatives to exaggerate the impact of the prior goal-consistent choice and maintain their motivation to persist towards their goal.

Third, our framework makes predictions under the assumption that people distinguish between the prior and current choice, but nevertheless perceive the two choices as components of

the same goal pursuit process. This suggests that cues of the relationship between the choices, such as timing, may be relevant to the foregone diversity effect. We find preliminary evidence that when the choices are close in time, such that they may be perceived as parts of a single goal-consistent action (e.g., Studies A6–7) or when the choices are very distant in time and potentially seen as unrelated (Study A8), the foregone diversity effect is reduced. Future research could study the role of both objective time and mental categorization of goal pursuit as potential moderators.

The present research suggests that it may be beneficial to incorporate consideration of alternatives in interventions designed to enhance motivation. In Study 1, participants in the control condition, who were not explicitly asked to consider foregone alternatives to the exercise they had actually chosen to do, indicated less impact on their goal and were less likely to choose the healthy food than did those prompted to consider diverse alternatives. Therefore, a simple external cue inducing people to look back at various alternatives they have foregone thus far to stick to their goal may help people stay motivated. This could be particularly beneficial in goal-relevant industries, such as healthcare, foods, financial services, and education, that aspire to keep their consumers motivated and persisting in goals.

For example, when goal tracking apps interact with their users, sending messages emphasizing users' past success in resisting diverse temptations for goal-pursuit (e.g., "You overcame so many different temptations to get this far...") could be more helpful to encourage behavioral consistency than merely tracking their past success or failure. Alternatively, when users logging their goal-consistent choices, they can be prompted to name goal-inconsistent alternatives and then the diversity among the alternatives can be highlighted to them.

In sum, our findings suggest that considering the diverse roads not taken motivates people to stick to their path. When people consider having foregone diverse (vs. similar) goal-inconsistent alternatives, they are likely to perceive that they have made a greater sacrifice when choosing a goal-consistent option, with greater impact on overall goal pursuit, motivating subsequent goal-consistent choices.

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Online Appendix A: Pre-test of goal endorsement

A pretest (N = 142) was conducted to explore the prevalence of each goal: exercising regularly (Studies 1 and 5), eating healthy (eating more vegetables, less meat, less sugar; Studies 2, 3 and 4), and saving (supplemental studies A4 and A5). At the end of an unrelated survey, participants indicated whether they currently endorse each goal or not. The order of goals was randomized. Percentages of participants who indicated they were endorsing each goal are as below.

	Endorsement rate (# of yes/n)
Exercising regularly	87% (123/142)
Eating healthy	89% (126/142)
Saving	96% (135/142)

Online Appendix B: Pre-registrations

Study 2: https://aspredicted.org/HCN_7JG

Study 4A: https://aspredicted.org/LJ7_W6Y

Study 4B: https://osf.io/j4fx2/?view_only=39c0d81bfdfd415685e586255aac6b58

Study 5: https://aspredicted.org/TYP_N92

Online Appendix C: Pre-test of energy bars for Study 1

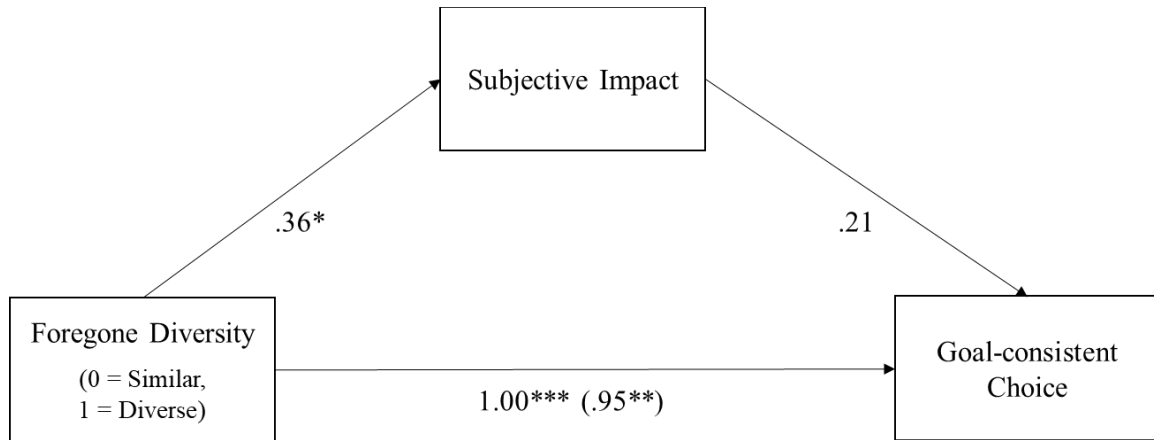
We conducted a pretest ($N = 45$) on MTurk about the two energy bars we planned to use in our studies – wholesome mix of healthiness: KIND almond, walnut & macadamia” vs. “sweet and salty indulgence: KIND dark chocolate & peanut butter. We wanted to confirm that people evaluate the two energy bars differently, in terms of perceived healthiness, indulgence, and congruence with a health goal.

We presented pictures, side-by-side, of the two energy bars and the same descriptions that would be used in main studies. Participants evaluated how well each adjective (tasty, healthy, enjoyable, and indulgent) described the energy bars, using a 10-point scale (1 = *Not at all*, 10 = *Extremely*). They also estimated the retail price on a sliding bar from \$0 to \$10. In addition, participants imagined that they were considering eating one of the energy bars after exercising and indicated 1) how guilty they would feel, 2) how much it would ruin their goal of being fit, 3) how much it would be inconsistent with their goal of being fit if they ate each of the bars, using the same 10-point scale.

Results confirmed that people perceived the almond, walnut & macadamia energy bar as healthier (6.77 vs. 5.02, $p < .01$), less indulgent (5.82 vs. 7.39, $p < .01$), and less tasty (7.09 vs. 7.77, $p = .06$) than the dark chocolate & peanut butter energy bar. There was no significant difference in enjoyment (7.05 vs. 7.50, $p = .28$) or estimated retail price (\$2.48 vs. \$2.53, $p = .75$). Also, people indicated that eating the dark chocolate & peanut butter energy bar would make them feel guiltier (4.75 vs. 3.34), more negatively impact their health goal (4.70 vs. 3.41), and would be more inconsistent with the health goal (5.80 vs. 4.20, all p 's $< .01$).

Online Appendix D: Mediation models

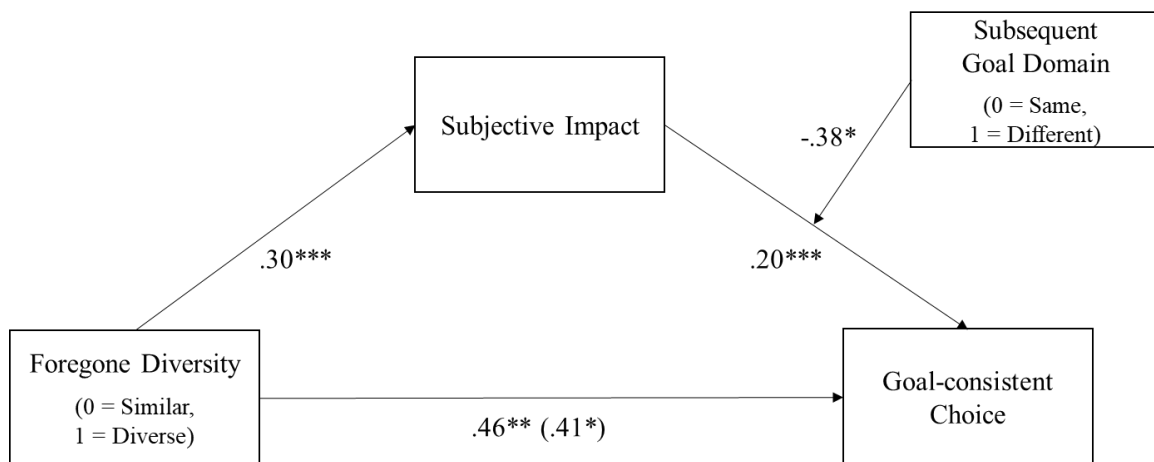
[Study 1]



Notes: Values indicate unstandardized regression coefficients. Value in parentheses indicates results when the proposed mediator is included in the model.

* $p < .05$, ** $p < .01$, *** $p < .005$

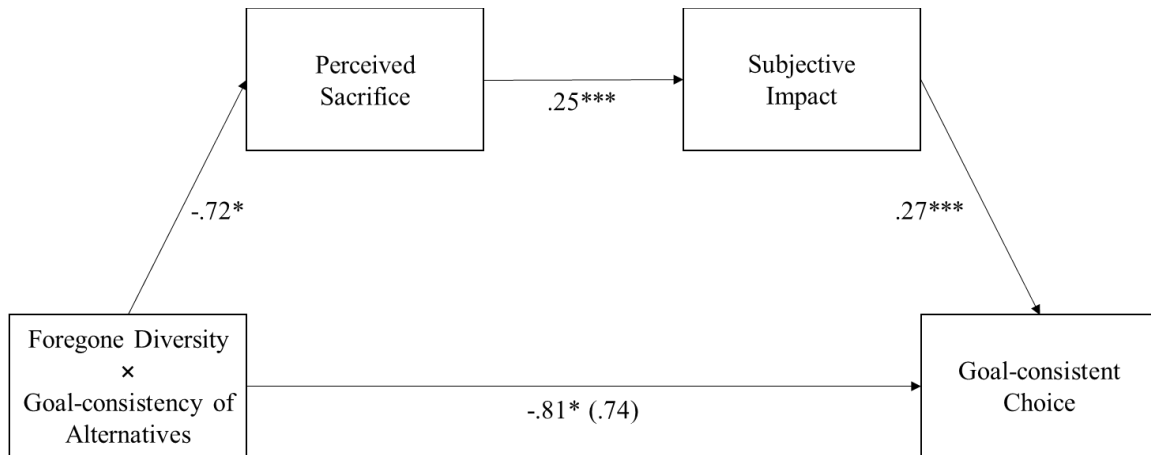
[Study 2]



Notes: Values indicate unstandardized regression coefficients. Value in parentheses indicates results when the proposed mediator is included in the model.

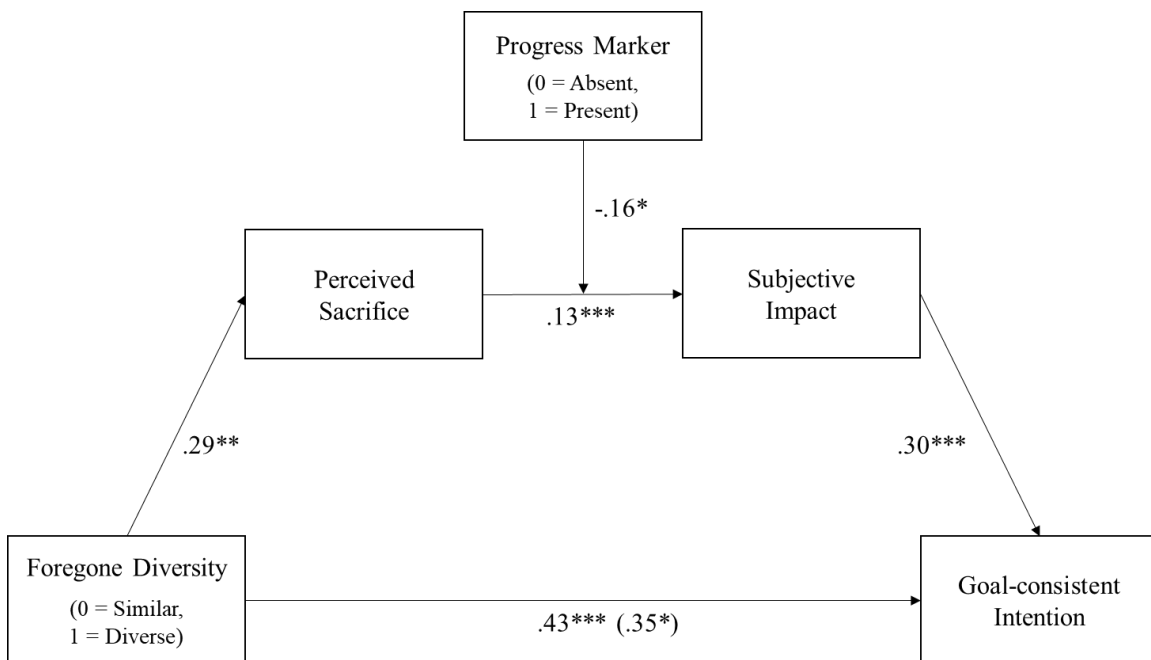
* $p < .05$, ** $p < .01$, *** $p < .005$

[Study 3]



Notes: Foregone Diversity (0 = similar, 1 = diverse), Goal-consistency of Alternatives (0 = inconsistent, 1 = consistent); Values indicate unstandardized regression coefficients. Value in parentheses indicates results when the proposed mediators are included in the model.

[Study 5]



Notes: Values indicate unstandardized regression coefficients. Value in parentheses indicates results when the proposed mediators are included in the model.

* $p < .05$, ** $p < .01$, *** $p < .005$

Online Appendix E: Goal endorsement results in Studies 4 and 5

	Goal endorsement	t-value (one-tailed)
<i>Study 4A</i>		
Healthy eating	4.91 (1.25)	24.66***
<i>Study 4B</i>		
Healthy eating	4.87 (1.74)	20.25***
<i>Study 5</i>		
Exercise	4.47 (2.14)	8.35***

Notes: Values in parentheses indicate standard deviation; *** denotes p -value < .001.

Online Appendix F: Study 4 predictions by suggested account

	Perception		Perceived sacrifice		Goal consistent choices	
	Similar	Diverse	Similar	Diverse	Similar	Diverse
<i>Sequential account predictions</i>						
Base	One choice	Multiple	Low	High	Low	High
Sequential	Multiple	Multiple	High	High	High	High
Superordinate	One choice	One choice	Low	Low	Low	Low
<i>Superordinate account predictions</i>						
Base	Small category	Big category	Low	High	Low	High
Sequential	Small category	Big category	Low	High	Low	High
Superordinate	Big category	Big category	High	High	High	High

Online Appendix G: Study 5 additional results
(number of personal training sessions to book)

		Foregone alternatives	
		Similar	Diverse
Progress	Absent	2.44 (1.70) ^a	3.02 (2.03) ^{b, c}
Marker	Present	2.66 (1.49) ^a	2.70 (1.57) ^{a, c}

Notes: Values in parentheses indicate standard deviation. Values with different superscripts indicate a significant difference at $p < .05$.

Online Appendix H: Meta mediation analysis

Logistic regression results on Goal-consistent Choice

	b	SE	<i>t</i>	<i>p</i>	
Constant	-1.79	.28	-6.34	< .001	***
Alternative diversity (1 = Diverse)	.71	.12	6.07	< .001	***
Subjective impact	.32	.05	6.75	< .001	***
Dummy 1 = Study 2	.68	.22	3.15	.002	**
Dummy 2 = Study 3	.27	.22	1.23	.22	
Dummy 3 = Study 5	-.04	.21	-.19	.85	
Dummy 4 = Study A6	-1.02	.25	-4.07	<.001	***
Dummy 5 = Study A7	-.41	.24	-1.73	.08	
Dummy 6 = Study A8	.67	.30	2.24	.03	*

Mediation of Subjective Impact on Goal-consistent Choice

	n	Effect	Boot SE	LLCI	ULCI
Study 1	143	.0493	.0723	-.0807	.2138
Study 2	298	.1408	.0731	.0196	.3073
Study 3	257	.0951	.0586	.0052	.2301
Study 5 (7-point scale)	330	.1329	.0612	.0334	.2677
Study 5 (when recoded as binary)	277	.1682	.0845	.0368	.3626
Study A6	156	.2035	.1269	.0017	.4935
Study A7	166	.1220	.0888	.0011	.3376
Study A8	85	.2779	.1999	-.0099	.7590
Combined	1382	.1398	.0313	.0855	.2085

Notes: Unlike the other studies, subsequent choice in Study 5 was measured using a 7-point scale, instead of a binary choice. To conduct the meta-mediation analysis, the values in Study 5 was recoded as 0 if below 4, 1 if above 4, and dropped if 4 (N=53). Caution should be used in interpreting the Combined result, due to the potential for heterogeneity across studies in the mediation effects.

Online Appendix I: Supplemental studies

Study	Study characteristics	Main findings
Study A1	Goal: diet (losing weight) IV: similar vs. diverse alternatives (provided) Moderator: goal endorsement (measured) DV: subjective impact	Greater subjective impact in the diverse condition among who actively pursuing a weight-loss goal
Study A2	Goal: donation IV: similar vs. diverse alternatives (self-generated) Moderator: goal endorsement (manipulated) DV: subjective impact	Greater subjective impact in the diverse condition among who were manipulated to think a donation goal important
Study A3	Goal: fitness IV: single vs. multiple categorization (manipulated perceived diversity) DV: subsequent food choice	More likely to choose a healthier food option in the multiple (vs. single) categorization conditions
Study A4	Goal: savings IV: similar vs. diverse alternatives (self-generated) DV: subjective impact	Greater subjective impact on a savings goal in the diverse (vs. similar) condition
Study A5	Goal: savings IV: similar vs. diverse alternatives (self-generated) DV: subsequent goal-persistence	Less willing to spend money when considered foregoing diverse (vs. similar) ways of spending money
Study A6	Goal: exercise IV: single vs. multiple categorization (manipulated perceived diversity) Moderator: subsequent choice as same vs. separate step DV: perceived sacrifice, subjective impact, subsequent workout choice	1) Greater perceived sacrifice and greater subjective impact when the foregone alternatives were grouped into multiple categories (vs. single category)
Study A7	Goal: exercise IV: single vs. multiple categorization (manipulated perceived diversity) Moderator: subsequent choice as same vs. separate step DV: subjective impact, subsequent workout choice	2) No effect of foregone-alternative diversity on subsequent choice when it is considered as a part of the same goal pursuit step
Study A8	Goal: healthy eating IV: similar vs. diverse alternatives (self-generated) Moderator: temporal distance of subsequent choice DV: subjective impact, subsequent food choice	Greater subjective impact in the diverse (vs. similar) condition; No effect of foregone-alternative diversity on subsequent choice when the subsequent choice is too far

Study A1 – Moderation of the foregone diversity effect by weight loss goal endorsement

According to classic goal theories, individuals are motivated to invest effort in pursuing a goal when they find the goal important (Brehm and Self 1989; Mitchell 1982; Vroom 1964). More recent research has further suggested that goal endorsement not only drives cognitive effort but also influences how people cognitively process goal-related information (Kruglanski et al. 2012; Ülkümen and Thomas 2013). For example, Ülkümen and Thomas (2013) suggests that when a goal is personally relevant, consumers tend to focus on and simulate goal-pursuit processes (e.g., the process of avoiding unhealthy foods) more than the outcome (e.g., the end benefits of achieving ideal body mass index).

These findings suggest that goal endorsement may be a necessary pre-condition for the foregone diversity effect. Specifically, people who endorse a focal goal and perceive it as personally more relevant may be more likely to focus on the process of a choice, which includes foregoing goal-inconsistent alternatives. Thus, considering a diverse set of foregone goal-inconsistent alternatives would enhance the subjective impact of a prior goal-consistent choice primarily among consumers who actively endorse the focal goal. In the current study, we employed a goal likely to vary in importance across people, weight-loss. A pretest revealed that a weight-loss goal, unlike the savings or health goal we employed in previous studies, is not universally held (only 62% endorsed weight-loss as an active personal goal).

Method

We collected 468 completed surveys from MTurk participants in the United States (248 male, $M_{\text{age}} = 39.03$). This study manipulated foregone-alternative diversity (similar or diverse) between-subjects, using a snacking scenario in which participants were randomly assigned to different foregone alternatives. We measured perceived diversity of option sets and subjective

impact, order counterbalanced. Given no significant differences based on order, the data was collapsed over the two orders. Participants rated weight-loss goal importance last.

Participants in all conditions were presented with eight sets of three different snacks. Participants rated how similar or diverse the snack items shown in a set were, using a 7-point scale (1 = *Absolutely different*, 7 = *Absolutely similar*).

Participants were then asked to imagine that they were currently on a diet and presented with a set consisting of one goal-consistent option and three goal-inconsistent alternatives. In the scenario, they had chosen the goal-consistent option, baked apple chips, instead of one of the three other (high-calorie) foregone alternatives. In the similar alternatives condition, all three foregone alternatives were the same kind of snack (either all donuts, all cupcakes or all chips, randomly assigned) but with different flavors (e.g., glazed, chocolate iced custard and powdered raspberry donuts). By contrast, in the diverse alternatives condition, the choice set consisted of three different kinds of snacks (a donut, a cupcake and a bag of chips). Each item appeared in exactly one similar-alternatives set and one diverse-alternatives set, so as to equalize the items, on average, across the conditions. As a manipulation check, participants rated how similar the three foregone alternatives were to one another on the same 7-point scale they used in the initial diversity evaluation phase.

Participants evaluated subjective impact by rating how much of (1) an achievement, (2) contribution, or (3) progress they thought their choice made towards their weight-loss goal (1 = *None*, 7 = *A lot*). We collected additional attitudinal variables, including how satisfied participants would feel with the decision, how good they would feel about themselves, and how much difficulty they would feel when making the decision, on a 7-point scale (1 = *Not at all*, 7 = *Very much*).

Next, after an unrelated filler task, participants rated the attractiveness of the nine snack items used in the study. As the measure of goal endorsement, participants completed a slightly modified Concern for Dieting subscale of the Restraint Scale (RS; Herman & Polivy, 1975). Sample items included “Would a weight fluctuation of 5lbs affect the way you live your life?” (1 = *Not at all*, 4 = *Very much*) and “How conscious are you of what you are eating?” (1 = *Not at all*, 4 = *Extremely*). In addition to five items of the Concern for Dieting subscale, participants also rated how likely they were to consciously eat low calorie foods using a 4-point scale (1 = *Very unlikely*, 4 = *Very likely*). We averaged the measures to create a composite score reflecting the personal endorsement of weight-loss goals. Finally, participants indicated their height and weight, to enable us to calculate BMI, as well as gender and age.

Results

Manipulation check. Participants perceived the foregone alternative sets comprised of the different kinds of snacks (i.e., in the diverse condition) as being more diverse than the sets comprised of different flavors of the same kind of snack (in the similar condition) ($M_{\text{similar}} = 3.35$, $M_{\text{dissimilar}} = 5.28$, $b = -1.92$, $t(466) = -12.06$ $p < .001$).

Moderating effect of goal endorsement. We conducted a regression analysis on the subjective goal-impact with three independent variables – foregone-alternative diversity (manipulated), goal importance (measured), and the interaction of the two, to test for moderation by goal endorsement. Results revealed a significant interaction between foregone-alternative diversity and goal endorsement ($b = .55$, $t(464) = 2.07$, $p = .039$). The interactive effect remained significant after controlling for participants’ BMI, question order, and four additional covariates (choice satisfaction, feeling good about oneself, decision difficulty, and averaged attractiveness of alternatives; $b = .55$, $t(458) = 3.07$, $p = .002$).

We conducted a floodlight analysis to identify the range of goal endorsement values for which the foregone-alternative diversity manipulation significantly increases the subjective goal-impact (Johnson and Neyman 1936; Spiller et al. 2013). The Johnson–Neyman point at $p < .05$ for the goal endorsement moderator was 2.06 (on the 4-point scale). For the 58% of participants whose weight-loss goal importance score was 2.06 out of 4 or higher, choosing a healthy option over a set of diverse unhealthy alternatives (rather than over a set of similar unhealthy alternatives) was perceived as having made a significantly greater impact on the focal goal. Conversely, among those who were not actively pursuing a weight-loss goal (below 2.06 on the weight-loss goal importance scale), the similarity or dissimilarity of the foregone alternatives did not significantly affect the perceived impact of the goal-consistent choice.

Study A2 – Moderation of the foregone diversity effect by donation goal endorsement

Method

We collected 382 valid completed surveys from US Mturk participants (47% male, $M_{\text{age}} = 37.99$). The experiment employed a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (goal endorsement: high vs. low) between-subjects design.

First, we manipulated the personal importance of a donation goal by having participants read an article either stressing the importance of donations from all individual donors (high endorsement) or emphasizing the particular importance of wealthy donors (low endorsement). Participants in the high endorsement condition read the following passage that emphasized the impact and responsibilities of individual donors like our participants:

Charities need to raise donations to continue doing their important work. It is crucial that everyone chips in and contributes their share.

A recent report from National Center for Charitable Statistics found that only about half of Americans donate to charity. Many people think their donation is too small to make a difference. However, even small donations can have a large impact on the lives of people in need. For example, a \$2 donation can provide 7 children with micronutrient fortification they need for a year.

Charities need the support of as many small individual donors as possible. When everyone participates and gives what they can, it helps charities to spread the word about their cause. Charities operate more effectively when they have a broad base of support, not just depending on a handful of wealthy donors.

In contrast, participants in the low endorsement condition read the following passage that emphasized the responsibilities of a small number of wealthy people, who are different from most of our participants:

Charities need to raise donations to continue doing their important work. It is crucial that wealthy people chip in and contribute their share.

A recent report from National Center for Charitable Statistics found that the wealthy give a smaller share of their income to charities than other people who earn less do. The wealthiest Americans, with earnings in the top 20 percent, donate only 1.3 percent of their income to charity. In comparison, middle-class and lower-income Americans donate more, 5.2 percent of their income.

Charities need the support of as many wealthy donors as possible. When wealthy Americans give their fair share, it helps charities to reduce their operating expenses.

Charities operate more effectively when they have sufficient support from wealthy donors, not just depending on chasing after small donations from people who can't afford to give more.

To ensure that participants read and comprehended the passage, we asked participants to write a one-sentence summary of the passage they read. We excluded 7 participants who gave incorrect answers, leaving 375 complete surveys for further analysis. As a manipulation check, we measured the personal importance of the donation goal to our participants, using the sum of three ratings: (1) "Donating to charities is important to me personally"; (2) "I plan to donate more in the future than I have in the past"; (3) "I feel personally responsible to make charitable contributions" using a 10-point scale (1 = *Completely disagree*, 10 = *Completely agree*).

All participants were first asked to think about and write down how they would like to spend \$100 for themselves. Next, participants were randomly assigned to one of two conditions. In the similar alternatives condition, they were asked to briefly list two similar alternative ways to spend the same amount of money, and explained why the three ways to spend the money are similar to one another. In the diverse alternatives condition, they listed two dissimilar alternatives and explained the dissimilarity of all three ways to spend the money. Participants then were asked to imagine that they had decided to donate an unexpected \$100 windfall of income to a charity, instead of spending it on one of the previously listed alternatives. After reading the scenario, participants reported the subjective impact as our main dependent variable, and additional attitudinal variables as well as attractiveness of each option they provided in the alternative-listing phase, using the same measures in Study A1. Finally, participants indicated their gender, age, and personal annual income.

Results

Manipulation check. A 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (goal endorsement: high vs. low) ANOVA on the goal endorsement measure ($\alpha = .88$) revealed only a significant main effect of the goal endorsement manipulation ($M_{\text{high}} = 7.27$, $M_{\text{low}} = 6.70$; $F(1, 371) = 7.62$, $p < .01$; all other p 's $> .20$), indicating a successful manipulation.

Subjective impact. We predicted that considering diverse foregone alternatives would result in higher perceived impact, but only among participants who perceived the focal goal as important. To test this prediction, we conducted a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (goal endorsement: high vs. low) ANOVA on the composite measure of subjective impact ($\alpha = .91$). The results revealed a significant interaction ($F(1, 371) = 5.87$, $p = .016$) as well as a significant main effect of alternative diversity ($F(1, 371) = 6.26$, $p = .013$).

In the high goal-endorsement condition, when participants had been prompted to consider donating and helping charities as their responsibility, those who considered a set of diverse alternative ways of spending money felt they had made a greater impact by instead making the donation than did those who considered a set of similar alternatives ($M_{\text{similar high}} = 5.30$, $SD_{\text{similar high}} = 1.47$, $M_{\text{dissimilar high}} = 5.97$, $SD_{\text{dissimilar high}} = 1.12$; $t(192) = 3.55$, $p < .01$). However, in the low endorsement condition, when prompted to consider donation as someone else's responsibility, diversity of the foregone alternatives did not affect perceived impact of the choice on their goal ($M_{\text{similar low}} = 5.45$, $SD_{\text{similar low}} = 1.38$, $M_{\text{dissimilar low}} = 5.45$, $SD_{\text{dissimilar low}} = 1.28$; $t(179) = .02$, $p = .983$).

Control measures. We conducted the same 2×2 ANOVAs on control measures. Results indicated no significant interaction or main effects for choice satisfaction, good feeling about oneself, and attractiveness of alternatives (all p 's $> .10$). Participants did view the donation decision as more difficult when the donation goal was not personally important ($M_{\text{high}} = 4.28$, $M_{\text{low}} = 4.82$; $t(371) = -2.98$, $p < .01$). Importantly, the effect of alternative diversity on subjective impact remained significant controlling for the control measures. In the high goal-endorsement conditions, considering diverse (vs. similar) alternatives led to higher subjective impact ($\beta = .59$, $t(188) = 3.50$, $p < .001$) controlling for the other measures (including choice difficulty), whereas the diversity of considered alternatives did not yield a difference when the goal was not actively endorsed ($\beta = .17$, $t(175) = 1.09$, $p = .277$).

Study A3 – Manipulating perceived diversity via categorization

In the current study, to control for any potential confounding effects due to differences in the alternatives generated across the conditions, we used a fixed set of foregone alternatives and instead manipulated the perceived diversity using categorization.

We manipulated the perceived diversity of the foregone alternatives to a goal-consistent choice via categorization in two ways, via more or less meaningful categorizations. We presented all participants with the same set of goal-inconsistent alternatives, which were either grouped into (1) a single category, (2) three different categories with attribute-based, meaningful labels, or (3) three different categories with alphabet-based, meaningless labels. According to Mogilner et al. (2008), splitting options into more categories signals greater variety among the available alternatives. They also showed that attribute-based categorization is more effective than alphabet-based categorization to identify distinguishing attributes of the options. Therefore, based on these previous findings, we expect that single categorization will signal less diversity among the foregone options than multiple-categorizations, particularly a meaningful attribute-based multiple categorization.

Method

This study employed a between-subjects design with three conditions: single category vs. multiple meaningless (alphabet-based) categories vs. multiple meaningful (attribute-based) categories. We collected 434 valid complete surveys from Prolific in the United States (161 male, $M_{\text{age}} = 34.94$; pre-registered at https://aspredicted.org/W91_P1D). We recruited participants who were currently pursuing and interested in exercise/fitness as a personal goal.

In the survey, participants were first asked to imagine that they had recently set two complementary health-related goals, to exercise regularly and to eat healthy, such that they needed to make progress on both to improve their health. In the scenario, they were deciding what to do with unexpected free time before going out for dinner. They were presented with a playlist consisting of 12 different videos, including 3 workout videos and 9 entertainment videos. The three workout videos were grouped together and labeled as “Home Workouts” in all conditions, but the entertainment videos were either grouped as a single, broad category (“Entertainment”), or divided into 3 categories with either meaningful labels or meaningless labels. The meaningful labels specified descriptive attributes of the videos, such as “heartwarming & inspiring”, “ominous & dark”, and “witty & quirky”. The meaningless categorization was based on the first letter of each video, such as “Playlist: A to L”, “Playlist: M to S”, “Playlist: T to Z, Numbers”.

After viewing one of the three types of playlists, the scenario specified that they had decided to play and follow a workout video instead of watching an entertainment video. After answering attention check questions, participants read the rest of the scenario, in which they were now at their favorite restaurant after completing their workout and could choose between a high-calorie option or a lower-calorie option for their side dish. Participants indicated how likely they were to change the high-calorie default (i.e., “assorted fritters”) to a lower-calorie option (1 = *Definitely have fritters*, 7 = *Definitely change to a lower calorie option*).

Finally, to confirm endorsement of the health goals among participants, we asked them to indicate the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “I am highly conscious of physical fitness,” (2) “I try to exercise regularly to keep my body fit and healthy,” (3) “Exercising is one of my important

personal goals,” (4) “I am highly conscious of what I am eating,” (5) “I try to eat healthy as much as I can,” (6) “Eating healthy is one of my important personal goals.” As a manipulation check of the perceived diversity, participants answered the following question: “How much variety do you think there was in the playlist?” (1 = *Very little variety*, 7 = *A lot of variety*). They also rated the attractiveness of each video and reported their gender and age.

Results

Goal endorsement. Both the composite scores of exercise goal ($\alpha = .90$) and healthy eating goal ($\alpha = .88$) confirmed that participants were generally pursuing exercise and healthy diet as important and active personal goals (exercise: $M = 5.09$, $SD = 1.90$; $t(433) = 16.44$, $p < .001$; healthy eating: $M = 5.24$, $SD = 1.79$; $t(433) = 19.32$, $p < .001$ compared to 4, the midpoint of the scale). One-way ANOVAs on exercise and healthy eating goal endorsement revealed no differences across conditions (all p 's $> .50$).

Manipulation check on perceived foregone diversity. A one-way ANOVA revealed that participants perceived the variety of the same foregone alternatives differently depending on the categorization conditions ($F(2, 431) = 37.37$, $p < .001$, $\eta_p^2 = .15$), as intended. Participants perceived the alternatives presented as three categories with meaningful attribute-based labels as more diverse than the same set of alternatives presented as one category ($M_{\text{attribute}} = 5.19$, $SD_{\text{attribute}} = 1.33$, $M_{\text{single}} = 3.87$, $SD_{\text{single}} = 1.44$; $t(431) = 8.15$, $p < .001$, $d = .96$). The same set of alternatives categorized with meaningless alphabet-based labels was also perceived more diverse than the single category condition ($M_{\text{alphabet}} = 4.93$, $SD_{\text{alphabet}} = 1.35$; $t(431) = 6.57$, $p < .001$, $d = .76$). Perceived diversity did not significantly differ between the attribute-based and alphabet-based multiple categories conditions ($t(431) = 1.59$, $p = .11$).

Subsequent goal persistence. The same one way ANOVA on the subsequent food choice revealed a weakly significant difference across the categorization conditions ($F(2, 431) = 3.09, p = .046, \eta_p^2 = .01$). In our focal comparison, participants who saw the foregone entertainment videos organized into multiple categories were more likely to choose a healthier option than participants in the single category condition ($M_{\text{multiple_pooled}} = 5.35, SD_{\text{multiple_pooled}} = 1.62, M_{\text{single}} = 4.97, SD_{\text{single}} = 1.71; t(432) = 2.25, p = .02, d = .23$). This effect was also significant comparing the meaningful attribute-based multiple categories condition to the single category condition ($M_{\text{attribute}} = 5.43, SD_{\text{attribute}} = 1.70; t(431) = 2.43, p = .02, d = .28$). While the effect was only directional in the meaningless alphabet-based multiple categories condition ($M_{\text{alphabet}} = 5.28, SD_{\text{alphabet}} = 1.54; t(431) = 1.67, p = .10$), it should be noted that there was no significant difference between the two multiple categories condition, attribute-based and alphabet-based ($t(431) = .76, p = .45$).

Study A4 – Effect of foregone diversity on savings goal impact

Method

We employed saving (vs. spending) as a widely shared goal. In a pretest ($N = 142$, see Online Appendix C), 96% of people endorsed saving as an active personal goal. We collected 120 valid completed surveys from participants in the United States (64 male, $M_{\text{age}} = 41.72$) on Amazon Mechanical Turk (MTurk).

First, in order to confirm that participants actively endorsed the savings goal, we asked them to indicate the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “Saving money is very important to me”; (2) “I am highly conscious of how and where I spend my money”; (3) “I am highly active in my pursuits toward financial planning”; (4) “I try to save money, rather than spending it, as much as I can”; (5) “I try not to make impulse spending as much as I can.”

Then, participants were asked to recall their recent experience that they decided not to spend money and save it, and wrote down how they wanted to spend the money and how much money they had saved. Next, they were asked to list two other ways that they could have spent the same amount of money for themselves. Then participants were randomly assigned to one of the two conditions. In the similar alternatives condition, they were asked to think about and describe how the three ways to spend the money are similar to one another. In the diverse condition, they described how the alternatives are dissimilar from one another. As a manipulation check for the option diversity manipulation, participants indicated the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “Alternatives overlap in term of what needs they meet” (reverse-coded); (2)

“All of the alternatives are more or less the same” (reverse-coded); (3) “Each alternative satisfies different desires I want to fulfill”.

After this experimental manipulation, participants rated how much of (1) an achievement, (2) contribution, or (3) progress they think their choice to save (rather than to spend) made towards their savings goal (1 = *None*, 7 = *A lot*). These three measures were averaged into a subjective impact score. Finally, we measured the difficulty of recalling their past decision not to spend money, as well as their gender and age for demographic information.

Results

The composite score of savings goal endorsement ($\alpha = .84$) revealed that saving was an important and active goal among participants ($M = 5.88$ out of 7, $SD = .97$; $t(119) = 21.18$, $p < .001$ compared to the midpoint (4)). As we intended, participants in the diverse condition indicated that the alternatives they had generated were more diverse than did the participants in the similar condition ($M_{\text{similar}} = 4.25$, $SD_{\text{similar}} = .88$, $M_{\text{diverse}} = 5.38$, $SD_{\text{diverse}} = 1.04$; $t(118) = 6.45$, $p < .001$).

To test our main hypothesis, we computed a composite score ($\alpha = .92$) reflecting the subjective impact of a goal-consistent choice. Participants in the diverse condition reported a greater impact of their past goal-consistent choice on their goal than did participants in the similar condition ($M_{\text{similar}} = 4.37$, $SD_{\text{similar}} = 1.37$, $M_{\text{diverse}} = 4.99$, $SD_{\text{diverse}} = 1.23$; $t(118) = 2.60$, $p = .01$). The effect of foregone-alternative diversity on the subjective impact remained significant controlling for the dollar amount saved and the recall task difficulty ($b = .58$, $t(116) = 2.44$, $p = .02$).

Study A5 – Effect of foregone diversity on savings goal persistence

Method

We recruited 306 participants in the United States (128 male, $M_{\text{age}} = 39.61$) on MTurk (pre-registered at https://osf.io/sjxvy/?view_only=4688c03d0f30405eb0fd375c6617874c). We excluded 20 records with duplicate IP addresses or from participants who failed an attention check and didn't follow the instructions, prior to analysis¹, remaining 296 valid complete surveys for analysis.

Participants first rated their endorsement of savings goal using the same measures used in Study A4. Participants were then asked to recall and briefly explain a recent experience in which they had been faced with a spending temptation involving a meaningful amount of money but had ultimately decided not to spend. Participants wrote down how they had wanted to spend the money and the approximate amount of money they had decided to not spend but to instead save. Next, they were asked to list two additional ways they could have spent the same amount of money for themselves. Thus, all participants recalled their own goal-consistent past choice (*saving*) and considered three goal-inconsistent options (*spending*) they could have chosen instead.

Participants were presented with a shopping scenario, in which they had gone to a mall with a specific spending budget and had found an item they had wanted to buy for a long time that was on sale, but beyond their planned budget. After reading the scenario, participants rated their intention to buy the item in the situation, using a 7-point scale (1 = *Never*, 7 = *Definitely*; reverse-coded to measure goal-consistent intention). Adopting from prior research for an

¹ For the current study, we also pre-registered to exclude participants who indicated below 4 out of 7 on the savings goal endorsement measure, but no participant recorded below 4.

exploratory measure of goal-consistent action (Nikolova et al., 2016; Lowe & Haws, 2019), we also asked how much participants would be willing to spend beyond the budget to buy the item, on a slider scale from \$0 to \$500 dollars.

Finally, as our primary predictive measure, participants rated the perceived diversity of the goal-inconsistent alternatives that they had spontaneously considered prior to making their spending decision. Participants were presented with the spending alternatives they had listed in the first part of the survey, and indicated the extent to which they agreed with the following statements on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*): (1) “Alternatives overlap in terms of what needs they meet” (reverse-coded); (2) “All of the alternatives are more or less the same” (reverse-coded); (3) “I have foregone diverse kinds of alternatives”.²

Participants also reported the attractiveness of each spending option they had provided on a 7-point scale (1 = *Not at all*, 7 = *Very much*). For demographic information, they indicated their gender and age.

Results

Goal endorsement. Consistent with the results of the pretest, the composite score of savings-goal endorsement ($\alpha = .79$) revealed that participants considered saving to be an important and active goal ($M = 5.97$ out of 7, $SD = .76$), rating it significantly above the midpoint of the scale (4) on average ($t(285) = 43.87, p < .001$).

Relationship between foregone diversity and subsequent choice. We first computed a composite score ($\alpha = .47$) reflecting the perceived diversity among the foregone alternatives that

² These measures are modified from the pre-registration to measure perceived diversity of alternatives more clearly. The last two items stated in the pre-registration were removed in the actual survey because they reflect the concept of “perceived sacrifice”, which will be separately examined in our later studies.

participants generated.³ Then we conducted regression analyses to predict participants' saving decision based on the diversity of the foregone alternatives. As predicted, participants who perceived they had foregone more diverse options had higher saving intentions ($b = .30$, $t(284) = 3.36$, $p < .001$, $f^2 = .04$). The relationship between foregone-alternative diversity and the subsequent motivation to save remained significant ($b = .28$, $t(282) = 3.04$, $p = .003$, $f^2 = .03$) controlling for the dollar amount saved and the attractiveness of the foregone alternatives.

Further, regression analyses predicting the amount of money participants intended to spend revealed the same effect of foregone-alternative diversity ($b = -10.88$, $t(284) = -2.10$, $p = .04$, $f^2 = .02$). Participants who viewed their foregone alternatives as more diverse indicated they would spend less money on the subsequent spending occasion. The effect was marginally significant when controlling for the dollar amount saved and the attractiveness of the foregone alternatives ($b = -9.72$, $t(282) = -1.86$, $p = .06$, $f^2 = .01$).

³ Due to the low internal consistency of the combined measure, we also conducted 3 separate regression analyses on the saving decision using each perceived diversity measure. The first perceived diversity measure showed a marginal effect ($p = .087$) and the second and third measures showed significant effects on the saving decision (p 's $< .01$).

Study A6 – Moderation by timing of a subsequent choice

Method

We collected 484 valid complete surveys from Mturk participants in the United States (229 male, $M_{\text{age}} = 39.21$). This study employed a 3 (control: uncategorized vs. similar: single alternative category vs. diverse: multiple alternative categories) \times 2 (single vs. separate choice) between-subjects design.

Participants were presented with a playlist consisting of 12 different videos. They were asked to imagine that they had recently set a long-term exercise goal and had chosen a home workout video to do instead of watching an entertainment video. We manipulated the perceived diversity of the same set of goal-inconsistent foregone alternatives by categorization. In the single-alternative-category condition (similar), the videos were categorized as either home workouts (goal-consistent) or entertainment (goal-inconsistent). However, in the multiple-alternative-categories condition (diverse), the same twelve videos were more narrowly categorized into four groups: one goal-consistent (home workouts), and three types of goal-inconsistent videos: Netflix series, 2020 Oscar winners, and musicals. In the uncategorized condition (control), the same videos were displayed, intermixed without any categorization. Participants rated the same three-item measures of perceived sacrifice ($\alpha = .79$) and subjective impact ($\alpha = .92$) used in Study 3, here regarding their past choice to do the exercise video.

Next, participants made a subsequent goal-related choice between a shorter (20-minute) vs. longer (30-minute) home workout video. To manipulate the timing of the subsequent choice, participants in the single condition were told that they usually do “one upper body circuit and one lower body circuit in one day” and they were going to do a lower body circuit “next, to complete today’s workout goal.” In the separate condition, however, they were told that they

usually do “an upper body circuit one day and a lower body circuit on the next day” and they were going to do a lower body circuit “tomorrow, to follow their exercise goal.”

After making the choice, as a manipulation check, participants indicated the perceived variety of the presented alternatives: (1) “How much variety do you think there was in the playlist?” (1 = *Very little variety*, 7 = *A lot of variety*), (2) How similar were the videos to each other?” (reverse-coded), (3) How different were the videos from each other?” (1 = *Not at all*, 7 = *Extremely*). They also rated the attractiveness of each video and reported gender and age for demographic information.

Results

Manipulation check. As expected, the composite score of perceived diversity ($\alpha = .68$) revealed that participants perceived the alternatives presented as three categories as more diverse than the same set of alternatives presented as one category ($M_{\text{multi}} = 5.11$, $SD_{\text{multi}} = 1.00$, $M_{\text{single}} = 4.56$, $SD_{\text{single}} = 1.23$; $t(315) = 4.35$, $p < .001$). The level of perceived diversity in the uncategorized condition was greater than in the single category condition ($M_{\text{uncat}} = 4.98$, $SD_{\text{uncat}} = 1.03$; $t(319) = 3.34$, $p < .001$), but not different from the multiple categories condition ($p = .27$). We first present the planned comparisons between the single alternative category (similar) and multiple alternative categories (diverse) conditions, and then exploratory contrasts involving the uncategorized (control) condition.

Perceived sacrifice. Participants in the multiple-alternative-categories condition reported higher sacrifice from choosing the goal-consistent workout video than those in the single-alternative-category condition ($M_{\text{multi}} = 4.41$, $SD_{\text{multi}} = 1.33$, $M_{\text{single}} = 4.05$, $SD_{\text{single}} = 1.42$; $t(315) = 2.32$, $p = .021$). Participants in the uncategorized condition reported marginally greater perceived sacrifice than those in the single-alternative-category condition ($M_{\text{uncat}} = 4.32$, SD_{uncat}

= 1.30; $t(319) = 1.78, p = .076$), but no difference from the multiple-alternative-categories condition ($p = .54$).

Subjective impact. Participants in the multiple-alternative-categories condition, who perceived greater diversity among the foregone alternatives, reported higher goal-impact from choosing the goal-consistent workout video than those in the single-alternative-category condition ($M_{\text{multi}} = 5.28, SD_{\text{multi}} = 1.22, M_{\text{single}} = 4.71, SD_{\text{single}} = 1.38; t(315) = 3.88, p < .001$). Subjective impact in the uncategorized condition was greater than in the single-alternative-category condition ($M_{\text{uncat}} = 5.14, SD_{\text{uncat}} = 1.29; t(319) = 2.87, p = .004$), while the uncategorized and multiple-alternative-categories conditions did not significantly differ ($p = .32$).

Subsequent choice. A logistic regression analysis on the subsequent workout choice revealed a significant interaction between alternative categories (single vs. multiple) and subsequent choice timing (single vs. separate choice) ($b = 1.40, se = .56, Wald = 6.36, p = .012$). In the separate choice condition, having foregone 3 different categories of goal-inconsistent alternatives yielded a higher likelihood of choosing the longer workout program for tomorrow's workout (41%), compared to having foregone the same alternatives grouped in a single category (20%, $\chi^2 = 6.92, p = .008$). Furthermore, participants presented with uncategorized foregone options were more likely to choose the longer workout program than those in the single-alternative-category condition (36% vs. 20%, $\chi^2 = 4.08, p = .043$). Contrary to the replication of the foregone diversity effect in the separate choice condition, the categorization manipulation had no effect on choices of which workout video to do when the subsequent choice is a part of the same goal pursuit step with the prior choice (20%_{single} vs. 15%_{multi}, $\chi^2 = .61, p = .434$). Choices in the single choice condition did not differ between the uncategorized and single-alternative-category conditions (20%_{uncat} vs. 20%_{single}, $p = 1$).

Study A7 – Moderation by timing of a subsequent choice

Method

We collected 361 valid complete surveys from Mturk participants in the United States (193 male, $M_{\text{age}} = 39.40$). This study employed a 2 (single vs. multiple alternative categories) \times 2 (single vs. separate choice) between-subjects design. Study procedure and measures were exactly the same with Study A6, except that the current study didn't include the uncategorized condition and perceived sacrifice measures.

Results

Manipulation of perceived variety was successful ($M_{\text{multi}} = 5.02$, $SD_{\text{multi}} = 1.10$, $M_{\text{single}} = 4.40$, $SD_{\text{single}} = .97$; $t(359) = 5.67$, $p < .001$). Participants in the multiple alternative categories condition, who perceived greater diversity among the alternatives, reported higher subjective impact than those in the single alternative category condition ($M_{\text{multi}} = 5.12$, $SD_{\text{multi}} = 1.27$, $M_{\text{single}} = 4.83$, $SD_{\text{single}} = 1.11$; $t(359) = 2.33$, $p = .020$). A logistic regression analysis on the subsequent workout choice showed a marginal interaction ($b = .86$, $se = .45$, $Wald = 3.60$, $p = .058$). In the separate choice condition, participants who perceived foregone alternatives more varied were more likely to choose a longer workout program (49% vs. 40%, $\chi^2 = 1.27$, $p = .26$), whereas the opposite pattern was observed when making a subsequent choice as a part of the same goal pursuit step (23% vs. 32%, $\chi^2 = 1.55$, $p = .21$).

Study A8 – Moderation by timing of a subsequent choice

Method

We collected 174 valid complete surveys from Mturk participants in the United States (45% male, $M_{\text{age}} = 39.05$). This study employed a 2 (foregone-alternative diversity: similar vs. diverse) \times 2 (temporal distance of subsequent choice: proximate vs. distant) between-subjects design.

Study procedure was same with Study 3, except that the current study did not measure perceived sacrifice. Participants first read a short description of what “healthy diet” means, recalled a recent experience when they had made a healthy food choice, generated either three similar or three dissimilar unhealthy alternatives they could have chosen instead of the healthy food that they did choose. After describing how the three alternatives were similar or dissimilar to one another, participants evaluated how much impact, contribution, and progress they thought they had made with their past goal-consistent choice. They also answered three additional attitudinal measures—decision satisfaction, feeling good about oneself, and decision difficulty.

The survey then asked participants to imagine that they were going to have a business dinner and they had to select their meal, either a healthy but less tasty option (“Get healthy with well-balanced dishes! Enjoy a green goddess salad, a nutrient-rich entrée, and a low-sugar dessert”) or a less healthy but tasty meal (“Treat yourself with tasty dishes! Enjoy a savory appetizer, a full-flavored entrée, and a delightful dessert”). In the proximate condition, the choice was for a dinner tomorrow, whereas in the distant condition, participants made a choice for a dinner that would take place in one month.

Finally, to validate that participants were endorsing healthy eating as a goal, we measured their consciousness of what they are eating, commitment to healthy eating, and importance of

eating healthy, using a 7-point scale (1 = *Not at all*, 7 = *Very much*). Participants indicated their height, weight, gender, and age as demographic information.

Results

As we intended, and confirming our pretest result, the composite score of healthy eating goal endorsement ($\alpha = .85$) revealed that, on average, participants were pursuing eating healthy as an important and active goal ($M = 5.24$, $SD = 1.17$; $t(173) = 13.96$, $p < .001$ when compared with the midpoint of the scale (4) in one-sample t-test).

Subjective impact. First, we tested our main hypothesis that considering diverse (vs. similar) alternatives increases the perceived impact of a goal-consistent choice on goal progress. Because we manipulated temporal distance after participants had already reported their subjective impact, we collapsed across temporal distance conditions, and conducted a one-way ANOVA with the option diversity manipulation as a factor. Replicating our previous findings, participants who considered diverse unhealthy alternatives felt they had achieved greater impact on their healthy eating goal compared to those who considered similar alternatives ($M_{\text{similar}} = 4.74$, $SD_{\text{similar}} = 1.44$, $M_{\text{dissimilar}} = 5.23$, $SD_{\text{dissimilar}} = 1.33$; $F(1, 172) = 6.68$, $p = .011$). The effect of option diversity remained significant after controlling for decision satisfaction, good feelings about oneself, decision difficulty, and individual's BMI ($F(1, 168) = 4.53$, $p = .035$).

Subsequent meal choice. A logistic regression analysis on the subsequent meal choice revealed a significant interaction between foregone-alternative diversity and temporal distance ($\beta = -2.02$, Wald = 8.16, $p = .004$). In the proximate condition, in which participants made a decision about a dinner tomorrow, considering diverse unhealthy alternatives to a prior healthy choice yielded more choices of a healthy meal, compared to considering similar unhealthy alternatives (83% vs. 51%, $\chi^2 = 8.17$, $p = .004$). However, the diversity of goal-inconsistent

alternatives had no effect when participants instead made a dinner choice for the distant future (1 month away; 80% vs. 70% chose the healthy option, $\chi^2 = .64, p = .425$). The interaction between foregone-alternative diversity and temporal distance remained significant after controlling for the three affective measures and individual's BMI ($\beta = -1.81, \text{Wald} = 6.20, p = .013$).