Choice Overload with Repeated Exposures:

The Role of Replication and Variety

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Whereas real-life consumers often make repeated choices from an assortment, research on choice overload has been limited to one-off decisions. We investigate how set size influences decision confidence in the more dynamic context of repeated choice exposures. Repeated exposures decrease choice difficulty, allowing consumers choosing from large sets to benefit from the option value offered by greater variety and enjoying increased confidence. Nevertheless, this progressive increase does not reduce the original advantage of consumers choosing from small sets. These consumers tend to replicate their initial choices, and therefore not only do not suffer from the limited option value associated with smaller variety, but also become progressively more confident about their replicated selection. If choice replication is prevented and each exposure implies a new choice, however, consumers choosing from small sets appreciate option value as much as those choosing from large sets, and smaller variety negatively affects their relative confidence. Thus, we hypothesize that over repeated choice exposures the choice overload effect persists if consumers can replicate their choices, but weakens if they cannot.

Keywords: choice overload, repeated choice, decision confidence, variety, replication.

In a scene from the movie *Moscow on the Hudson*, Robin Williams' character enters a New York grocery store and asks for coffee. Directed to aisle two, he starts browsing the shelves while mumbling to himself the names of the different coffee brands and product variants on display: Star's Choice, El Pico, Chock full o'Nuts… As he progresses along the aisle reciting the litany of different coffee labels, his gaze blurs, his distress escalates, and his voice raises and stumbles: espresso, cappuccino, Café Francaise, Folgers, Café Caribe… The endless coffees appear threatening to him, and his cry "Coffee! Coffee! Coffee!" resonates in the store as he finally collapses on the floor, buried by coffee cans.

Although a bit hyperbolic, the response of the shopper portrayed in this movie is consistent with the findings of research on choice overload showing that choosing from large choice sets can elicit a host of undesirable effects, such as choice paralysis and greater unhappiness, whereas choosing from small sets can induce a more pleasurable subjective experience both with the decision process and the decision outcome (Diehl and Poynor 2010; Iyengar, Wells, and Schwartz 2006; Sela, Berger, and Liu 2009). This effect has been demonstrated in domains as diverse as chocolates, pensions funds, human services' treatment strategies, and touristic destinations (Iyengar and Lepper 2000; Iyengar, Jiang, and Huberman 2004; Park and Jang, 2013; Reed et al. 2011)

And yet, modern Western consumers do not appear to be debilitated by the explosion of choices they witness daily—after all, it is rare to meet distraught Starbucks' customers even if they are confronted by 87,000 drink combinations (Harford 2009). On the contrary, consumers seem able to cope with large assortments better than researchers would expect, as they not only regularly make choices from these assortments, but also continue to be attracted by extensive

choice (Bown, Read, and Summers 2003; Iyengar and Lepper 2000) and demand more choice and more variety (Botti and Hsee 2010; Ratner, Kahn, and Kahneman 1999).

How can we reconcile consumers' apparent ability to handle numerous choice-set options with the evidence for the detriments of extensive choice? One possibility is that participants in choice overload studies are typically asked to make one-shot decisions, whereas in real life consumers usually have the option to expose themselves to the same choice assortment repeatedly over time.

One may expect choice overload to be mitigated in the context of repeated choice exposures. Among the main advantages provided by large, relative to small, sets is greater variety, which increases consumers' likelihood of finding the option that best matches individual preferences (Baumol and Ide 1956; Kahn 1995). In one-shot decisions, this advantage is overcompensated by the greater cognitive and emotional difficulty of perusing numerous, as compared to limited, options, resulting in lower decision confidence and higher regret (Chernev 2003; Inbar, Botti, and Hanko 2010; Sela, Berger, and Liu 2009). In repeated choice exposures, however, task familiarity would reduce the difficulty of choosing from large sets (Alba and Hutchinson 1987) such that consumers would increasingly benefit from these sets' greater variety, resulting in improved decision confidence.

Nevertheless, we predict that this progressive increase in the perceived confidence of consumers choosing from large sets will not necessarily reduce the initial gap relative to consumers choosing from small sets. Consumers faced with limited assortments have been shown to quickly develop strong preferences for one option (Chernev 2003; Iyengar and Lepper 2000). Because initial satisfactory choices tend to be replicated in subsequent occasions (Hoeffler and Ariely 1999; Hoyer 1984), and because replication is likely to be associated with

enhanced confidence (Bem 1967; Berger and Mitchell 1989; Park and Lessig 1981), we expect that these consumers will not suffer from the constrained variety offered by small sets. In contrast, consumers faced with limited assortments will rapidly and confidently select their best-matching option within the set's narrow boundaries, replicate this choice in following exposures, and maintain their original relative confidence advantage over those choosing from large sets. If, however, the original choices could not be replicated, consumers would need to re-engage in the preference-matching task at each exposure. This process may reveal the inability of low-variety sets to accommodate changing preferences (Simonson 1990) and gradually reduce the greater confidence of consumers choosing from small, as compared to large, sets.

We therefore hypothesize that the impact of repeated choice exposures on decision confidence depends on the possibility of replicating an initial selection. When this replication is prevented, the advantage of small sets relative to large sets will decrease over time because of limited variety, resulting in a dissipation of the choice overload effect. However, when a previous option can be selected again, the initial greater confidence of consumers choosing from smaller, versus larger, sets will be preserved over time, despite lower variety.

EASE OF CHOICE, VARIETY, AND DECISION CONFIDENCE

Human beings have long being defined as cognitive misers (Taylor 1981), their rational decision-making ability bounded by limitations in processing capacity and thinking costs that restrict the amount of information accessed and elaborated per unit of time (Shugan 1980; Simon 1955; Wright 1975).

Because consumers are limited information-processing systems, comprehensive examinations and careful assessments of choice options become more cognitively daunting as the number of these options increases (Bettman, Luce, and Payne 1998; Iyengar and Lepper 2000; Malhotra 1982; Tversky and Shafir 1992). Decision makers facing large choice sets may attempt to eschew the associated information load by avoiding the choice altogether (Dhar 1997; Iyengar, Jiang, and Huberman 2004). When choice avoidance is not possible, however, the overwhelming mental effort of selecting an option from an extensive set eventually lowers consumers' confidence that the best alternative has been chosen (Chernev 2003; Iyengar and Lepper 2000; Iyengar, Wells, and Schwartz 2006).

Given the detrimental consequences of the cognitive strain associated with examining extensive sets, it is not surprising that consumers seek ways to reduce information load. As information load depends on the amount of data to be processed per unit of time, one possibility is to decrease the number of options to scrutinize (Lurie 2004; Malhotra 1982). Research has shown that choosers faced with extensive sets use decision strategies that allow them to quickly eliminate some of the available alternatives and focus on a smaller subset (Bettman, Luce, and Payne 1998; Hauser and Wernerfelt 1990; Wright 1975). Even when the actual amount of choice remains high, the simple perception of a decrease in the number of choice-set alternatives, for example through the level of assortment organization (Broniarczyk, Hoyer, and McAlister 1998; Gourville and Soman 2005) or the number of assortment categories (Mogilner, Rudnick, and Iyengar 2008), has been found to reduce the mental effort of deciding among numerous options.

Whereas both simplified decision-making models and improved assortment organization limit the amount of data to be considered by reducing either the actual or the perceived number of alternatives under scrutiny per unit of time, an alternative strategy to lessen

the information load caused by extensive choice would be to expand the number of occasions in which consumers are exposed to the same choice over time. Research on familiarity and expertise (Alba and Hutchinson 1987) suggests that repeated choice-making experiences in a given domain increase consumers' familiarity with the choice task and the ease with which they successfully match personal preferences and choice-set alternatives. Choosers who repeatedly engage in a choice task should therefore spend less effort when processing choice-relevant information, possess a better understanding of both their own preferences and the differences among the available alternatives, and be more efficient at locating the best-matching option (Bettman and Park 1980; Huffman and Kahn 1998; Johnson and Russo 1984).

Easier preference-matching processes have been shown to enhance decision confidence in the context of extensive, relative to limited, sets (Chernev 2003; Mogilner, Rudnick and Iyengar 2008). In a series of studies, Chernev first exposed participants to a preference learning phase in which they identified their ideal set of attributes, and then confronted them with a choice task in which they retrieved their learned preferences and searched for the best available match. This initial preference construction phase weakened a major relative drawback of choosing from large, versus small, sets: choice difficulty. Participants choosing from large sets enjoyed fewer conflicts because they did not have to simultaneously construe preferences and identify the best match in the face of numerous possibilities. In contrast, participants choosing from small sets did not benefit as much from this simplified choice process because their task was already made easier by the lower number of potential matches. At the same time, preference learning in advance of choosing enhanced a major relative advantage of large, versus small, sets: greater variety. Participants choosing from numerous options were more likely to find their best match among a more varied choice set, whereas participants choosing from few options were

less likely to find the best-matching one because of the limited variety offered by the choice set. Greater preference-matching ease and higher chances to find the preferred option resulted in participants who chose from large assortments to be more confident about their choice than participants who chose from small assortments.

Thus, facilitating the choice-making process by allowing participants to learn their preferences before being exposed to a decision benefited the confidence of consumers choosing from larger sets more than those choosing from smaller sets, and resulted in a moderation of the choice overload effect in the context of one-off decisions. At first sight, these results suggest that a facilitation of the choice-making process through repeated choice exposures, rather than through initial preference learning, would also lead to a weakening of the choice overload effect over time. However, we propose that this relationship between repeated choice exposures and confidence is more nuanced, and specifically that it depends on whether a satisfactory choice can be replicated (i.e., selected again) at a later exposure.

CHOICE REPLICATION, VARIETY, AND DECISION CONFIDENCE

The literature reviewed so far indicates that one of the main advantages of large, relative to small, assortments consists in their superior variety, which increases decision makers' likelihood of finding the option that best matches their preferences (Baumol and Ide 1957; Kahn 1995). Often, this advantage is overcompensated by the difficulty of choosing among numerous options, which causes lower confidence even when a best match is found (Iyengar, Wells, and Schwartz 2006; Sela, Berger, and Liu 2009). However, choosing can be made easier either by performing the choice task repeatedly over time (Alba and Hutchinson 1987) or by performing a

preference construal task before making a one-off choice (Chernev 2003). In the case of one-off decisions, easier choices following the initial preference learning led to a reversal of the choice overload effect. Consumers faced with large sets, freed from the pains of choosing, benefited from greater variety and enjoyed more confidence; in contrast, consumers faced with small sets, for whom the pains of choosing were negligible, experienced the constraints of limited variety in allowing preference matching and suffered from less confidence.

Would the same positive effect of preference-matching ease on confidence in large and more varied assortments, and its negative effect on confidence in small and less varied assortment be found when consumers are repeatedly exposed to the same choice set? We argue that this may not be the case.

We base our argument on previous findings indicating that consumers' desire for variety depends on the degree to which they hold established preferences (Hoch, Bradlow, and Wansink 1999; Kahn and Lehmann 1991). Research has shown that consumers value variety more when their preferences are less well formed, because variety offers option value, namely the flexibility to explore potentially attractive alternatives (Reibstein, Youngblood, and Fromkin 1975). In contrast, when preferences are more clearly formed, variety is less desirable. In a classic study, participants initially chose their preferred option for immediate consumption and then either predicted their future choice for the next two weeks or actually chose one option for immediate consumption in each of the following two weeks (Simonson 1990). Results showed that participants in the prediction condition selected more variety to offset the greater uncertainty characterizing future preferences and avoid the disappointment following potential preference changes. However, participants in the immediate consumption condition were more certain of their preferences and replicated the choice of their preferred item more often. The finding that

stronger preferences are more likely to lead to choice replication, regardless of any variety-seeking tendencies, is consistent with research demonstrating that consumers construe their preferences based on the available alternatives, and that once a satisfactory match has been found they tend to select the same alternative again during the next exposures (Hoffler and Ariely 1999; Hoyer 1984).

Research has shown that preferences are more clearly established and consumers are more confident about their decisions when making a single choice from small, as compared to large, sets (Iyengar and Lepper 2000). It is then plausible that during repeated choice exposures consumers who are initially confronted with small, relative to large, sets will be less sensitive to the option value offered by variety and more likely to stick with the originally chosen option.

How does this different sensitivity to the benefits of variety in small versus large choice sets influence decision confidence over repeated choice exposures? We predict a stronger influence of variety on the confidence of consumers who choose at first from large sets relative to those who choose at first from small sets. Specifically, we expect the greater option value associated with greater variety to have a positive effect on confidence with a choice made from a large set because consumers need the flexibility to accommodate future changes in their unstable preferences. However, we do not expect the limited option value associated with smaller variety to have a comparable negative effect on confidence with a choice made from a small set because consumers quickly select their preferred option, replicate this selection in the next exposures, and therefore do not need flexibility. Nevertheless, the mere act of replicating the same choice over time may have a beneficial effect on confidence. Bem's (1967) theory of self-perception posits that individuals infer their liking for a specific option from observing their past behaviors. It is therefore likely that the more often the same option is selected, the stronger the inference of that

option being superior to the alternatives in the set. Indeed, a causal link between replication of a behavior and confidence about that behavior has been shown in the literature. For example, replicating one's exposure to the same ad increased confidence in the attitude towards the ad (Berger and Mitchell 1989) and replicating a product experience generated greater confidence for the product choice (Park and Lessig 1981).

Thus, we posit that the positive influence of greater variety on decision confidence in large sets will be stronger than the negative influence of smaller variety in small sets. Because the greater tendency to replicate choice in small sets is also likely to grow confidence, the original advantage of consumers choosing from small, versus large, sets will persist in the context of repeated choice exposures.

Nevertheless, not all the options encountered in a previous choice occasion may be available for selection in subsequent occasions, for example because of stockouts (Fitzsimons 2000). In this case, at each choice exposure, and regardless of the size of the choice set, consumers would have to re-engage in the preference-matching process by reassessing their likes and dislikes relative to a different set of available alternatives. This forced choice reconsideration should make the option value offered by variety as desirable for consumers choosing from small sets as for those choosing from large sets, because in both situations the best preference-matching option cannot be rapidly and confidently established. We therefore expect the strength of the influence of variety on decision confidence to be similar across large and small choice sets, such that in large sets decision confidence will be positively affected by greater variety and in small sets decision confidence will be negatively affected by smaller variety. Hence, we predict that the original superior confidence of consumers choosing from small, versus large, sets

will be reduced when the selection of a previous option cannot be replicated during repeated choice exposures.

To sum up, we hypothesize that choosing becomes easier over time for consumers faced with large choice sets than for those faced with small choice sets because the former benefit to a greater extent from the preference-matching ease associated with choice-task repetition. We also hypothesize that the relative change in decision confidence between consumers choosing from large versus small sets over repeated exposures depends on whether or not these consumers can select the same option for as many times as they wish, namely on their ability to replicate a previous choice. If a previous choice cannot be replicated, the initial greater confidence of consumers choosing from small sets will weaken over repeated exposures relative to that of consumers choosing from large sets, thereby dissipating the choice overload effect. However, if choice replication is possible, this greater confidence will be maintained over repeated choice exposures, preserving the choice overload effect.

These hypotheses were investigated in three studies, in which we manipulated participants' repeated exposures to either a smaller or a larger choice set and their ability to replicate initial choices. For all studies, we selected relatively unfamiliar choice-set options (i.e., unpopular songs, unbranded chocolates) so that participants could rely only weakly on pre-established preferences, and we limited our investigation to consumers' subjective decision confidence, rather than to choices that are objectively right or wrong. In addition to being externally relevant, the repeated exposure methodology used in this study is theoretically important for understanding the tension between choosing from small versus large sets once repeated, rather than single, choices are considered.

STUDY 1

In study 1 we tried to simulate a real-life situation in which consumers were exposed to repeated choices without being able to replicate a previous selection, meaning without the possibility to select an option more than once. Music represents an appropriate setting for our study as consumers usually do not pay for more than one copy of a given song. We therefore showed participants the same iTune choice set, either small or large, for ten consecutive times, and prevented choice replication by having them download the selected iTune on their computers after each exposure. Also in an attempt to make the repeated choice task more realistic, we allowed exploratory behavior: instead of forcing participants to select an option at each choice exposure, we gave them the opportunity to examine the choice set and decide whether to choose an option or not.

In line with previous research on task familiarity and expertise (Alba and Hutchinson 1987), we predicted that choosing would become easier over time for consumers faced with larger sets, who initially experienced a more difficult choice task, than for those faced with smaller sets, who initially experienced a less complex task. We also predicted that the inability to replicate previous choices would lead to a mitigation of the choice overload effect on decision confidence over time. Specifically, we anticipated variety to be as desirable for participants in the large-set condition, who are naturally more likely to engage in preference-matching at each exposure, as for participants in the small-set condition, who were forced to engage in preference-matching at each exposure by the study design. Thus, we also anticipated that the decision confidence of participants in the small-set condition would increasingly suffer relative to that of

participants in the large-set condition because of the constraints of limited variety in accommodating changing preferences.

Method

Ninety students at a large East Coast university in the U.S. participated in this study in exchange for a cash reward of $20 and the possibility to download up to 10 songs for free. The study involved 10 repeated exposures to the same selection of songs, which was either small or large. In the small choice-set size condition participants browsed from among 30 songs by 10 different artists, whereas in the large choice-set size condition they browsed from among 300 songs by 100 different artists. The order in which the songs were presented was counterbalanced. Participants in the small-set condition were randomly assigned to one of five different sets, each comprising a different random selection of the songs that appeared in the large-set condition.

To resemble as much as possible the real-life experience of repeated choice exposures, at each exposure participants were not forced to make a choice. Rather, they were asked whether they wanted to choose the song, be assigned a song (either a random song or the song that was most popular with the other participants), or did not want to receive a song at all.

The study consisted of 10 sessions, corresponding to the number of times that each participant was exposed to the same choice set. The first session took place in the laboratory. Upon arrival, participants were seated at a computer equipped with a set of headphones and were presented with either the small or the large selection of songs. They were allowed to sample as many songs as they wished before deciding whether they wanted to choose a song, receive either a random or a popular song, or avoid the choice altogether. Next, participants answered a post-choice questionnaire. Those who opted to make a choice were asked three questions assessing how easy it was for them to find the best match between their preferences and the available

alternatives: “How easy was it for you to choose?” “How stressful was the experience of choosing?” (reverse-scored) and “How difficult was it to differentiate among the options?” (reverse-scored). All participants also indicated their subjective decision confidence by answering the following question: “How confident are you that you received the best option available (i.e., the song that best matches your personal preferences)?” All these questions were answered on nine-point scales (1 = not at all; 9 = very much). Participants were compensated $5 for taking part to this first session and were emailed on the evening of the same day.

The next eight sessions were administered entirely online. For each session, participants received an email in the morning that linked them to a survey to be completed by the evening of the same day. Participants were then allowed to browse the same songs encountered in the first session again before deciding whether to choose a new song, receive a random or a popular song, or avoid receiving any song. They finally answered the same post-choice questionnaire about perceived ease of the choice-making process and decision confidence, and received the selected song via email on the evening of the same day.

The final session required participants to make their choice online and to respond to the questionnaire as in the previous eight sessions and then return to the lab to receive their remaining $15.

Results

The total number of useful observations across the 90 participants was 802. In the remaining 98 occasions the data were not captured by the system because of participants’ unwillingness to submit their responses, errors in submissions, or technical glitches. As we could not ascertain the exact reason behind the data that were not captured, we treated them as missing values. We then used the restricted maximum likelihood estimation method in our analyses,

which allows fitting the wider class of mixed, rather than general, linear models in the presence of missing values (http://www.math.wpi.edu/saspdf/stat/chap41.pdf).

Participants decided to choose their own song on 58.23% of the total number of choice exposures (467 exposures). On 17.21% of the exposures (138 exposures), participants opted to receive the most popular song, on 11.72% of the exposures (94 exposures) to receive a random song, and on 12.84% of the exposures (103 exposures) they chose not to receive any song. The analyses below referred only to participants who made a choice, who were asked both about the ease with which they chose and about their confidence with the subsequent decision outcome. In contrast, participants who did not make a choice were asked only about decision confidence and were not included in the analysis reported below. The results for the decision confidence variable were the same when the whole set was analyzed as when the choice-only subset was analyzed.

Preference-matching ease. The three questions capturing participants' comfort in the choice-making task were combined into an overall preference-matching ease score ($\alpha = .70$, $p < .001$). To test for choice overload on the first and last choice exposures, we treated both factors as discrete and conducted a 2×10 analysis of variance, with choice-set size as the between-subject factor with two levels (small, large) and choice exposure as the within-subject factor with 10 levels (choice one to 10). These analyses revealed that, as predicted by the choice overload research, on their first choice participants choosing from the small set ($M = 5.95$, $SE = .25$) perceived the preference-matching task to be easier than those choosing from the large set ($M = 5.10$, $SE = .28$; $t(1, 359) = 2.26$, $p < .05$). On their last choice, this difference between the small-set and large-set conditions was not significant ($M_{small} = 6.15$, $SE = .45$, $M_{large} = 6.47$, $SE = .39$; $t(1, 359) = -.53$, NS).

Next, we analyzed the change in the preference-matching ease dependent variable over repeated choice exposures by treating the choice-set size factor as a discrete variable and the choice exposure factor as a continuous variable. We first conducted a trend analysis by specifying orthogonal polynomials up to the ninth order for the choice exposure scores (see the Appendix for a complete list of the contrast coefficients used across the three studies). We then regressed the overall preference-matching ease score on the dummy-coded categorical choice-set-size variable (0 = small; 1 = large), the nine trends of the continuous choice-exposure variable, and the interactions between choice-set and each of the trends. Results showed that the interaction of choice-set size with the linear trend of choice exposure was, as predicted, significant ($t(1, 359) = 2.76$, $p < .01$; see figure 1a) but none of the other interactions between choice-set size and the higher-order trends was ($ps > .1$).

The interaction term was subsequently interpreted following the procedure recommended by Fitzsimons (2008), namely by examining the parameter and significance of the slope of the choice exposure continuous variable first in the context of the original dummy variable coding, and then after reverse-coding these dummy variables (0 = large; 1 = small). This analysis showed the predicted effect: overall ease increased for participants in the large choice-set condition ($B = 1.48$, $SE = .33$; $t(1, 359) = 4.42$, $p < .0001$) but remained unchanged for those in the small choice-set condition ($B = .19$, $SE = .33$; $t(1, 359) = .57$, NS).

[Insert figure 1a about here]

Decision confidence. The same analyses were repeated on the one-item decision confidence measure (note that the difference in degree of freedom relative to the previous analysis was due to one additional missing response). Again consistent with the choice overload theory, on the first exposure small-set participants were more confident than large-set

participants (M_{small} = 5.70, SE = .34; M_{large} = 4.65, SE = .39; t(1, 358) = 2.02, $p < .05$). On the last exposure, however, this difference was marginally significant in the opposite direction (M_{small} = 4.15, SE = .60; M_{large} = 5.49, SE = .53; t(1, 358) = -1.68, $p < .1$).

Regressions analyses confirmed these results. Once again, polynomial contrasts were used to fit trends up to the ninth order for the choice exposure scores, revealing that the interaction between choice-set and the linear trend of the choice exposure variable was significant (t(1, 358) = 2.29, $p < .05$; the interaction was significant also when the cubic and nonic trends were considered; cubic: t(1, 358) = 2.23, $p < .05$; nonic: t(1, 358) = -1.97, $p = .05$). A more in-depth analysis of the choice-exposure linear slopes in the two choice-set size conditions revealed that decision confidence did not vary across number of exposures in the large choice-set condition (B = .02, SE = .44; t(1, 358) = .05, NS) but decreased significantly in the small choice-set condition (B = -1.37, SE = .43; t(1, 358) = -3.23, $p < .005$), leading to a reversal of confidence on the last choice exposure (see figure 1b).

[Insert figure 1b about here]

Discussion

Consistent with our predictions, choice became progressively easier for participants choosing from a large set, who initially faced greater conflicts, than for those choosing from a small set, who initially faced a less effortful task. Also as hypothesized, in a decision context in which previous choices could not be replicated, this greater preference-matching ease corresponded to a mitigation (and an eventual reversal) of the choice overload effect as the original gap in decision confidence enjoyed by participants choosing from small sets decreased over repeated choice exposures relative to that of participants choosing from large sets. According to our theory, having to reassess their preferences at each choice exposure made the

option value offered by variety as valuable in the small as in the large choice-set size condition. Thus, the lower ability of small, relative to large, sets in providing the needed variety progressively undermined the initial superior confidence of participants choosing from these sets.

Study 1 had the advantage of presenting participants with choice-making experiences that were close to real-life situations, as it is common for consumers interested in buying music online to visit a website repeatedly but to pay for downloading a piece of music from that website only once. This advantage, however, came at the cost of introducing a potential confound in that participants were exposed to a decreasing number of choice options after each song selection. Because participants in the small-set and large-set conditions were similarly sensitive to variety in this no-replication context, they were both hurt from this progressive decrease in set size and variety but, in line with our theorizing, those in the small-set condition suffered more than those in the large-set condition. Thus, the confidence of participants choosing from large sets remained stable, but did not increase, whereas the confidence of participants choosing from small sets actually decreased across repeated exposures. Study 3 will address this concern by manipulating participant's inability to replicate previous choices without decreasing at the same time the size, and the variety, of the choice set.

Study 2 tested the hypothesis that the choice overload effect persists when consumers can select the same option more than once. In this study, at each exposure participants faced the same assortment from which to choose, either large or small. To allow for choice replication and at the same time limit the potential negative effects of satiation on decision confidence (McAlister and Pessemier 1982; Ratner, Kahn, and Kahneman 1999; Redden 2008) we chose a choice context—chocolates—in which choice replication is a natural occurrence in real life. We also ensured that

two subsequent choices were separated by at least sixteen hours, as spreading consumption over time has been shown to slow the rate of satiation (Galak, Kruger, and Loewenstein 2013)

We predicted a stronger effect of variety on decision confidence over time in large, relative to small, sets. Greater variety was expected to benefit participants choosing from large sets because they could enjoy option value, that is, the flexibility to explore additional, potentially attractive alternatives, without the burden of choice conflicts. However, smaller variety was not expected to harm as much participants choosing from small sets as they would quickly find a best match, replicate the same selection again in the next exposures, and potentially grow more confident with it (Bem 1967; Berger and Mitchell 1989; Park and Lessig 1981).

As the previous study showed that the majority of participants preferred choosing even when the option of not choosing was offered, participants in study 2 were simply asked to make a choice at each exposure, and the number of exposures was reduced to five.

STUDY 2

Building on study 1, participants in this study were exposed for five times in five consecutive days to the same set of chocolates, either large (50 chocolates) or small (five chocolates). Different from study 1, in both conditions participants could choose the same option again over the five subsequent choice exposures, allowing us to test the hypothesis that choice overload persists over time when consumers have the possibility to replicate previous selections.

Method

Sixty members of a U.K. University staff were paid £20 to complete this 15 minute study. Participants were asked to come to the lab for five days in a row at any time from 10 am to 6 pm. They were informed that they would be paid a fix amount (£2) for each day in which they took part in the study and an additional £10 for completing all the five days. Participants received their final compensation on the last day of the study.

Upon arriving to the lab, participants were informed that the study was part of a research project aimed at understanding consumers' consumption of ordinary food items, and that to ensure an experience as close as possible to real life they would be making repeated choices, as it happens when going back to the same grocery store or restaurant. Participants were seated in front of a computer and were told that they would examine a set of chocolate pictures, choose one chocolate to taste, and then answer some questions about this tasting experience. Participants were also informed that they could virtually sample the assortment before making their choice by clicking on as many pictures as they wanted to read the name and a brief description of each chocolate (i.e., Precieux: A velvety cinnamon flavored cream smothered in milk chocolate and topped with spicy biscuit pieces). Participants were finally instructed to raise their hand when they were ready to taste the selected chocolate.

In the small-set condition participants were exposed to the same set of five chocolate pictures for five subsequent days, whereas in the large-set condition they were exposed to the same set of 50 chocolates. Thus, participants were free to replicate their previous selections in subsequent choices.

After participants had made their daily choice, the experimenter served the selected chocolate on a small plate and instructed them to take their time tasting it before answering a questionnaire. The questionnaire included the same questions about preference-matching ease

and decision confidence as in study 1, adapted to reflect the different type of stimuli. Two questions about liking and knowledge of chocolates ("How much do you like chocolate?" "How much do you consider yourself a chocolate expert?"), which were combined into an overall liking score ($\alpha = .73$, $p < .0001$), were added at the end of the questionnaire used on the first day of the experiment. All these questions were answered on nine-point scales (1 = Not at all; 9 = A great deal).

Results

To analyse these data we conducted the same analyses performed in study 1. In the mixed ANOVAs we treated both variables as categorical and assigned two levels (small, large) to the between-subjects variable—choice-set size—and five levels (choice1 to 5) to the within-subjects variable—choice exposure. In the regressions we treated the choice-set size variable as categorical and the choice exposure variable as continuous, and we used orthogonal polynomial contrasts to fit linear, quadratic, cubic, and quartic trends to the choice exposure scores (see Appendix). We then regressed the dependent variables on the dummy-coded categorical choice-set-size variable (0 = small; 1 = large), the four trends of the choice-exposure variable, and the interactions between choice-set and each of the trends.

Five participants missed one of the five days of the study. Data for these participants were entered consecutively for four days, respectively, with the remaining final days treated as missing values. Note, however, that the results reported below remained the same even without performing this sequential re-arrangement of the data. One participant in the small-set condition was identified as outlier in the overall liking for chocolate score, as his/her score was three interquartile ranges below the 25^{th} percentile (Tukey 1977), and was eliminated from the

analyses below. This left us with 59 participants and a total of 290 observations. Including this participant in the analyses did not significantly change the following results.

Preference-matching ease. The mixed ANOVA was conducted on the overall preference-matching ease measure ($\alpha = .67$, $p < .0001$). On the first choice exposure participants choosing from a small set ($M = 7.50$, $SE = .23$) perceived the choice task as easier than those choosing from a large set ($M = 6.47$, $SE = .23$; $t(1, 223) = 3.17$, $p < .005$). On the last choice exposure, this difference was only marginally significant ($M_{small} = 8.39$, $SE = .24$, $M_{large} = 7.80$, $SE = .24$; $t(1, 223) = 1.77$, $p < .08$).

Regressing preference-matching ease on choice-set size, the four trends of choice exposure, and the respective interactions revealed that the expected interaction between choice-set size and choice exposure was marginally significant only when the linear trend was considered ($t(1, 223) = 1.89$, $p = .06$; see figure 2a), whereas the interactions involving the other trends were all not significant ($ps > .18$). As predicted, preference-matching ease improved in both choice-set size conditions, but it increased at a greater rate for participants in the large-set condition ($B = .34$, $SE = .06$; $t(1, 223) = 5.49$, $p < .0001$) than for those in the small-set condition ($B = .18$, $SE = .06$; $t(1, 223) = 2.86$, $p < .005$).

[Insert figure 2a about here]

Decision confidence. On their first exposure, small-set participants were more confident than large-set participants ($M_{small} = 7.30$, $SE = .42$; $M_{large} = 5.72$, $SE = .43$; $t(1, 223) = 2.62$, $p < .01$), replicating the choice overload effect on decision confidence. On the last exposure, as hypothesized, this significant difference persisted ($M_{small} = 8.53$, $SE = .44$; $M_{large} = 6.70$, $SE = .44$; $t(1, 223) = 2.92$, $p < .005$).

The regression including the dummy-coded choice-set-size variable, the four trends of the choice-exposure variable, and the interactions between choice-set and each of the trends did not yield any significant interactions, in line with our predictions (t(1, 223) = -.34, NS, for the linear trend; see figure 2b). Confirming our hypothesis, the linear slopes significantly increased in the small choice-set condition (B = .31, SE = .13; t(1, 223) = 2.41, $p < .05$) and marginally increased in the large choice-set condition (B = .25, SE = .13; $t(1, 223) = 1.90$, $p < .06$), but as expected the increase over the five choice exposures did not vary significantly across these two conditions.

[Insert figure 2b about here]

Overall liking of chocolate. A one-way ANOVA of choice-set size conducted on the overall liking of chocolate scores collected only on the first day of the study revealed a main effect such that participants in the small-set condition reported liking chocolate more than those in the large-set condition ($M_{small} = 6.97$, SD = 1.35; $M_{large} = 5.91$, SE = 1.99; $F(1, 56) = 5.65$, $p < .05$; one participant did not respond to the questions included in this overall score). Although this difference was not expected, it can be attributed to a spillover of the choice overload effect on a response that was, however, intended to measure chronic, rather than contextual, preferences for chocolate.

Choice replication. To empirically support the argument that decision makers confronted with small sets desire less variety and are more likely to replicate previous choices than those confronted with large sets, we collected several measures of choice behavior. First, we adapted a measure of variety borrowed from prior research (Menon and Kahn 1995) and counted the number of different choices made across choice exposures, from one (same choice made across the five days) to five (each day a different choice). According to our line of reasoning, participants in the small-set condition should exhibit lower variety seeking than those in the

large-set condition. A one-way ANOVA of choice-set size conducted on this measure confirmed this prediction. Just as one would expect, the number of different choices made by participants was lower in the small (M = 2.93, SD = .96) than in the large (M = 4.29, SD = .71; $F(1, 57) = 36.76$, $p < .0001$) choice-set condition.

Second, we measured the percentage of choice replicates by calculating how many of the choices made after the first exposures were replications of previous selections. For example, a sequence like 1-2-2-2-2, in which different numbers corresponded to different chocolates, would be considered as 75% choice replicates because there were three replications of the same chocolate (chocolate 2) on the last three days. A sequence like 1-1-2-2-2 would be considered as 75% choice replicates as well because there were also three replications, one of the chocolate 1 on the second day and two of chocolate 2 on the fourth and fifth day. However, a sequence like 1-2-3-3-3 would be considered as 50% choice replicates because there were only two repetitions, of chocolate 3 on the last two days. The same one-way ANOVA conducted on the percentage of choice replicates yielded again the expected results: participants in the small choice-set condition had a higher percentage of replicates (M = .46, SD = .27) than those in the large choice-set condition (M = .17, SD = .17; $F(1, 57) = 25.07$, $p < .0001$).

Finally, we compared the percentage of participants' replicating a previous choice across the small-set and the large-set conditions. To do so, we created a dummy variable in which participants who replicated any previous choice were coded as "1" and participants who did not replicate any previous choices were coded as "0." A binary logistic regression in which this dummy variable was regressed on choice-set size yielded the expected significant effect: the percentage of participants who replicated a previous choice was higher in the small-set condition (90.32%) than in the large-set condition (53.57%; Wald $\chi^2(1) = 8.52$, $p < .005$).

These series of tests documented in different ways the same phenomenon, that is, participants choosing from small sets had a greater tendency to replicate previous choices, and a lower tendency to seek variety, than those choosing from large sets. This result is consistent with our argument that even if participants in both choice-set conditions could choose a different option at each choice exposure, those in the small set condition valued this opportunity less than those in the large set condition and were more likely to stick with a previously chosen option.

Discussion

Consistent with results from study 1, repeated choice exposures made the preference-matching task easier over time for participants choosing from a large set than for those choosing from a small set. However, in a decision context in which previous choices could be replicated, this greater increase in choice ease did not translate into greater decision confidence. Indeed, participants choosing from small sets, who were more confident than those choosing from large sets on the first exposure and less likely to seek variety across the subsequent four exposures, maintained their confidence advantage on the last exposure. As hypothesized, allowing participants to pick the same option more than once resulted in a persistence of the choice overload effect over time.

We explain these results with the lower sensitivity to variety and the greater tendency to stick with the same option of consumers choosing repeatedly from small, relative to large, sets as well as with the benefits of choice replication on confidence (Bem 1967; Berger and Mitchell 1989; Park and Lessig 1981). Thus, even though greater ease of choosing made participants in the large-set condition enjoy the advantages of variety and become more confident over time, participants in the small-set condition also grew more confident with their decisions, reflecting

preferences that quickly stabilized within the narrow boundaries of the available options and regardless of limited variety.

Study 3 replicated the basic set-up of study 2 (five repeated exposures to two sets of five versus 50 chocolates) to test our two hypotheses at the same time by manipulating both the size of the choice set (small versus large) and the possibility of replicating previous choices (replicate versus no-replicate).

This study also addressed some issues with the manipulations used in the previous experiments. Both studies 1 and 2 had the advantage of presenting participants with realistic choice-making experiences: in study1, options could not be chosen more than once because they were eliminated from the consideration set after being selected, as it is likely the case for products such as books, jewels, and academic courses; in study 2, options could be chosen again after the first selection, as it is likely the case for products such as detergents, food, and spa treatments. These more naturalistic settings, however, presented confounds that could potentially undermine our theory testing. As mentioned above, in study 1 each choice of a song to download shrank the choice set, such that at any subsequent choice exposure participants were faced with a smaller and less varied set of songs. In study 2, participants were free to replicate their previous choices at any time, which prevented us from analyzing differences in confidence across the two choice-set size conditions controlling for the specific exposure in which preferences were formed and choice replication was initiated.

In study 3 we therefore traded off realism for control and we ensured both that in the no-replicate condition the number of available options remained unchanged over repeated choice exposures, and that in the replicate condition the very first choice was captured. To do so, we forced participants in the no-replicate condition to taste different chocolates by removing the

selected chocolate after each exposure and replacing it with a new chocolate in the subsequent exposure. We also forced participants in the replicate condition to taste repeatedly the same chocolate they had first selected by assigning this chocolate to them again at each following exposure.

The choice-replication manipulations used in this study also influenced the amount of variety available to participants in the two choice-set conditions in a way that was opposite to that of studies 1 and 2. Whereas in study 1 the no-replication manipulation implied less variety over time, in study 3 the no-replication manipulation was not associated to a lower amount of variety. At the same time, whereas in study 2 the replication manipulation implied that variety did not change over time, in study 3 the replication manipulation was associated to a lower amount of variety. Through these manipulations we were able to provide empirical support to the psychological process underlying our hypotheses. Specifically, recall our assumption that, in the no-replicate condition, variety would be valued to a similar extent by both small and large choice-set choosers. The progressive drop in size and variety caused by the manipulation adopted in study 1 therefore hurt participants in both conditions, but those in the small-set condition suffered more than those in the large-set condition given the initial more limited selection. As a result, we observed a flat slope in the large-set condition and a negative slope in the small-set condition. Because in study 3 this drop in variety was prevented by replacing the selected chocolates at each exposure, we expected an overall positive trend in confidence as participants in both conditions would benefit from variety, although once again to a different extent: participants choosing from small, less varied, sets would benefit less than those choosing from large, more varied, sets, and this difference in slopes would eventually lead to the hypothesized weakening of the initial gap in confidence due to choice overload.

In the replicate-choice condition, on the other hand, we posited that variety would be valued more in the large-set than in the small-set condition. The provision of this variety entailed by the manipulation used in study 2, together with the positive effect of replication (Bem 1967; Berger and Mitchell 1989; Park and Lessig 1981), resulted in the overall positive trend in confidence observed in that study. As the choice imposition adopted in the replication manipulation of study 3 inhibited participants from taking advantage of the variety offered to them, our proposed mechanism would anticipate an overall negative trend. Consistent with our hypothesis, however, we expected participants in the large-set condition to be hurt more by the inability of seeking variety than those in the small-set condition, preserving over time the initial difference in confidence due to choice overload.

STUDY 3

Participants were exposed for five consecutive times to either a large (50) or a small (five) set of pictures of chocolates on a computer screen. Choice replication was manipulated in order to either prevent participants from selecting again a previous choice on subsequent exposures (no-replicate condition) or ensure that their first choice would be selected again in the subsequent four exposures (replicate condition).

Method

One-hundred fourteen members of a U.K. University's staff participated in this study. Participants were asked to come to the lab for five days in a row at any time between 10 am and 6 pm, and each time the experimental task took about 15 minutes to complete. Participants were informed that they would be paid a fix amount (£2) for each day in which they took part in the

study and an additional £10 for completing all the five days, for a total of £20 maximum, to be received on their final day.

The study involved three independent variables: choice-set size and choice replication had each two levels (choice-set size: small, large; choice replication: replicate, no replicate) and were manipulated between-subjects, choice exposure had five levels (1 to 5) and was manipulated within-subjects. Participants learned that the study was part of a research project aimed at understanding consumers' consumption of ordinary food items and that it would involve repeated choice exposures and actual consumption of the chosen options. On the first day, the study procedure was practically identical to study 2. Participants in both the replicate and the no-replicate conditions examined on a computer screen either a small (five) or a large (50) set of pictures of chocolates, clicked on the chocolate pictures of which they wanted to know more (name and brief description), chose one chocolate to taste, and then answered a questionnaire. We urged participants to choose and taste their preferred chocolate by instructing them to select the chocolate that they liked the most.

From the second day on, participants in the replicate condition read on the computer screen: "On the first day of this study, you examined a chocolate assortment, chose one chocolate that you liked the most, tasted the chocolate that you had chosen, and then answered a few questions about this experience. Today, we are going to give you again the chocolate that you chose on the first day." Participants then saw on the computer screen the same selection of different kinds of chocolates that they had examined on the first day, including their preferred one. They were told that they could collect additional information on the chocolates by clicking on the relative pictures and that they had to raise their hand when they wanted to taste the chocolate, the same one they had chosen on the first day of the study.

In contrast, participants in the no-replicate condition read the same experimental instructions across the five days of the study. However, starting from the second day, we removed the chocolate that was chosen on the previous day and replaced it with another chocolate, the same for all participants.

Because the replicate condition involved a choice imposition, the questionnaire participants answered after tasting the chocolate did not include questions about the ease with which they chose. Participants were instead asked three questions about their decision confidence. In addition to the same question used in study 2, participants were also asked: "Do you think that there were other chocolates in the assortment that would taste much better than the one you chose?" and "If you could change the chocolate you chose for another chocolate in the same assortment, how likely would you be to do so?" Responses to these last two questions were reverse-scored and combined to the first question to obtain an overall confidence measure (α = .85, $p < .001$).

Finally, on the first day of the study participants reported their liking and knowledge of chocolate by answering the same two questions as in study 2, which were combined into an overall liking score (α = .69, $p < .0001$). All these questions were answered on nine-point scales (1 = Not at all; 9 = A great deal)

Results

We used the same set of mixed analyses of variance and regressions that were employed in study 2. Nine participants missed one of the five days of the study and seven missed two days. Data for these participants were entered consecutively for four or three days, respectively, with the remaining final days treated as missing values, but the results reported below remained unchanged when this sequential re-arrangement of the data was not performed. Two participants

were mistakenly switched to a different condition during the five days of the experiment and were therefore removed from the subsequent analyses. Four participants (three in the small, no replication, first choice condition; one in the small, replication, third choice condition) whose overall confidence scores were three interquartile ranges below the 25^{th} percentile (Tukey 1977) were identified as outliers and also removed from the subsequent analyses. In this study, there were no outliers in the overall liking score. We were then left with 108 participants and 519 observations.

Decision confidence. The three-way, mixed ANOVA on the overall confidence score, with choice-set size (small, large), choice replication (replicate, no replicate), and choice exposure (1 to 5) as discrete factors confirmed the choice overload effect. Averaging across the replicate and no-replicate conditions, on their first exposure participants were more confident when presented with a small (M = 6.76, SE = .31) than with a large set (M = 5.44, SE = .30; t(1, 395) = 3.09, $p < .005$). On the last exposure this difference decreased but remained significant (M_{small} = 6.40, SE = .32; M_{large} = 5.43, SE = .32; t(1, 395) = 2.15, $p < .05$).

We subsequently used dummy variables to code choice-set size (0 = small; 1= large) and choice replication (0 = no replicate; 1 = replicate), and the same linear, quadratic, cubic and quartic orthogonal polynomial contrast coefficients to fit the choice exposure scores. We then regressed the overall confidence measure on choice-set size, choice replication, the four choice-exposure trends and the corresponding two-way and three-way interaction terms.

This regression revealed that the three-way interaction term including the linear trend for choice exposure was significant (t(1, 395) = -2.46, $p < .05$); the three-way interaction including the quartic trend also reached significance (t(1, 395) = 2.18, $p < .05$). To test our hypotheses—a weakening of the choice overload effect when the initial selection could not be replicated, and a

persistence of the choice overload effect when the initial selection could be replicated—we report the results of the two choice-set size × linear choice exposure interactions separately for the no-replicate and the replicate conditions.

In the no-replicate condition, the choice-set size × choice exposure interaction was significant ($t(1, 395) = 1.96$, $p = .05$). In the small choice-set size condition, confidence remained stable across the five choice exposures (B = -.09, SE = .11; $t(1, 395) = -.80$, NS), whereas in the large choice-set size condition confidence increased (B = .22, SE = .11; $t(1, 395) = 1.99$, $p < .05$), resulting in the expected progressive reduction of the original advantage of the small set over the large set. In contrast, in the replicate condition, the choice-set size × choice exposure interaction was not significant ($t(1, 395) = -1.51$, NS). A subsequent analysis of the linear slopes revealed that, consistent with our predictions, confidence remained constant over repeated exposures in the small choice-set condition (B = -.04, SE = .11; $t(1, 395) = -.34$, NS) but it significantly decreased in the large choice-set condition (B = -.27, SE = .11; $t(1, 395) = -2.53$, $p < .05$), showing that the initial greater confidence of participants choosing from a small set persisted, and even directionally increased, over time.

These results (shown in figures 3a and 3b) are in line with the findings from study 1 showing that, when replication of previous selections was not allowed in subsequent exposures, the confidence of participants choosing from small sets offering smaller variety was hurt to a greater extent than that of participants choosing from large sets offering greater variety. These results are also in line with those from study 2 showing that, when choice replication was allowed, participants choosing from small sets were more likely to replicate previous choices and were less affected by the smaller variety than those choosing from large sets. Taken together, these results support our hypotheses that the choice overload effect weakens over time when an

option cannot not be selected more than once, but persists when the same option can be chosen again over repeated exposures to the same set.

[Insert figures 3a and 3b about here]

Overall liking of chocolate. We conducted a one-way ANOVA of choice-set size on the overall liking score collected on the first day of the study after combining the two replication conditions, which did not vary on that day. This analysis revealed that the main effect was not significant ($F(1, 104) = .39$, NS; two participants did not respond to the questions included in this overall score).

Discussion

Study 3 tested our two hypotheses in the same study and found empirical support for these hypotheses: when participants were forced not to replicate their first choice, the initial choice overload effect on decision confidence became smaller over repeated exposures; however, when participants were forced to replicate their first choice, the initial choice overload effect persisted over repeated exposures.

Recall that our explanation for these effects rests on the prediction that if consumers cannot replicate their previous selections they value variety regardless of the size of the set from which they choose. In contrast, if consumers can replicate their previous selections, they value variety less when choosing from small sets than when choosing from large sets. Results were consistent with this prediction. In the no-replicate condition, participants' desire for variety was fulfilled by the ever-changing set of chocolates, but to a lesser extent for those choosing from small sets than for those choosing from large sets. Because of the limits of small sets in accommodating changing preferences over time through variety, the confidence of participants choosing from small sets increased at a lower rate than that of participants choosing from large

sets and determined a weakening of the initial gap in confidence. In contrast, in the replicate condition, desire for variety was frustrated as participants were forced to replicate four times in a row their first choice. This frustration was, however, greater for participants choosing from larger sets relative to those choosing from smaller sets, and resulted in a perseverance of the choice overload on confidence.

GENERAL DISCUSSION

In this paper we addressed for the first time one of the main weaknesses in the literature on the choice overload effect, namely that the dilemma of choosers confronted by choice sets involving a different number of options had been investigated in one-off choices rather than in more dynamic real-life settings (for an exception, see Redden 2013). The potential limits in the external validity of the choice overload effect have recently taken the center stage in the debate around the robustness of the underlying theory and existing findings (Scheibehenne, Greifeneder, and Todd 2010). The sets of studies presented in this paper therefore examined choice overload in the more naturalistic contexts of repeated exposures to a small, versus a large, choice set.

It could be argued that repeated choice exposures should indeed lessen choice overload. Choosing from large sets, as compared to small sets, has the advantage of offering decision makers greater variety and a higher likelihood to find the best match between individual preferences and available alternatives, but has the disadvantage of generating greater cognitive and emotional conflicts. In one-off decisions, the conflict disadvantage offsets the variety advantage, as demonstrated by the greater confidence experienced by small-set choosers relative to large-set choosers repeatedly found in previous studies (Chernev 2003; Iyengar and Lepper

2000; Iyengar, Wells, and Schwartz 2006; Inbar, Botti, and Hanko 2011; Mogilner, Rudnick, and Iyengar 2008; Park and Jang, 2013; Reed et al. 2011; Sela, Berger, and Liu 2009). However, this disadvantage weakens when repeated decisions are considered because preference matching becomes easier and consumers more able to overcome the associated conflicts. Over time, the variety advantage might cause an increase in decision confidence that could reduce the original gap between small-set and large-set choosers.

Results from three studies, which tried to combine more naturalistic and more controlled experimental designs, suggest that the effect of repeated choice exposures on decision confidence depends instead on the value attributed to variety and the possibility to replicate previously made choices. When initial choices could be replicated, variety became more important over time for consumers choosing from large sets than for those choosing from small sets. The latter formed strong preferences quickly within the boundaries of their limited options and stuck with their selections. As a result, their initial greater confidence was reinforced, and persisted over repeated choice exposures. However, when initial choices could not be replicated, variety became as important over time for consumer choosing from small sets as for those choosing from large sets because in both cases these consumers had to re-engage in preference matching. In this situation, the limitation of small sets in satisfying desired variety progressively reduced the initial greater confidence of consumers choosing from small sets.

Choice overload remains an important factor to consider for managers and public policy makers when designing the amount of choice to offer. This is not only because repeated choice exposures may not always improve the relative confidence of consumers choosing from large sets, but also because important choices, such as deciding how to invest one's own pension money or whom to marry are often still of the one-off type. In addition, even in those domains in

which choice repetition is the norm, an initial poor subjective experience with choosing from large assortments may undermine the likelihood that consumers engage in future exposures, thereby preventing them to enjoy the potential benefits of large variety in the absence of decision conflicts. For example, research shows that consumers who initially faced a higher number of choices were more likely to default subsequent choice opportunities than those who started with a lower number of choices (Levav et al. 2010).

Going back to our initial example, Robin Williams' character graphic reaction to the overabundance of coffees was due to his inability to choose in the face of large assortments, having just emigrated to the U.S. from choice-constrained U.S.S.R. By the end of the movie, he confidently navigates the isles of New York's grocery stores with no nostalgia for the queue-rationing system of his earlier years. As long as most of the choices made in grocery stores are replicable, this outcome echoes our study 2 results, in which participants free to replicate their selections increased their decision confidence over time both when choosing from small and from large assortments.

In reality, consumers may never really consider large sets in their entirety; rather, they may select smaller sub-portion from which to choose, replicating their initial choices over time. Or, the may form their preferences (their ideal points) before being exposed to the assortments, and not during the exposure, as theorized by Chernev (2003). Or, they may just accept the cognitive and emotional conflicts associated with choosing from large sets as an inevitable shortcoming of modern life. As it is often the case, then, controversy about the choice overload effect should not be around whether or not it is generalizable, but around the circumstances in which generalizability is more likely to be observed (Chernev, Böckenholt, and Goodman 2010).

Previous research on choice overload has been limited to a specific kind of choosing paradigm involving sets of different sizes in the context of isolated, static decisions. However, this paradigm is becoming increasingly unable to explain the dilemmas and tradeoffs of real-life choosers who are often confronted with more dynamic choice settings. Not only these consumers may encounter the same assortments repeatedly, either large or small; they may also encounter assortments that change over time in ways that facilitate or prevent the selection of the same option more than once. As this gap between the choices consumers made every day and those they make in the lab widens, scientists should adopt research methods that simulate the real-world choice environments and allow a better compromise between internal and external validity. This way, we can seek to deepen our insight into how we choose and how we get the most from our choices.

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FIGURE 1A

Study 1: Linear Trend Analysis for Preference-Matching Ease

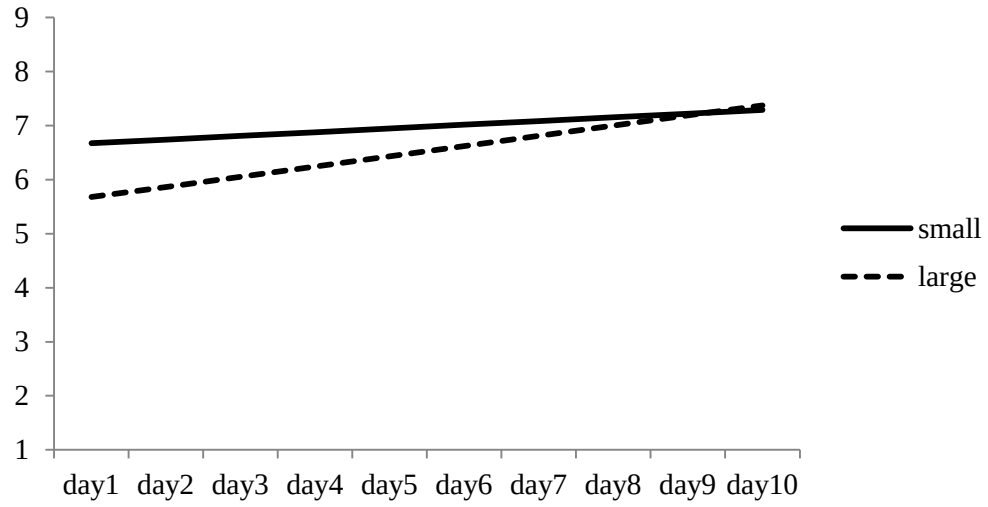


FIGURE 1B

Study 1: Linear Trend Analysis for Decision Confidence

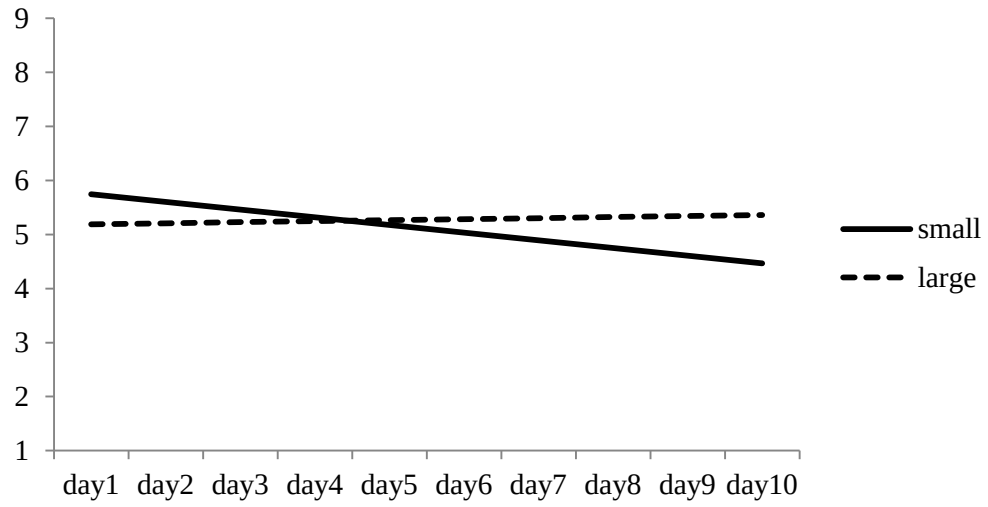


FIGURE 2A

Study 2: Linear Trend Analysis for Preference-Matching Ease

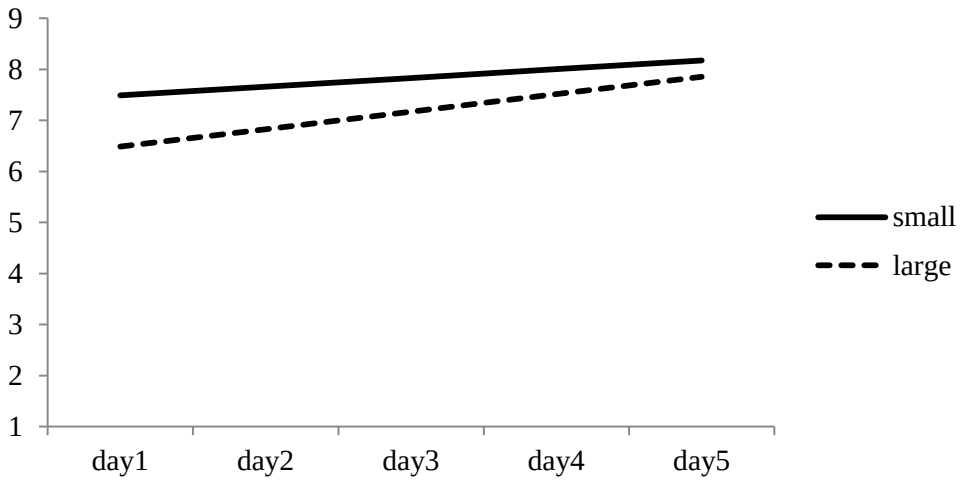


FIGURE 2B

Study 2: Linear Trend Analysis for Decision Confidence

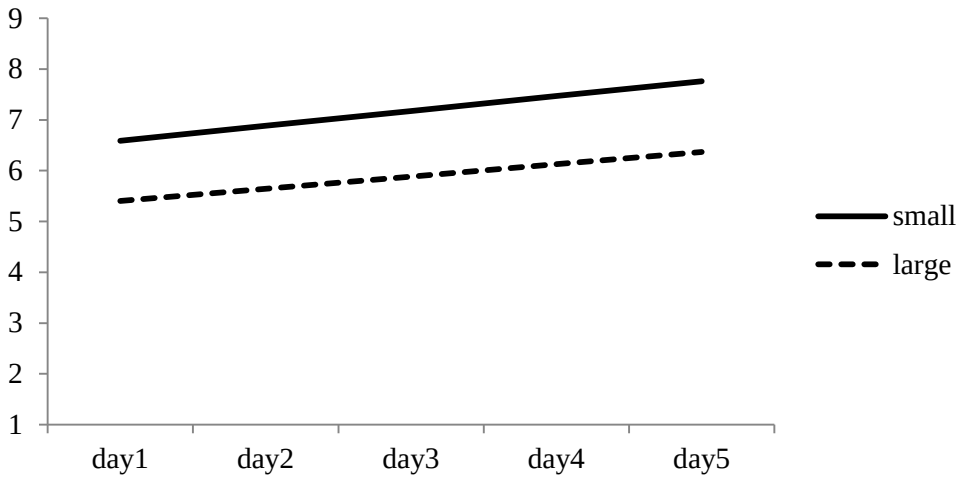


FIGURE 3A

Study 3: Linear Trend Analysis for Decision Confidence

(No-Replication Condition)

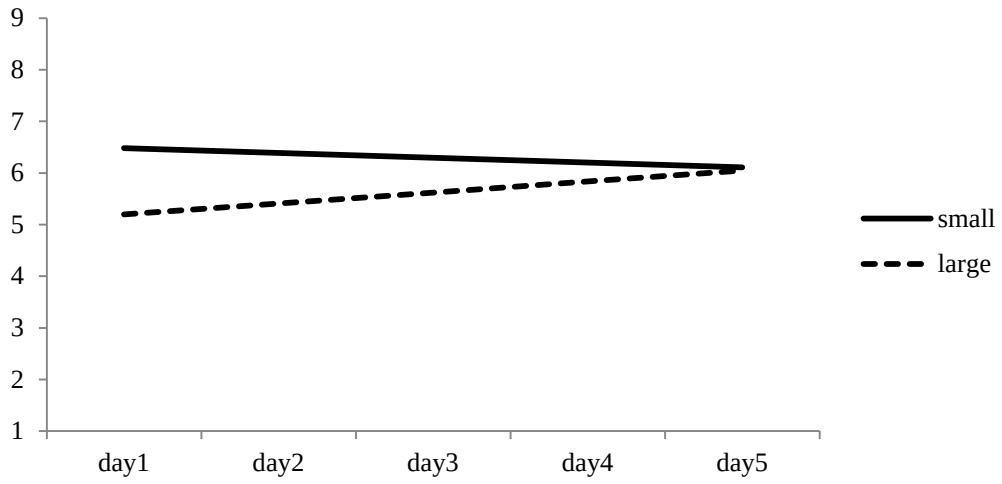
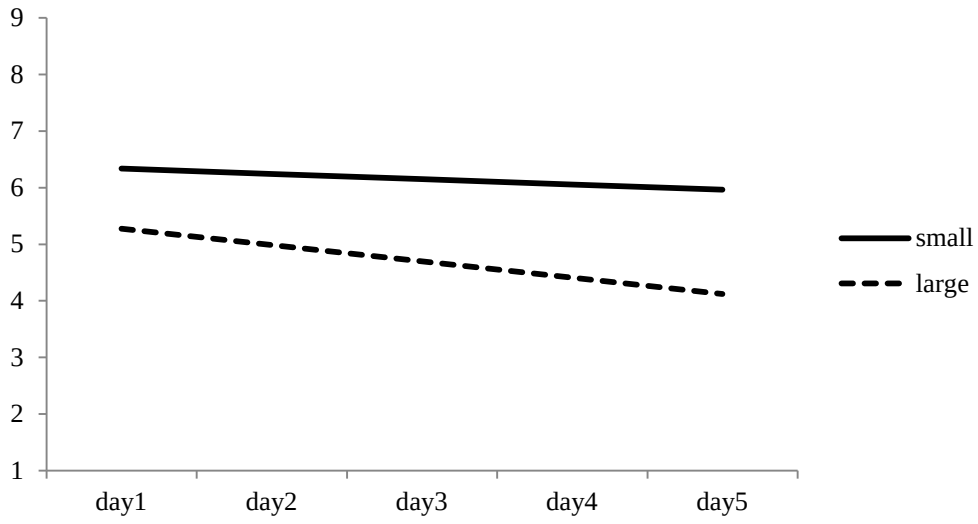


FIGURE 3B

Study 3: Linear Trend Analysis for Decision Confidence

(Replication Condition)



APPENDIX

Orthogonal Polynomial Contrast Coefficients (Study 1)

	Day1	**Day2**	**Day3**	**Day4**	**Day5**	**Day6**	**Day7**	**Day8**	**Day9**	**Day10**
Linear	-0.495434	-0.385337	-0.275241	-0.165145	-0.055048	0.0550482	0.1651446	0.2752409	0.3853373	0.4954337
Quadratic	0.522233	0.1740777	-0.087039	-0.261116	-0.348155	-0.348155	-0.261116	-0.087039	0.1740777	0.522233
Cubic	-0.453425	0.1511417	0.3778543	0.334671	0.1295501	-0.12955	-0.334671	-0.377854	-0.151142	0.4534252
Quartic	0.3365809	-0.411377	-0.317882	0.0560968	0.3365809	0.3365809	0.0560968	-0.317882	-0.411377	0.3365809
Quintic	-0.214834	0.5012804	-0.035806	-0.393863	-0.214834	0.2148345	0.3938632	0.0358057	-0.50128	0.2148345
Sextic	0.1167748	-0.428174	0.3892495	0.2335497	-0.3114	-0.3114	0.2335497	0.3892495	-0.428174	0.1167748
Septic	-0.052694	0.2751787	-0.503518	0.2459043	0.3278724	-0.327872	-0.245904	0.5035184	-0.275179	0.0526938
Octic	0.0186989	-0.130893	0.3739788	-0.52357	0.2617852	0.2617852	-0.52357	0.3739788	-0.130893	0.0186989
Nonic	-0.004535	0.0408164	-0.163266	0.3809534	-0.57143	0.57143	-0.380953	0.1632657	-0.040816	0.0045352

Orthogonal Polynomial Contrast Coefficients (Studies 2, 3)

	Day1	**Day2**	**Day3**	**Day4**	**Day5**
Linear	-2	-1	0	1	2
Quadratic	2	-1	-2	-1	2
Cubic	-1	2	0	-2	1
Quartic	1	-4	6	-4	1