Partitioning Menus to Nudge Single-item Choice

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Abstract

Decision makers are often called on to choose a single item from a menu of options: employees pick health plans from provider-sponsored lists, citizens vote for a representative among candidates, physicians select a treatment from an order set. Because options are often organized or grouped into subsets, the question arises whether the grouping of menu items affects the options ultimately selected by decision makers. Across ten experiments, we provide robust evidence of *single-item partition dependence* — decision makers are more likely to choose from response categories that are more finely partitioned, holding the underlying set of options constant. For example, an employee choosing a health plan from a menu that lists HMOs individually but groups PPOs into a single category with sub-options may be biased towards choosing an HMO. Unlike prior work on multi-item allocation decisions, the traditional explanation of partition dependence — a bias toward even allocation — cannot apply to single-item choice, because singular choices are not divisible. Instead, we find that finer partitions receive greater choice share because decision makers infer that separately listed options are more popular on average than grouped ones. More broadly, strategic partitioning of the menu space may serve as a simple and effective tool for managers, policymakers, and choice architects: listing options separately rather than grouping them together tends to increase their choice share, without fundamentally altering the underlying set of alternatives or the effort required to choose among them.

Keywords: decision making, choice architecture, partition dependence, social norms

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Decisions are influenced by how options are presented, ordered, framed, and described. Based on this simple but powerful insight, governments around the world have become interested in designing behaviorally informed "choice architecture" policies to enhance public welfare and promote other public priorities (Sunstein, 2013; Thaler & Sunstein, 2008, 2021). Examples include policies that nudge employees to save more for retirement by automatically enrolling them into a savings plan, nudge homeowners to consume less energy by comparing electricity usage to that of their neighbors, and nudge students to take advantage of college federal loans by making financial aid forms less daunting (Allcott & Rogers, 2014; Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012; Madrian & Shea, 2001).

A necessary feature of any choice architecture decision is whether, and how, to group a set of options. In this paper we examine the impact of grouping or partitioning the option set on the selection of a single choice from a menu. Examples of single-item choice include managers choosing an employee as project lead from a roster, citizens voting on a candidate for public office from a ballot, physicians selecting a medical prescription from an electronic order set, or restaurant patrons ordering an entree from a menu. For reasons we discuss below, the application of menu partitions to single-item choice is both theoretically interesting and practically important.

Because options must often be organized or grouped in some way, an important question is whether the partitioning of menu items affects what decision makers ultimately choose. We provide evidence of *single-item partition dependence*, where decision makers are more likely to choose a single option from response categories that are more finely partitioned. To illustrate, consider an employee choosing from a list of healthcare plans, some of which are HMOs and some PPOs. Our results suggest that HMOs are more likely to be selected when they are partitioned into finer-grained categories (such as group model HMOs, individual practice HMOs, and network model HMOs) than when all such options appear under a single category ("HMOs").

In this paper, we present a series of experiments establishing the robustness and generality of single-item partition dependence across multiple theoretically distinct choice tasks and using

real incentives. We also directly test for a mechanism underlying single-item partition dependence, namely that decision makers view the grouping of options as a signal about what options are most frequently chosen by others (i.e., descriptive social norms). Our findings suggest that incidental menu partitioning can inadvertently bias responses, and strategic menu partitioning can provide a simple but potent tool of choice architecture.

Menu Grouping and Choice

When constructing a choice menu, there is often a need to group items in order to reduce complexity and organize options (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). For instance, a wine merchant may group wines by the geographic region of production (California, Italian, and French wines), by grape varietal (Merlot, Pinot Noir, and Malbec wines), by price point (low-priced, medium-priced, and high-priced wines), or by color (red, rosé, and white wines). Similarly, an organization may group resources by specialization (product development, manufacturing, and marketing), by geography (domestic and international offices), or by market segment (retail, small business, and enterprise clients). Menus with three or more options necessarily require a decision about grouping, including the decision not to group at all. As the number of options increases, so too do the number of possible partitions.

While the partitioning of options may help individuals navigate the option space more efficiently, such groupings can also serve to bias choice. Past research finds that for multi-item allocation decisions, in which a decision maker divides or distributes a fixed set of resources, choices are *partition dependent* because individuals tend to be biased towards even allocation (Fox, Ratner, & Lieb, 2005; Bardolet, Fox, & Lovallo, 2011; for a review see Fox, Bardolet, & Lieb, 2005). To illustrate, consider the following two firms. At firm A, an employee allocates earnings to a savings plan from a menu that partitions options according to domestic stocks, international stocks, and bonds. At firm B, an employee allocates earnings from a menu that instead partitions the same set of options according to stocks, domestic bonds, and international bonds. A bias towards even allocation over identified groups will lead to a relatively stock-heavy portfolio for employees at firm A (e.g., 1/3 to domestic stocks, 1/3 to international stocks, and 1/3 to bonds) but will lead to a

relatively bond-heavy portfolio for employees at firm B (e.g., 1/3 to stocks, 1/3 to domestic bonds, and 1/3 to international bonds). Partition dependence for allocation has been observed in both laboratory and field settings, and across a number of domains, including consumption decisions, assessments of fairness, budgeting, hiring, corporate capital allocation, and parental investment (Bardolet et al., 2011; Bogard, West, & Fox, 2026; Feng, Liu, Wang, & Savani, 2020; Fox & Clemen, 2005; Fox, Langer, & Lohmeier, 2026; Hertwig, Davis, & Sulloway, 2002; Martin & Norton, 2009; Shah & Oppenheimer, 2011; Sonnemann, Camerer, Fox, & Langer, 2013; West, Ülkümen, Arundel, & Fox, 2026).

Partition dependence entails a bias toward even allocation over the subsets into which the overall set of options happen to be partitioned, with relative insensitivity to the specific nature of those partitions. Prior investigations have explored this phenomenon in contexts of making multiple selections from a menu or allocation of a continuous resource to a set of options, where the bias toward even allocation may be driven by a diversification heuristic (e.g., variety seeking over consumer options, naive diversification over investments, the principle of insufficient reason in probability assessment). In contrast, the present investigation explores partition dependence in the context of a single choice, where diversification is, by definition, not possible. To illustrate, note that an individual wishing to seek variety can express that preference when choosing multiple items ("I'll choose one option from group A, one from group B, and one from group C"), but cannot when choosing a single option from a list. To the extent that partition dependence is observed in the context of single-item choice, it must therefore entail mechanisms that are distinct from those applied to multi-item choice.

As an illustration of how menu partitioning might matter for single-item choice, consider political elections where voters are asked to select a single candidate for office. In such cases, election officials must decide whether to organize voter ballots, among other possibilities, according to political candidates or political parties. However, since multiple parties may run the same candidate, partitioning by political party can lead to multiple listings for the same candidate. For instance, in the 2025 New York mayoral race, Zohran Mamdani appeared on the ballot twice (once

as the Democratic candidate and once for the Working Families Party) while his main opponent, Andrew Cuomo, appeared only once as an independent (Patil, 2025; for another example, see Glatsky & Beltran, 2024). Several prominent conservatives seized on this feature of the ballot, arguing that the menu partition had been deliberately structured to boost Mamdani's vote share (Myers, 2025).

The voting example above suggests the following form of partition dependence for single-item choice: decision makers are especially likely to choose from response categories that are more finely partitioned. Just as listing the same political candidate twice (rather than once) might increase their vote share, multiple listings for a category of items may increase choice share for that class of items. In fact, a small number of prior studies have documented related patterns using hypothetical choice scenarios. Using medical vignettes, Tannenbaum et al. (2015) found that physicians were more likely to prescribe aggressive treatment options (e.g., broad-spectrum antibiotics) when those options were individually listed compared to when those options were grouped together. Similarly, using a hiring vignette, Feng et al. (2020) found that respondents were more likely to select a racial/ethnic minority job applicant when the candidate pool consisted of minorities from different specializations (and thus were not grouped together) than when the candidate pool consisted of minorities from the same specialization (and thus were grouped together). Finally, Brenner, Rottenstreich, and Sood (1999) found that choice shares for hypothetical consumer goods sum to greater than 100% in between-participant designs where one item is listed separately (e.g., "Seafood restaurant") and all other remaining items are grouped together as an alternative compound option (e.g., "Your choice of either Italian, Mexican, or Thai restaurant").

While this prior work is consistent with single-item partition dependence, we note that all past studies involved hypothetical decisions with incomplete or imperfect information. The present studies, in contrast, demonstrate that single-item partition dependence is robust across theoretically distinct choice domains, under conditions of complete information, and for decisions with real stakes. Furthermore, no prior studies have directly examined why single-item partition dependence arises. The present studies are, to our knowledge, the first to directly investigate a potential mechanism

underlying single-item partition dependence.

Information Leakage from Menu Partitions

If decision makers are indeed biased toward choosing single items from more finely partitioned categories, this raises the question of why this bias occurs. Common intuition suggests that menu partitions may affect choice by enhancing salience of more finely partitioned options. For instance, more detailed or delineated descriptions of events often make those events seem more likely, partly because such descriptions increase attention and deliberation (Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994); it is possible that separately enumerating options rather than grouping them together may likewise drive choices through enhanced attention. Another possibility is that menu partitions capitalize on thoughtless responding that effectively randomizes choices over partitioned categories. These accounts imply that single-item partitioning may be most likely to influence choice when decision makers are not especially motivated or engaged (we explore these issues in greater detail in the General Discussion). Here, we examine a distinct mechanism that may drive single-item partition dependence even in situations where decision makers *are* highly motivated and engaged — specifically, we hypothesize that decision makers infer task-relevant information from the way options are grouped.[1]

If categorization and grouping often serve to reduce complexity (Rosch et al., 1976), then decision makers may infer that such groupings are not arbitrary and therefore carry useful information (e.g., Kamenica, 2008; Prelec, Wernerfelt, & Zettelmeyer, 1997). Benartzi and Thaler (2001), for instance, speculated that employees engage in naive diversification when saving for retirement because they recognize their lack of financial sophistication and trust their employer has curated a set of funds (i.e., constructed a menu of options) suited to employee needs. More generally, conversational norms prescribe that information should only be as fine-grained as necessary (the conversational maxim of quantity; Grice, 1975), and decision makers appear to apply similar assumptions when confronting a menu of options (Zhang & Schwarz, 2012). As a result,

[1]While others have speculated that menu partitions may signal task-relevant information (Fox & Clemen, 2005; Fox, Ratner, & Lieb, 2005; Kahneman & Tversky, 1982; Martin & Norton, 2009; Tannenbaum et al., 2015), to our knowledge no prior studies have directly tested this hypothesis.

two extensionally equivalent menus can nevertheless convey different information (McKenzie & Nelson, 2003; Sher & McKenzie, 2006, 2014).

We focus in particular on the possibility that menu partitions signal information about *descriptive social norms* — that is, how others typically choose in the same situation. Decision makers may assume that managers and other choice architects allocate menu space preferentially to options that are frequently chosen, while clustering less popular options together or consigning them to a residual category (e.g., "all other options"). For instance, if a retirement menu individually lists stock funds but groups bond funds into a single category, employees may infer that most of their colleagues invest primarily in stocks. Stated more precisely, this account suggests that decision makers act as if menu partitions follow a "principle of maximum entropy" (Jaynes, 1957) over the distribution of preferences in a population: among the feasible ways to carve up the menu, choice architects try to divide the menu in a way that most evenly allocates preferences across options (with more popular items listed separately rather than grouped).

This account is consistent with broader evidence that decision makers readily infer descriptive norms from features of the choice context. Options placed in the center of a simultaneously presented array are assumed to be more commonly chosen by others (Valenzuela & Raghubir, 2009), as are products that occupy a relatively large fraction of shelf space (Reit & Critcher, 2020). Similarly, decision makers often consult the range of options in a menu to learn about the distribution of preferences in the population (Prelec et al., 1997). For instance, survey respondents sometimes use the range of the response alternatives on a survey to infer typical and atypical behavior (e.g., the extremes of the response scale are assumed to correspond to extreme or atypical behavior in the population), which they then use as a frame of reference when estimating their own behavior (Menon, Raghubir, & Schwarz, 1995; Schwarz, Hippler, Deutsch, & Strack, 1985; Tourangeau & Smith, 1996). These findings suggest that design features of a choice menu are often viewed as conveying information about the preferences of others.

To the extent that people look to descriptive norms for guidance — because common choices are often taken to signal option quality (i.e., informational social influence; Banerjee, 1992) and/or

socially appropriate behavior (i.e., normative social influence; Bearden & Rose, 1990) — the way options are partitioned may reveal task-relevant information and thereby shape choice. Furthermore, our account implies that single-item partition dependence will be linked to the social and organizational context in which menus are encountered and will be especially influential for individuals who chronically rely on descriptive norms to guide their own decisions.

The Current Studies

In this paper we investigate the conditions that give rise to single-item partition dependence. We extend prior literature by studying this phenomenon across a diverse range of decision settings, including contexts with real stakes (incentive-compatible choice) and complete information about all options. Furthermore, we examine a novel mechanism that can help explain when and why partition dependence is observed for single-item choice.

In Study 1, we test for single-item partition dependence across several workplace settings. In Studies 2A–2C, we show that these effects are robust to incentive-compatible choice and generalize across theoretically distinct task domains (riskless decisions, risky decisions, and nonstrategic social preferences). In Studies 3–5, we examine the extent to which single-item partition dependence is driven by inferences of descriptive social norms from menu partitions. We report an additional three studies (Studies S1–S3) in the Supplemental Material.

For all studies, we determined sample sizes prior to data collection. We preregistered hypotheses and analysis plans for all studies except Studies 3, 4, and S2. Section 1 of the Supplemental Material lists all preregistration deviations (these were primarily additional analyses that were suggested during the review process). For each study, we also excluded a small number of observations with either duplicate IP addresses or incomplete survey responses; the sample sizes reported below reflect the final samples after these exclusions. The only demographic information we collected was participant age and gender, always measured at the end of each study. Study material, data, code, and preregistration documents can be found at https://researchbox.org/227.

Study 1: Single-item Partition Dependence

Study 1 tests for single-item partition dependence across several workplace contexts. Participants chose from menus in which options from one category were individually listed ("unpacked" options), while options from another category were grouped together ("packed" options).[2,3] This design mirrors common menu partitions in which a subset of possible choices are presented while remaining options are grouped together — for example, when a merchant lists out certain categories of goods (e.g., a liquor vendor website that partitions its selection of Bourbon, Scotch, and Rye whiskeys) while relegating other goods to a residual category (e.g., "all other spirits").

While this "featured subset + packed remainder" menu structure is commonplace, grouping options into a residual category reduces informational content and increases search or effort costs, as such options are harder to locate (e.g., buried deeper within a website). To rule out these confounds, we constructed our menu partitions so that visibility, information, and effort costs were held constant across conditions. If participants exhibit partition dependence for single-item choice, then we should see greater choice share for options from more finely partitioned categories compared to options from more coarsely partitioned categories.

Method

We recruited a sample of 400 respondents from CloudResearch Connect to participate in return for a flat cash payment (48% male, mean age = 38 years, age range: 19–83 years).

[2]We distinguish our use of "packed" and "unpacked" categories, which refers to whether options are grouped or listed separately, from a related stream of research that examines "unpacking effects" in which individuals assign relatively greater weight to more delineated or detailed descriptions of events (Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994). For instance, in Tversky and Koehler (1994) one group of participants assigned higher probability to a person dying from "heart disease, cancer, or other natural causes" than a second group assigned to a person dying simply from "natural causes." We note that unpacking effects are distinct from partition dependence — the former focuses on how the description of events affects judgment, whereas the latter focuses on how options or events are grouped together. For instance, Fox and Clemen (2005) find a bias towards $1/n$ when varying the partitioning of the elicitation format while holding the description of events constant. In our studies, we also describe all options in equal detail across menu partitions in order to rule out any role of traditional unpacking effects.

[3]In Section 2 of the Supplemental Material, we report the results from an additional study that compares menu partitions to a "control" condition in which all items are individually listed. Such a design allows us to examine whether individually listing only focal versus nonfocal items is the primary driver of single-item partition dependence. We find that, relative to the control condition, both treatments have a roughly comparable effect on choice.

Figure 1: Example of Menu Partition (Study 1)

Innovation-focused Projects Unpacked

Imagine your manager asks you to join one cross-functional project team. Which project would you prefer?

- New Product Development Team
- Market Expansion Initiative
- Digital Transformation Project
- An efficiency-focused project: your choice of either the Process Improvement Task Force, Cost Reduction Initiative, or Supply Chain Optimization Project

Which one project would you choose? _____

Innovation-focused Projects Packed

Imagine your manager asks you to join one cross-functional project team. Which project would you prefer?

- Process Improvement Task Force
- Cost Reduction Initiative
- Supply Chain Optimization Project
- An innovation-focused project: your choice of either the New Product Development Team, Market Expansion Initiative, or Digital Transformation Project

Which one project would you choose? _____

Participants responded to four hypothetical choices involving common workplace decisions. Each trial consisted of a menu of six options partitioned into two categories of three options each. The four choice domains and menu categories were as follows: (1) undertaking an organizational project from a menu consisting of innovation-based and efficiency-based projects; (2) professional development opportunities from a menu consisting of trade conferences and training programs; (3) team building activities consisting of indoor and outdoor activities; and (4) office resources from a menu consisting of convenience-based and wellness-based amenities. For each menu, we randomly selected one category of options to be individually listed while the other category was grouped into a single listing (see Figure 1 for an example). Participants completed the four choice domains in random order and on separate pages.[4,5]

To minimize random or thoughtless responding, participants wrote out their preference in an

[4]Section 9 of the Supplemental Material reports an analysis of trial order effects for all studies with multiple trials.

[5]Our studies used menus consisting of six options from two categories (three options each). However, single-item partition dependence is not limited to choice sets with six items, nor to choice sets with an equal proportion of packed versus unpacked items. For instance, Tannenbaum et al. (2015) presented a sample of physicians with menus of nine, ten, and fourteen treatment options, and where 7:3, 5:4, 6:4, and 8:6 items were packed versus unpacked. Future work may wish to examine whether menu partitioning effects are moderated by the ratio of packed to unpacked items within a menu (perhaps because such item ratios amplify or attenuate inferences of descriptive social norms).

open text field.[6] We also note that regardless of the menu partition, participants were presented with the same set of options and selected only one option. To control for possible menu position effects, we also counterbalanced (at the participant-level) the position of the grouped category by placing it as either the first or last listing on the menu.

Analysis Strategy

We estimate the average treatment effect of menu partitions on choice, by examining the likelihood of choosing an item when individually listed versus when grouped into a single listing. To do so, we code outcomes for whether participants chose an item from a focal category (0 = did not choose from group A, 1 = chose from group A), and our predictor is an indicator for whether the menu partition unpacks a focal category of items (0 = group A packed, 1 = group A unpacked). Because each domain contains only two categories, the category we designate as focal is arbitrary and does not affect the results. When combining responses across domains, we use a logit model that includes domain fixed effects and participant-clustered standard errors. When examining individual domains, we perform a two-sample test of proportions.

Results

Table 1 provides a summary of the results. Across trials, participants were 60 percentage points more likely to choose individually listed items than when those same items were grouped into a single listing (95% CI: 55–65 pp, $p < 0.001$). As shown in the Table, we observed this pattern in all four domains. We also find a reliable menu partitioning effect regardless of whether the grouped

[6]We presumed that requiring participants to write out their answers, rather than to simply click on an option to register a response, would prompt greater cognitive effort and reduce thoughtless or random responding. Research in survey methodology suggests that open-ended response formats, compared to multiple-choice or closed-ended formats, can encourage more thoughtful responses by participants (e.g., Bernhard-Harrer & Pfaff, 2025).

Because participants in our studies wrote out their answers in an open text field, we exclude from the analysis participants who provided unusable responses. Such responses often involved writing an option not present in the menu (e.g., listing "Singapore" when the response options were France, Italy, Germany, China, Japan, and Vietnam). However, some of these omitted responses were cases where participants wrote the entire grouped category instead of a single item (e.g., a participant writing "an Asian country" instead of specifying a specific country). Because omitting such responses potentially biases results in favor of our hypothesis, we also analyzed the data when including *all* omitted responses and coding these observations to go *against* our hypothesis. Note that this represents a particularly conservative approach, as many unusable responses did not bias the results in a particular direction. In all studies we continue to observe robust menu partitioning effects even when using this more conservative approach. Full details and results for all studies are provided in Section 8 of the Supplemental Material.

Table 1: Percentage of Participants Choosing an Option from Group A (Study 1)

Domain	Group A	Group B	Group A Unpacked	Group A Packed	Difference
Organizational Projects	Innovation-focused	Efficiency-focused	89.7	20.6	69.1***
Professional Development	Training Programs	Trade Conferences	91.2	38.9	52.3***
Team Building	Outdoor Activities	Indoor Activities	74.8	15.2	59.6***
Office Resources	Wellness Amenities	Convenience Amenities	77.2	17.8	59.4***

Notes: "Difference" represents the difference in choice share for choosing an option from Group A when that category is unpacked versus packed. *** $p \leq 0.001$.

category was the first or last listing on the menu (see Table 8), and the interaction between menu partition and grouped category position was not statistically significant ($p = 0.216$).[7]

Studies 2A–2C: Extending Single-item Partition Dependence to Incentive-compatible Choice

Study 1 documents clear evidence of single-item partition dependence across a range of workplace settings. However, by necessity, the choices in Study 1 were hypothetical and participants likely had limited familiarity with such decisions. In Studies 2A–2C we examine whether single-item partition dependence also arises in choices with real stakes, and in contexts where participants possess high task familiarity and/or are provided with complete information.

Studies 2A–2C also test whether single-item partition dependence generalizes across substantively distinct choice domains. Study 2A examines riskless decisions involving familiar consumer products and goods. Study 2B examines decisions under risk, where participants are provided with complete information about option attributes (in this case, lottery payoffs and probabilities). Study 2C examines nonstrategic social preferences, where individuals consider their own material payoffs relative to those of others. Because these studies share the same basic design as Study 1, we report only features unique to each.

[7]When examining interaction effects from binary choice data, we report p-values from the interaction term of the logit model. An alternative approach is to examine the difference in average treatment effects when the packed category is positioned at the bottom versus top of the menu. While these two approaches are identical for ordinary least squares, they are not equivalent for models that make nonlinear transformations to predictor variables (see McCabe, Halvorson, King, Cao, & Kim, 2022; Rohrer & Arslan, 2021). For all results reported in this paper, coefficient signs for the interaction are the same across the two approaches, and p-values that are statistically significant/nonsignificant using one approach (at $p < 0.05$) are also significant/nonsignificant using the other approach.

Study 2A: Riskless Consumption Decisions

Method We recruited a sample of 299 participants from Amazon.com's Mechanical Turk labor market (MTurk; 46% male, mean age = 35 years, age range: 19–74 years). Participants were presented with menus of consumer goods, and indicated the item they would most prefer to receive. We notified participants up front that some respondents would be selected at random to receive one of their chosen options, and that we would follow-up with these participants in order to claim their prize.[8]

Participants made four choices across different consumer goods, in random order and on separate pages. The four choice domains and menu categories were as follows: (1) a menu of DVD movies consisting of science-fiction and romantic comedy movies; (2) a menu of books consisting of behavioral science and life science books; (3) a menu of magazine subscriptions consisting of popular science and world news magazines; and (4) a menu of charitable donations consisting of animal and environmental charities. For each menu, we randomly selected one category of items to be individually listed while the other category was grouped into a single listing, and participants wrote their preference in an open text field (for an illustration, see Figure S2 in the Supplemental Material). We also counterbalanced, at the participant-level, the position of the grouped category by placing it as either the first or last listing on the menu.

Results We find clear evidence of single-item partition dependence for riskless decisions. Across trials, participants were 36 percentage points more likely to choose individually listed items than when those same items were grouped into a single listing (95% CI: 30–42 pp, $p < 0.001$). We observed this pattern in all four domains, as shown in Table 2. Furthermore, we find a reliable menu partitioning effect regardless of whether the grouped category was the first or last listing on the menu (see Table 8), and the interaction between menu partition and grouped category position was not statistically significant ($p = 0.411$).

[8] In Studies 2A–2C, we incentivized participants by randomly selecting a subset and implementing their decisions for real prizes or payouts. This approach can be contrasted with incentive schemes that pay out all participants with smaller stakes. Although findings on experimental incentives are mixed, the evidence generally indicates that paying only a subset of participants relatively larger amounts is at least as effective, and sometimes more effective, than paying all participants with relatively smaller amounts (see Charness, Gneezy, & Halladay, 2016).

Table 2: Percentage of Participants Choosing from Group A

	Group A Unpacked	Group A Packed	Difference
Study 2A: Consumer Goods			
(A) Animal vs (B) Environmental charities	85.4	52.9	32.5***
(A) Science fiction vs (B) Romantic comedy movies	78.1	54.2	23.9***
(A) Life science vs (B) Behavioral science books	79.1	31.7	47.4***
(A) World news vs (B) Popular science magazines	70.0	28.2	41.8***
Study 2B: Chance Gambles			
(A) More risky vs (B) Less risky gambles	28.6	13.0	15.7***
Study 2C: Social Preferences			
(A) More generous vs (B) Less generous offers	72.9	53.7	19.2***

Notes: Study 2A reports the percentage of participants selecting an item from Group A according to menu partition. Study 2B reports the percentage of participants choosing a more risky gamble according to menu partition. Study 2C reports the percentage of participants in a dictator game transferring $2 or more according to menu partition. The rightmost column reports the difference in choice share between the two menu partitions. *** $p \leq 0.001$.

Study 2B: Chance Gambles

Method We recruited a sample of 400 participants from CloudResearch Connect (44% male, mean age = 41 years, age range: 18–80 years). Participants were presented with a single menu of six chance gambles (labeled A–F). The gambles were constructed to be roughly equal in value based on typical prospect theory parameters (for details, see Section 6 of the Supplemental Material). Half of participants chose from a menu with three relatively risky gambles unpacked, while the other half of participants chose from a menu with three relatively safe gambles unpacked (for an illustration, see Figure S3 in the Supplemental Material). Participants were told up front that five of them would be randomly selected to play their gamble for additional bonus money. Participants wrote their preference in an open text field. We also counterbalanced the position of the grouped category by placing it as either the first or last listing on the menu.

Results We find clear evidence of single-item partition dependence for risky decisions. Only 13% of participants chose a more risky gamble when those gambles were grouped into a single listing, compared to 29% when riskier gambles were individually listed ($z = 3.84$, $p < 0.001$). Thus, while participants were generally risk averse, preferences for riskier gambles more than doubled when they were partitioned separately compared to when those same gambles were partitioned

into a single grouping. Furthermore, we observed a reliable menu partitioning effect regardless of whether the grouped category was the first or last listing on the menu (see Table 8), and the interaction between menu partition and grouped category position was not statistically significant ($p = 0.935$).

Study 2C: Social Preferences

Method Participants played a dictator game in which they were asked to split $10 between themselves and an anonymous recipient from the same subject pool. Because the dictator game involves no strategic interaction with the recipient, such decisions serve as a straightforward measure of self-regarding versus other-regarding behavior (Forsythe, Horowitz, Savin, & Sefton, 1994; Kahneman, Knetsch, & Thaler, 1986).

We recruited 801 participants from CloudResearch Connect (48% male, mean age = 38 years, range: 18–75 years) in exchange for a flat cash payment. Participants were told they had been anonymously paired with another respondent and randomly assigned to the role of Player A; the other participant served as Player B. As Player A, participants received an endowment of $10 (USD) and decided how much, if any, of that endowment to transfer to Player B. We also notified participants that 10 pairs would be randomly selected to have their decisions implemented for real payment.

Participants first indicated a range of money to give to Player B, and on a follow-up page indicated an exact amount. Half of participants selected from a menu where four of the five options were less than $2 (less than $0.50; $0.50–$0.99; $1.00–$1.49; $1.50–$1.99; $2.00 or more), while the other half of participants selected from a menu where only one of the five options was less than $2 (less than $2.00; $2.00–$2.99; $3.00–$3.99; $4.00–$4.99; $5.00 or more). This design parallels our previous studies, in which one category of options was partitioned into multiple listings or into a single listing (for an illustration, see Figure S4 in the Supplemental Material). Unlike our previous studies, we did not counterbalance whether the grouped category was positioned at the top or bottom of the menu; transfer ranges were always presented in ascending order. On a follow-up

page, participants then specified an exact transfer amount to give to Player B in an open text box.[9] When the study was complete, we assigned payoffs by randomly pairing 20 participants (half as Player A, and half as Player B) and paid bonus amounts based on the decisions made by Player A.

Results We find clear evidence of single-item partition dependence for social preferences. A greater proportion of participants gave \$2 or more when "generous" offers were more finely partitioned (73%) than when grouped into a single listing (54%; $z = 5.64$, $p < 0.001$). When looking at final transfer amounts, participants also sent more money to Player B in the high transfer partition ($M = \$3.45$, $SD = 2.25$) than in the low transfer partition ($M = \$2.88$, $SD = 2.30$; $t(798) = 3.52$, $p < 0.001$, $d = 0.25$).

When examining the distribution of transfer amounts, past studies find response spikes at complete profit-maximization (i.e., giving nothing) and complete fairness (i.e., giving exactly half; for a metanalytic review, see Engel, 2011). Such responding is thought to arise partly because giving nothing or giving half serve as focal points that are often applied in a heuristic manner (Chen & Fischbacher, 2020; Peysakhovich & Rand, 2016). In our sample, 48% of participants transferred exactly \$0 or \$5. We surmised (and preregistered in our analysis plan) that the effects of partitioning the menu space would be most pronounced among those who demonstrate non-heuristic responding, and thus have not yet "made up their mind" before being exposed to the menu of options. Restricting the data to only those participants who provided nonheuristic responses (i.e., any transfer amount besides \$0 or \$5), we again see that a greater proportion of respondents gave \$2 or more in the high transfer partition than in the low transfer partition (76% vs. 32%; $z = 9.08$, $p < 0.001$). When looking at final transfer amounts, participants also sent more money to Player B in the high transfer partition ($M = \$3.43$, $SD = 2.20$) than in the low transfer partition ($M = \$1.97$, $SD = 2.09$; $t(412) = 6.92$, $p < 0.001$, $d = 0.68$). Thus, while we observe single-item partition dependence regardless of our analysis, the effects roughly double in size when restricting the data

[9]For the open text box, participants were restricted to stating an amount within the initial choice range they had specified on the previous page. For instance, a participant selecting a transfer amount of "less than \$2.00" was required to give a response between \$0 and \$1.99. However, due to a programming error, one participant that had selected "less than \$2.00" was able to register a response of \$121, which is clearly outside the range of potential transfer amounts. We recorded this answer as a missing observation.

to participants who likely did not engage in heuristic responding.[10]

Study 3: Do Menu Partitions Communicate Information?

Studies 1-2 document robust evidence for single-item partition dependence across theoretically distinct decision tasks and under conditions that incentivize thoughtful and honest preference reporting. In the remaining studies, we examine a potential mechanism for this phenomenon. In particular, we test whether partitioning the menu space signals information concerning *descriptive social norms*. Since beliefs about how other people decide are a powerful influence on one's own behavior (Bearden, Netemeyer, & Teel, 1989; Cialdini, 2007; Cialdini & Goldstein, 2004), menu partitions may exert their influence by structuring beliefs about what options are commonly chosen.

According to this information-leakage account, participants should view an item as relatively more popular (i.e., more frequently chosen by others) when individually listed than when grouped with other items. Also, to the extent that inferences about descriptive norms causally influence decisions, beliefs about item popularity should statistically mediate menu partitioning effects.

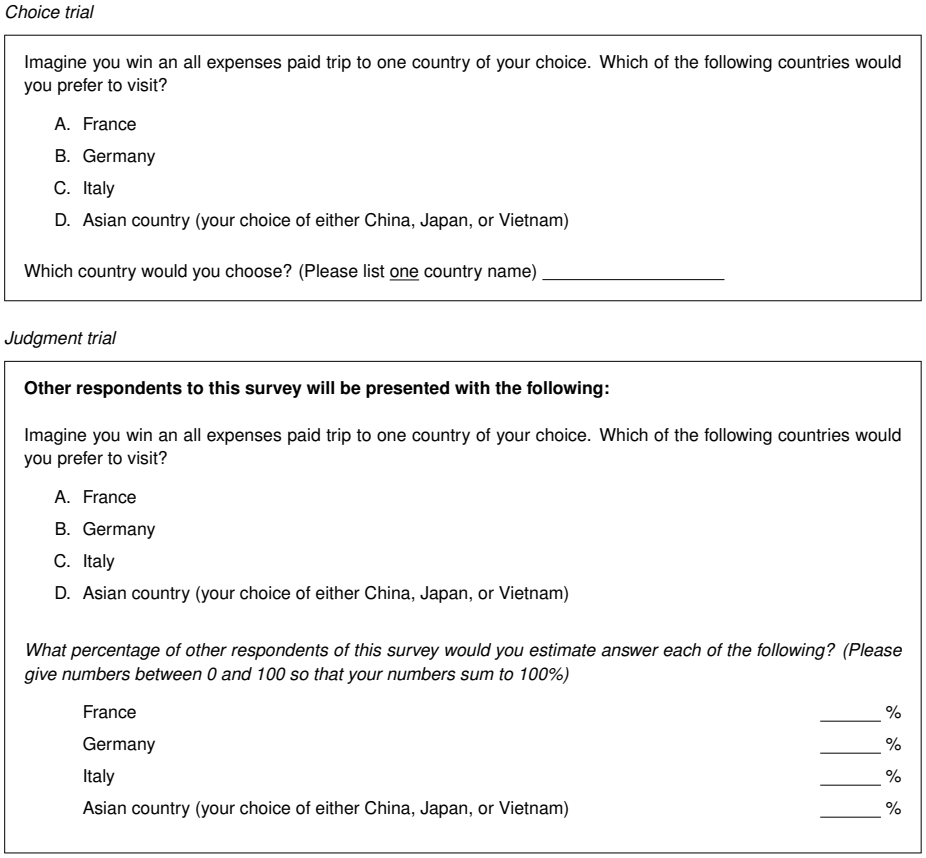
Method

We recruited a sample of 154 participants from MTurk (69% male, mean age = 28 years, range: 18–72 years). Similar to our previous studies, participants chose a single item from a menu of options. We also asked participants to judge the relative popularity of each menu listing as an empirical measure of inferred descriptive norms.

Choices and judgments were elicited in separate blocks. For the choice block we presented participants with four hypothetical choice menus; for each menu, half of the items were individually listed and the other half of items were grouped into a single listing. As in our previous studies, we counterbalanced (at the participant-level) the position of the packed category to be either the first or

[10]We obtain even stronger results if we also exclude participants who gave \$10 (which along with giving nothing and giving half, may serve as a third focal point). Only 2% of respondents in our sample gave the entire endowment to Player B. When excluding participants who gave \$0, \$5, or \$10, we again see a greater proportion of respondents giving \$2 or more in the high transfer partition (75% vs. 29%; $z = 9.18$, $p < 0.001$). Looking at final transfer amounts, participants also sent more money to Player B in the high transfer partition ($M = \$3.10$, $SD = 1.68$) than in the low transfer partition ($M = \$1.64$, $SD = 1.33$; $t(394) = 9.60$, $p < 0.001$, $d = 0.96$).

Figure 2: Example of Choice and Judgment Task (Study 3)



last listing. For the judgment block, we presented participants with the same menu partitions they viewed in the choice block and asked them to estimate the percentage of respondents in the study who would choose an item from each listing, with all estimates summing to 100 (see Figure 2 for an example). Participants were not informed upfront that they would be evaluating the same menu options on different dimensions.

We randomized the order of domains within each block, and also counterbalanced the order of the two task blocks: half of participants completed the choice block first and judgment block second, while the other half completed the study in the reverse order. Counterbalancing the task blocks allowed us to compare response tendencies between the first and second blocks in order to examine potential spillover effects (for instance, judgments of item popularity being influenced by prior choices; e.g., Ross, Greene, & House, 1977).

Table 3: Study 3 Results

			Choices (%)			Judged Popularity (mean estimate)		
Domain	Group A	Group B	Group A Unpacked	Group A Packed	Difference	Group A Unpacked	Group A Packed	Difference
Vacations	Europe	Asia	71.8	51.3	20.5**	69.8	54.3	15.5***
Entertainment	Sports	Cultural	62.7	27.8	34.8***	77.5	56.5	21.0***
Weekend trip	West Coast	East Coast	81.3	51.9	29.4***	61.9	41.9	20.1***
Desert	Cookies	Ice Cream	83.7	23.0	60.8***	65.0	30.8	34.2***

Notes: "Difference" represents the difference in choice share (or for judgment blocks, the difference in average estimated percentages) for choosing an item from Group A when that category is unpacked versus packed. Any discrepancies in difference scores shown in the table are due to rounding error. ** $p \leq 0.01$, *** $p \leq 0.001$.

Analysis Strategy

When combining choice responses across domains, we use logit regression. We code outcomes as a binary choice variable for whether participants chose an item from a focal category (0 = did not choose from group A, 1 = chose from group A), and our predictor is an indicator for whether the menu partition unpacks a focal category of items (0 = group A packed, 1 = group A unpacked). All logit models include domain fixed effects and cluster standard errors by participants. For individual domains, we perform two-sample tests of proportions. When combining judgments of item popularity across domains, we use ordinary least squares (OLS) regression. Our outcome is judged popularity of the focal group (from 0–100%), and the predictor is an indicator for menu partition (0 = group A packed, 1 = group A unpacked). All OLS models include domain fixed effects and cluster standard errors by participants. For individual domains, we perform two-sample t-tests.

Results

Table 3 provides a summary of the results. Across trials, participants were 36 percentage points more likely to choose individually listed items than when those same items were grouped into a single listing (95% CI: 28–45 pp, $p < 0.001$). As shown in the Table, we observed this pattern in all four domains. Consistent with an information-based account, menu partitions also influenced inferences about descriptive norms. Across trials, judgments of item popularity increased by 23 percentage points for unpacked items compared to packed items (95% CI: 18–27 pp, $p < 0.001$). We observed this pattern in all four domains.

Unlike our previous studies, we also find an (unexpected) interaction between menu partition and grouped category position (p-values were 0.006 and 0.024 for the interaction terms on choices and judgments, respectively). For choices, the partitioning effect was significantly larger when the packed category was placed at the bottom of the menu (50 percentage point marginal effect, 95% CI: 38–62 pp, $p < 0.001$) than when it was placed at the top of the menu (24 percentage point marginal effect, 95% CI: 13–36 pp, $p < 0.001$). Likewise, for judgments, menu partitions had a larger effect on judgments of item popularity when the packed category was placed at the bottom of the menu (28 percentage point marginal effect, 95% CI: 22–33 pp, $p < 0.001$) than when it was placed at the top of the menu (18 percentage point marginal effect, 95% CI: 12–24 pp, $p < 0.001$). We return to the issue of positioning effects in the General Discussion.

Menu partitions strongly influenced both choices and beliefs about item popularity, and we next examine the relationship between the two. Consistent with an information-based account, the correlation between choice and judged popularity was positive and significant ($r = 0.41$, $p < 0.001$ across participants and domains). The average correlation within participants and across domains was $r = 0.35$; the average correlation across participants and within domains was $r = 0.46$. Since one's choices can affect beliefs about how others choose (e.g., Ross et al., 1977), we also examined whether block order (i.e., choosing first and then estimating item popularity, or vice versa) influenced our results. We did not find reliable evidence that choices or judgments of item popularity were moderated by task block order (for the interaction between menu partition and block order, p-values were 0.511 for choices and 0.602 for judgments). Furthermore, we found qualitatively identical results when restricting the analysis to only the first block that participants completed, where spillover effects cannot occur (see Section 10 of the Supplemental Material).

Lastly, we examined whether beliefs about descriptive norms statistically mediate participant choice. In other words, does the menu partitioning effect reduce in size when we statistically adjust for beliefs about how frequently items are chosen by others? To examine this, we performed a Sobel-Goodman mediation test using bootstrapped standard errors based on 10,000 resamples clustered at the participant level, along with domain fixed effects and adjustments to the test procedure to

account for potential scaling artifacts that can arise when using binary choice data (Karlson, Holm, & Breen, 2012; Preacher & Hayes, 2008; Shrout & Bolger, 2002).[11,12] Using this procedure we find a reliable mediation effect, with inferences of item popularity mediating 51% of the menu partitioning effect on choice ($b_{indirect} = 0.92$, SE = 0.20, 95% CI: 0.57–1.33). Furthermore, we find a reliable indirect effect both when restricting the analysis to only participants that provided choices first ($b_{indirect} = 0.95$, SE = 0.28, 95% CI: 0.50–1.58), or to only participants that provided judgments of item popularity first ($b_{indirect} = 0.95$, SE = 0.32, 95% CI: 0.46–1.64).

Study 4: Blocking Inferences

The results of Study 3 suggest that menu partitions influence beliefs — when confronted with a set of options, decision makers tend to infer that unpacked items are more popular than packed items. The results of Study 4 also suggest that the shift in beliefs caused by partitioning of the option set may help to explain single-item partition dependence. However, a limitation of Study 3 is that its design does not allow one to definitively conclude that the causal chain flows from menu partitions to judged popularity, and then from judged popularity to choice. Both our putative mediator (judgments of descriptive social norms) and outcome variable (choice) were exposed to the experimental treatment (the partitioning of the menu), and so we cannot decisively rule out the reverse causal pathway (i.e., that participant choice is causally prior to beliefs about item popularity; Imai, Tingley, & Yamamoto, 2013; Pieters, 2017; Spencer, Zanna, & Fong, 2005) or that an unobserved third variable influences both item popularity and choice (see Simonsohn, 2022).

In Study 4 we directly manipulate beliefs about descriptive norms independent of menu

[11] All bootstrapping procedures reported in this paper use bias-corrected confidence intervals (Efron, 1987).

[12] We report tests for mediation using the standard framework based on linear structural equation models (e.g., Preacher & Hayes, 2008). Recently, researchers have suggested an alternative test of statistical mediation based on the potential outcomes framework for causal inference (Imai, Keele, & Tingley, 2010). This procedure also returns a reliable mediation effect, with inferences of item popularity mediating 50% of the menu partitioning effect on choice. Another advantage of the potential outcomes approach is that it allows us to test the degree to which our results are robust to potential violations of confounding between the mediator and outcome variable (i.e., to violations of sequential ignorability). We report the results of this sensitivity test, along with the full details for the potential outcomes mediation procedure, in Section 11 of the Supplemental Material.

partitions. If the information gleaned from a menu partition plays a causal role in determining choice, then menu partitioning effects should be attenuated whenever decision makers fail to extract information provided by the menu partition. To block information extraction, we asked some participants to state their beliefs about popularity of each menu category *before* exposing them to the menu partition. We anticipated that having participants first state their descriptive norm beliefs would inoculate any informational effects provided by the partition, and should therefore attenuate observed partitioning effects on choice. Thus, Study 4 uses a "blockage" design (Pirlott & MacKinnon, 2016) to test the hypothesis that menu partitions are causally mediated by beliefs about descriptive norms.

Method

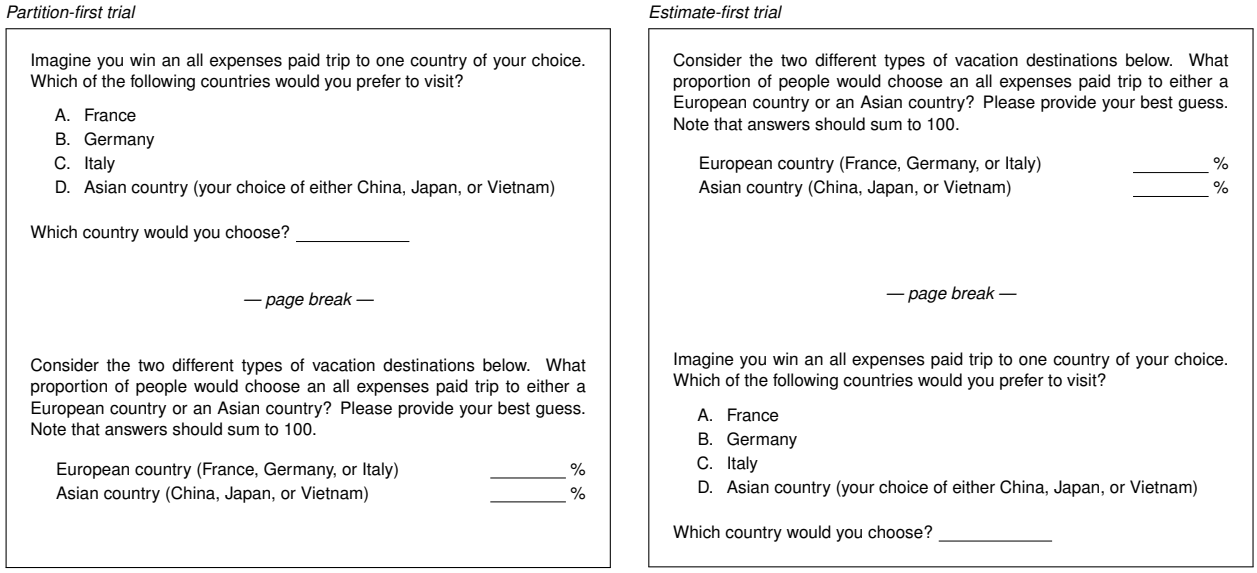
We recruited a sample of 302 participants from MTurk[13] (65% male, mean age = 29 years, range: 18–60 years). Participants first responded to a simple attention check (Oppenheimer, Meyvis, & Davidenko, 2009), and only those who passed the attention check were allowed to continue participating in the study.

Participants were first told they would make "a series of judgments and choices" and then were presented with the same four choice domains as in Study 3. For each menu, half of the items were individually listed and the other half of items were grouped into a single listing. Crucially, unlike Study 3 where choices and judgments were elicited in separate blocks, participants were randomly assigned to either estimate the relative popularity of the two grouped categories on the page immediately before or after exposure to the menu partition (see Figure 3 for an illustration). In other words, choice and judgment trials were interleaved by domain. Also different from the previous study is that participants estimated the relative popularity of category groupings, rather than for each listing.

To summarize, some participants provided estimates of popularity for a category of items before exposure to a specific menu partitioning of those categories (estimate-first condition), while

[13] One participant reported their age as 520 years old; we assume this was a typo, and omit this response when calculating age statistics for the sample.

Figure 3: Example of Elicitation Sequence (Study 4)



Notes: The figure shows an abbreviated set of instructions.

others provided popularity estimates after viewing and responding to the menu partition (partition-first condition). We expected that single-item partition dependence would be attenuated in the estimate-first condition compared to the partition-first condition, because participants in the latter condition would assess descriptive norms for themselves before being exposed to a partition that might otherwise leak such information.

Analysis Strategy

We use a similar analysis strategy to Study 3. When combining choice responses across domains, we use logit regression. We code outcomes as a binary choice variable for whether participants chose an item from a focal category (0 = did not choose from group A, 1 = chose from group A), and our predictor is an indicator for whether the menu partition unpacks a focal category of items (0 = group A packed, 1 = group A unpacked). All logit models include domain fixed effects and cluster standard errors by participants. When combining judgments of item popularity across domains, we use ordinary least squares (OLS) regression. Our outcome is judged popularity of the focal group (from 0–100%), and the predictor is an indicator for menu partition (0 = group A

Table 4: Study 4 Results

			Choose, then Estimate (choice %)			Estimate, then Choose (choice %)		
Domain	Group A	Group B	Group A Unpacked	Group A Packed	Difference	Group A Unpacked	Group A Packed	Difference
Vacations	Europe	Asia	73.0	49.4	23.6**	73.4	54.4	19.0*
Entertainment	Sports	Cultural	76.0	38.8	37.3***	67.1	32.4	34.7***
Weekend trip	West Coast	East Coast	83.3	44.2	39.2***	73.0	56.2	16.8*
Desert	Cookies	Ice Cream	84.4	20.5	63.9***	76.5	31.6	44.8***

Notes: "Difference" represents the difference in choice share for choosing an item from Group A when that category is unpacked versus packed. Any discrepancies in difference scores shown in the table are due to rounding error. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

packed, 1 = group A unpacked). All OLS models include domain fixed effects and cluster standard errors by participants.

Results

Table 4 provides a summary of the results. Across choice domains and elicitation sequence, participants were 35 percentage points more likely to choose individually listed items than when those same items were grouped into a single listing (95% CI: 29–41 pp, $p < 0.001$). As shown in the Table, we observed this pattern in all four domains. Furthermore, we observed a large menu partitioning effect regardless of whether the grouped category was the first or last listing on the menu (see Table 8), and the interaction between menu partition and grouped category position was not statistically significant ($p = 0.972$).

Our primary prediction was that partitioning effects would be attenuated (compared to our standard treatment) when participants provided their judgments about descriptive norms before being exposed to menu partitions. As expected, we observe a larger partitioning effect on choice in the partition-first condition (41 percentage point marginal effect, 95% CI: 33–49 pp, $p < 0.001$) than in the estimate-first condition (29 percentage point marginal effect, 95% CI: 20–38 pp, $p < 0.001$). This 12 percentage point decrease was reliably different from chance ($p = 0.036$ for the interaction between menu partition and elicitation sequence). As shown in Table 4, this pattern of an attenuated partitioning effect was directionally consistent in all four domains.

Next, we examined judgments of item popularity (as noted earlier on, unlike Study 3 this was measured at the category level rather than at the item level). We predicted a similar pattern

to that observed for choice: popularity judgments would shift in the predicted direction when participants were first exposed to the menu partition before estimating judged popularity, but that judgments would be relatively unaffected by menu partition in the estimate-first condition (since participants had not yet been exposed to the menu partition). As expected, participants who were first exposed to the menu partition rated items from the unpacked category as more popular than those from the packed category ($b = 3.49$, 95% CI: 0.82–6.17, $p = 0.011$), whereas participants who first estimated item popularity before exposure to menu partitions did not reliably differ across conditions ($b = -0.16$, 95% CI: -2.91–2.58, $p = 0.908$). The difference in this "judgment gap" across the two elicitation sequences was marginally significant ($p = 0.062$ for the interaction between menu partition and elicitation sequence).

Last, we conducted mediation tests using the same analysis strategy outlined in Study 3, but this time we performed separate mediation analyses depending on whether judgments of popularity were elicited before or after exposure to the menu partition.[14] As in Study 3, judgments of item popularity reliably mediated the effect of menu partitions on choice for participants who were first exposed to the menu partition ($b_{indirect} = 0.10$, SE = 0.05, 95% CI: 0.02–0.22). Also, as expected, judgments of popularity did not reliably mediate the partitioning effect on choice when participants first reported their estimates before exposure to the menu partition ($b_{indirect} = -0.01$, SE = 0.08, 95% CI: -0.17–0.14). Thus, beliefs about descriptive norms only reliably mediated menu partitioning effects when participants had previously been exposed to menu partitions, and could extract information from them.

Taken together, Studies 3 and 4 suggest that menu partitions convey information about descriptive social norms. Individually-listed options were viewed as more popular (i.e., more frequently chosen by others) than options that were grouped together, and participants tended to choose options they thought were more popular. Such a strategy may be reasonable to the extent

[14] As in Study 3, we can also test for mediation using the potential outcomes framework outlined by Imai et al. (2010). Similar to the results reported above, we find a reliable indirect effect through judged popularity in the partition-first condition, but no reliable indirect effect in the estimate-first condition. Full details are provided in Section 11 of the Supplemental Material.

that (a) menu partitions accurately reflect majority preference, (b) majority preference is positively correlated with an option's consumption utility for the targeted individual, and (c) decision makers do not have more diagnostic sources of task-relevant information available to them when making a decision (assuming such alternative sources of information are no more costly to acquire).

Study 5: Moderation by Social Motivations

Studies 3 and 4 suggest that menu partitions influence beliefs about descriptive social norms, and beliefs about descriptive social norms influence choice. In Study 5 we test a corollary of this hypothesis, specifically that single-item partition dependence should be especially pronounced for individuals most sensitive to descriptive norms. We administer a susceptibility to interpersonal influence scale (Bearden et al., 1989), which measures two conceptually distinct motivations for using social information (Deutsch & Gerard, 1955). Susceptibility to *informational* social influence (ISI) reflects the motivation to use others' behavior to learn about task parameters and reduce uncertainty (i.e., learn which options may be most attractive). Susceptibility to *normative* social influence (NSI) reflects the motivation to use others' behavior to calibrate on social expectations (i.e., adhere to norms of expected behavior).

We predict that both forms of social influence should be positively associated with menu partitioning effects, but for different reasons. As suggested in our prior studies, participants view menu partitions as a signal about what options are frequently chosen by others. Participants susceptible to informational social influence can use inferred popularity to reduce uncertainty about option quality, while participants susceptible to normative social influence can instead use inferred popularity to help identify a socially appropriate choice. Because we did not have an a priori reason to expect participants to be especially motivated by one particular form of social influence rather than another, we measured both forms of social influence. We expected that either form of social influence (or both) could potentially moderate menu partition effects.

In Study 5 we use the same design as in Study 3, where participants were asked to provide choices and infer the popularity of menu items, and also measure individual differences in sus-

ceptibility to interpersonal influence. By measuring both choices and beliefs, we can also isolate where in the causal chain any potential moderation effects occur. That is, we can examine whether participants high in susceptibility to interpersonal influence show pronounced partitioning effects because they are especially likely to infer item popularity from menu partitions (i.e., the *menu partition* $\longrightarrow$ *judged descriptive norm* pathway) and/or because these individuals give greater weight to considerations of item popularity when making a consumption decision (i.e., the *judged descriptive norm* $\longrightarrow$ *choice* pathway).

Method

We recruited a sample of 601 participants from MTurk (46% male, mean age = 41 years, range: 18–83 years). The procedure was virtually identical to that in Study 3, in which participants responded to the same four choice domains, and completed both choice and judgment blocks in counterbalanced order.[15]

After completing both choice and judgment blocks, participants responded to an 8-item measure of susceptibility to interpersonal influence (Bearden et al., 1989). Participants completed four items from the susceptibility to normative influence (NSI) subscale, rating their agreement with each statement on a 7-point scale from *strongly disagree* (-3) to *strongly agree* (3). Example items were "it is important that others like the products and brands I buy" and "when buying products, I generally purchase those brands that I think others will approve of." We averaged the four items to create an index of NSI ($\alpha = 0.93$). Participants also completed four items from the susceptibility to informational influence (ISI) subscale. Example items were "to make sure I buy the right product or brand, I often observe what others are buying and using" and "I often consult other people to help choose the best alternative available from a product class." We averaged the four items to create an index of ISI ($\alpha = 0.88$). We counterbalanced across participants whether the four items from the NSI came first or second, and also randomized the order of statements within each subscale. The correlation between the two subscales was 0.44.

[15]Study 5 included a few small differences from Study 3. In Study 5 the menu options were separated by bullet points instead of letters, and Study 5 used slightly different labels for the packed listing (e.g., "European country (your choice of either France, Germany, or Italy)" instead of "Europe (your choice of either France, Germany, or Italy)").

Table 5: Study 5 Results

			Choices (%)			Judged Popularity (mean estimate)		
Domain	Group A	Group B	Group A Unpacked	Group A Packed	Difference	Group A Unpacked	Group A Packed	Difference
Vacations	Europe	Asia	74.8	55.2	19.6***	77.6	54.1	23.5***
Entertainment	Sports	Cultural	63.4	38.1	25.3***	80.3	52.2	28.1***
Weekend trip	West Coast	East Coast	69.9	49.0	20.9***	63.2	40.2	23.0***
Desert	Cookies	Ice Cream	67.6	34.8	32.8***	63.0	32.6	30.4***

Notes: "Difference" represents the difference in choice share (or for judgment blocks, the difference in average estimated percentages) for choosing an item from Group A when that category is unpacked versus packed. Any discrepancies in difference scores shown in the table are due to rounding error. *** $p \leq 0.001$.

Analysis Strategy

We use the same analysis strategy as in Study 3. We use logit regression when examining choices, and use OLS regression when examining judgments of item popularity. Similar to our previous studies, when pooling across domains we include domain fixed effects and cluster standard errors by participants.

Results

We first examined whether our earlier findings from Study 3 replicate. Across domains, participants were 25 percentage points more likely to choose individually listed items than when those same items were grouped into a single listing (95% CI: 21–29 pp, $p < 0.001$). We also again found that menu partitions influenced beliefs about social norms, with an average 26 percentage point increase in judged popularity for unpacked items compared to packed items (95% CI: 24–28 pp, $p < 0.001$). Finally, we again found that judgments of item popularity statistically mediated the menu partitioning effect on choice ($b_{indirect} = 1.26$, SE = 0.09, 95% CI: 1.09–1.44). Table 5 presents the main results, and additional details can be found in Section 7 of the Supplemental Material.

We next examined whether menu partitioning effects were statistically moderated by NSI scores, ISI scores, or both. We report all moderation analyses in Table 6. To facilitate interpretation, in the Table we report unstandardized OLS coefficients but report p-values using logistic regression. Thus, coefficients can be interpreted as the percentage point increase in choosing from a given category of items as a linear function of an explanatory variable, and a positive coefficient for

Table 6: Study 5 Results

	moderation of basic effect (partition → choice)		moderation of pathway 1 (partition → judged popularity)		moderation of pathway 2 (judged popularity → choice)	
	(1)	(2)	(3)	(4)	(5)	(6)
Partition	0.281***	0.242***	0.287***	0.259***	−0.004	−0.004
	(0.029)	(0.022)	(0.013)	(0.010)	(0.024)	(0.024)
NSI	−0.005		−0.012*		−0.012	
	(0.010)		(0.005)		(0.014)	
Partition × NSI	0.027†		0.019***			
	(0.015)		(0.006)			
ISI		−0.007		−0.008†		−0.017
		(0.011)		(0.005)		(0.015)
Partition × ISI		0.019		0.013*		
		(0.015)		(0.006)		
Judged Popularity					0.977***	0.920***
					(0.046)	(0.040)
Judged Popularity × NSI					0.040*	
					(0.022)	
Judged Popularity × ISI						0.035
						(0.024)
Domain Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2331	2331	2404	2404	2331	2331
Participants	601	601	601	601	601	601
R^2	.080	.078	.376	.374	.218	.216

Notes: OLS estimates, with participant-clustered standard errors in parentheses. For Models 1, 2, 5, and 6 the outcome variable was choosing an item from a focal category (e.g., for the charity domain, 0 = not choosing an animal-based charity, 1 = choosing an animal-based charity). The outcome variable in models 3 and 4 was "Judged Popularity," or the estimated percentage of other participants selecting an item from the focal category (rescaled to fall between 0 and 1). "Partition" indicates whether the menu was partitioned such that the focal category was packed or unpacked (0 = packed, 1 = unpacked). "NSI" and "ISI" represent a participant's susceptibility to normative social influence and informational social influence score, respectively. Scores on the NSI and ISI range from –3 to 3, with higher numbers reflecting greater susceptibility. All models include domain fixed effects. For Models 1, 2, 5, and 6 we use significance stars based on logit regressions. † $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

the interaction term represents the increase in menu partitioning effects as a linear function of the moderating variable. For instance, in Model 1 (column 1 of Table 6) the "partition" coefficient indicates a 28.1 percentage point increase in choosing unpacked items compared to packed items (when NSI scores are set to 0), and that the size of this partitioning effect increases by 2.7 percentage points for every 1-point increase in NSI scores (as represented by the "partition × NSI" interaction term).

We begin by examining moderation of overall partition effects by susceptibility to normative social influence (Model 1) and informational social influence (Model 2). Shown in Model 1, we find a positive and marginally significant interaction term ($p = 0.060$), indicating that menu partitioning effects grew in size for those higher in susceptibility to normative social influence. Shown in Model 2, we observe a similar pattern for ISI scores, but the interaction term was not statistically significant ($p = 0.195$).

We next turn to where in the causal chain such moderation effects occur. Models 3 and 4 examine moderation for the first part of the causal chain (i.e., the *menu partition* $\longrightarrow$ *descriptive norm beliefs* pathway). We find a positive interaction between menu partitions and NSI scores (Model 3: $p = 0.001$) as well as between menu partitions and ISI scores (Model 4: $p = 0.039$). On average, the size of the "judged popularity" gap across menu partitions increased by 1.9 percentage points for every 1-point increase in NSI scores, and by 1.3 percentage points for every 1-point increase in ISI scores. Thus, participants high in susceptibility to interpersonal influence were especially likely to view unpacked menu items as more frequently chosen by others.

Models 5 and 6 examine the second part of the causal chain (i.e., the *descriptive norm beliefs* $\longrightarrow$ *choice* pathway). We find a positive interaction between judgments of item popularity and NSI scores (Model 5: $p = 0.045$), and a positive but not statistically significant interaction between judgments and ISI scores (Model 6: $p = 0.194$). Thus, participants higher in susceptibility to normative social influence were also more likely to place greater weight on descriptive social norms when making a consumption decision.

In summary, the results of Study 5 suggest that, like earlier studies, menu partitions are more likely to communicate information about descriptive social norms. Furthermore, participants most susceptible to social norms (especially normative social influence) also tended to show more pronounced single-item partition dependence.[16] Participants high in susceptibility to social norms

[16]One possible reason for the relatively stronger predictive performance of the NSI over the ISI may be that the former scale contains less measurement error. Since the reliability of a measure (i.e., its lack of measurement error) limits its predictive validity with other measures (Lord & Novick, 1968), scales with greater measurement error will be less predictive, all else equal. In both Study 5 and its replication (Study S2), we observe greater internal reliability for the NSI than the ISI, consistent with past scale validation studies (Bearden et al., 1989; Bearden, Netemeyer, & Teel, 1990; DeMarais, 2014; Schroeder, 1996). We hasten to note, however, that the differences in predictive strength

appear to be both especially likely to interpret menu partitions as a signal of descriptive norms, and give greater weight to descriptive norms (i.e., item popularity) when selecting an item to consume. While these findings were modest in magnitude, we have directly replicated them and report those results in Section 3 of the Supplemental Material.

General Discussion

Given that many important organizational decisions involve single-item decisions rather than multi-item allocation, strategic partitioning of menu options holds promise as an attractive tool for managers, policymakers, and choice architects. Our results demonstrate that single-item choice is often highly sensitive to how menus are partitioned, in that participants are more likely to choose individually listed options compared to when those same options are grouped together. This was true across a wide range of choice settings, including contexts with real stakes and complete information over option attributes. The effect of partitioning the menu set was rather large, shifting choice share by an average of 32 percentage points across studies (see Table 7 for a summary). Our findings suggest that the strategic partitioning of menus can be used as a simple, flexible, and potent policy tool to affect behavior change (Johnson et al., 2012). Furthermore, menu partitioning can be used to supplement more traditional forms of choice architecture, such as setting defaults and ordering options, or alternatively as a substitute in cases where traditional choice architecture techniques are less well-suited (e.g., Keller, Harlam, Loewenstein, & Volpp, 2011).

Our results indicate that partitioning effects occur partly because menu partitions are seen as communicating task-relevant information. The current study contributes to a growing body of research suggesting that choice menus can influence behavior in non-obvious ways through the information they signal to the public (Bogard, Reiff, Caruso, & Hershfield, 2024; Krijnen, Tannenbaum, & Fox, 2017; McKenzie, Sher, Leong, & Müller-Trede, 2018; Reiff, Dai, Beshears, Milkman, & Benartzi, 2023; Tannenbaum, Valasek, Knowles, & Ditto, 2013). For example,

between the NSI and ISI are small and not statistically significant, and our data lack the statistical power necessary to adjudicate among possible explanations for this pattern.

Table 7: Menu Partitioning Effects Across Studies

	Target Behavior Unpacked (choice %)	Target Behavior Packed (choice %)	Difference
Study 1	83.4 (1.6)	23.2 (1.8)	60.2 (2.5)***
Study 2A	78.2 (1.7)	41.8 (2.3)	36.4 (3.1)***
Study 2B	28.6 (3.2)	13.0 (2.4)	15.7 (4.0)***
Study 2C	72.9 (2.2)	53.7 (2.5)	19.2 (3.3)***
Study 3	75.0 (2.9)	38.6 (3.1)	36.4 (4.4)***
Study 4	75.8 (2.0)	40.8 (2.1)	35.0 (3.0)***
Study 5	68.9 (1.5)	44.2 (1.5)	24.7 (2.1)***
Study S1	63.9 (2.0)	43.7 (1.8)	20.2 (2.7)***
Study S2	75.2 (1.7)	42.1 (2.0)	33.1 (2.8)***
Study S3	81.7 (4.3)	44.0 (5.4)	37.7 (6.9)***
Combined	71.2 (2.0)	39.0 (2.1)	32.2 (1.0)***

Notes: Percentage choosing an item from a focal category when the menu is partitioned such that the focal group is packed or unpacked. For Study 2C, we use the percentage transferring $2 or more to an anonymous recipient in a dictator game. Parentheses represent robust standard errors for Studies 2B, 2C, and S3, and participant-clustered standard errors for all other studies. "Difference" represents the average marginal effect estimated from the logit model specified in the results section of each study. Combined results are estimated using study fixed-effects, with weights proportional to the inverse variance of the average marginal effect of each study. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

individuals are sensitive to how options are framed (e.g., whether a medical treatment is described as having a 90% survival rate or a 10% mortality rate) partly because the framing of an option is thought to communicate information about salient reference points and, more generally, about options endorsed by the choice architect (Keren, 2007; McKenzie & Nelson, 2003; Sher & McKenzie, 2006). Here we suggest that, in a similar fashion, individuals approach choice menus with the tacit assumption that managers, policymakers, and other choice architects usually provide a range of options that roughly match the distribution of preferences in the population. As a result, the more finely a set of options is partitioned, the more those options will be viewed as relatively popular in terms of market share.

Our work also contributes to the broader choice architecture literature by showing how subtle design features can affect behavior by implicitly signaling social norms. It is well known that explicitly providing information about descriptive social norms can be a powerful motivator of behavior (Cialdini, 2007). For instance, introducing peer comparison information has been found to motivate homeowners to reduce their energy usage (Allcott, 2011; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), increase voter turnout among citizens (Gerber & Rogers, 2009), and to curb

inappropriate prescribing by physicians (Linder et al., 2017; Wagner et al., 2024). Our research, along with related work, suggests that explicit information provision is not always necessary: merely changing the composition or presentation of the choice set can tacitly communicate information about norms. For instance, decision makers may stick with default options partly because they view the presence of a default option as a signal of normative behavior (Altmann, Falk, & Grunewald, 2025; Everett, Caviola, Kahane, Savulescu, & Faber, 2015; Tannenbaum & Ditto, 2021). Similarly, a retirement savings menu that simultaneously presents the option to save now or in the future may, by placing both options on equal footing, tacitly communicate to decision makers that the need to save now is not normative or expected (Reiff et al., 2023). These examples suggest that decision makers often interpret choice sets as meaningful signals, extracting and relying on implicit information about social norms to guide their decisions.

If menu partitions communicate information about social norms, then policymakers may wish to consider additional (and less obvious) decision costs that arise when designing menu partitions (see Krijnen et al., 2017). For example, choosing an option from a packed category may suggest that such behavior is relatively uncommon or atypical, and therefore has the potential to induce feelings of social disapproval or stigma (Krishna, Herd, & Aydınoğlu, 2019; Reiff et al., 2022). Conversely, listing items individually may unwittingly communicate to decision makers that those options are more popular than they actually are. Furthermore, if individuals distrust policymakers or view the menu partition as an intentional act of manipulation on the part of the choice architect, then those individuals may engage in reactive behaviors as a way of asserting their agency and autonomy (Bogard et al., 2024; Krijnen et al., 2017).

Positioning Effects

In all studies (with the exception of Study 2C), we experimentally varied menu partitions and also independently varied the position of the packed category to be placed at the top or bottom of the menu. In a subset of studies (Studies 3, S2, and S3), we found a statistically significant interaction between the two factors, where partitioning effects were larger when the packed category was placed at the bottom of the menu rather than at the top. One possibility is that participants infer

Table 8: Menu Partitioning Effects by Packed Category Position

	Packed Category Placed on Bottom	Packed Category Placed on Top	Difference
Study 1	63.3 (3.4)***	57.6 (3.9)***	5.7 (5.2)
Study 2A	34.1 (4.5)***	38.7 (4.2)***	−4.5 (6.2)
Study 2B	15.6 (5.6)**	15.7 (5.6)**	−0.1 (8.0)
Study 3	50.1 (6.3)***	24.5 (5.7)***	25.6 (8.5)**
Study 4	34.9 (4.3)***	35.2 (4.3)***	−0.3 (6.0)
Study 5	27.3 (3.0)***	21.9 (3.0)***	5.4 (4.3)
Study S1	21.1 (3.7)***	19.2 (3.8)***	2.0 (5.3)
Study S2	39.1 (3.7)***	26.7 (4.0)***	12.4 (5.5)*
Study S3	53.7 (9.2)***	22.2 (10.0)*	31.4 (13.5)*
Combined	36.6 (1.4)***	30.2 (1.4)***	6.4 (2.0)***

Notes: The first two columns display the average marginal partitioning effect when the packed category is the bottom or top listing, estimated from the logit model specified in the results section of each study. We exclude Study 2C because we did not vary of the position of the packed category in this study. Parentheses represent robust standard errors for Studies 2B and S3, and participant-clustered standard errors for all other studies. "Difference" displays the difference in average marginal effects as a function of packed category position. Combined results are estimated using study fixed-effects, with weights proportional to the inverse variance of each study. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

descriptive norms from both menu partitions and the ordering of items, and that the two inferences reinforce each other. Specifically, decision makers may be especially likely to infer that items are unpopular when they are both grouped together and placed at the end of a menu (consistent with the judged popularity results in Study 3), and as a result menu partitioning effects are especially large under these conditions. Another possibility is that attention is biased towards items at the top of the menu, especially when those items are unpacked (e.g., Dellaert, Johnson, Duncan, & Baker, 2024).

To explore this finding more thoroughly, we aggregate data across all applicable studies. Table 8 displays the menu partitioning effect (i.e., the percentage point difference in choice across menu partitions) when the packed category was placed at the bottom versus top of the menu. The last column of the Table also reports the difference between the two partitioning effects, with positive difference scores reflecting a larger effect when the packed category is placed at the bottom of the menu. As shown in the Table, the difference score was positive in six of the nine studies, and the three negative difference scores were negligible in size. Weighting each study by the inverse of its variance (i.e., using study fixed-effects),[17] we find a combined menu partitioning effect of

[17]If we instead use a random-effect model, which weights studies according to both their degree of precision and as a function of the variability in effect size found across studies, we fail to find a statistically significant aggregate

36.6 percentage points when the grouped category was placed at the bottom of the menu, and 30.2 percentage points when placed at the top of the menu. This 6.4 percentage point difference between partitioning effects for bottom and top listings was statistically reliable ($\chi^2(1) = 10.34, p = 0.001$). Thus, while menu partitioning effects were large and statistically significant regardless of grouped item position, they were slightly larger when grouped items were placed at the end of the menu. As mentioned earlier, this may be due to inferences of descriptive norms being reinforced by the ordering of options or by biased attention. We hasten to add, however, that such positioning effects were not predicted a priori and relatively small in size. As such, they should be treated as tentative and in need of further corroboration. We leave this as an avenue for future research to explore.

Potential Additional Mechanisms

We find that single-item partition dependence can be partly attributed to inferences of descriptive norms that vary systematically with menu partitions. However, other possible mechanisms also likely play a role. In particular we discuss biased attention, random responding, and other forms of information leakage as potential contributing factors.

Biased Attention One possibility is that menu partitions bias the allocation of attention. By dividing options into smaller units, menu partitions may induce individuals to spend more time attending to and elaborating on items that are listed separately than when the same items are grouped with other options (e.g., Dellaert et al., 2024; Tversky & Koehler, 1994). Closely related, partitions may also shape the options actively considered during choice (i.e., composition of consideration sets; Hauser & Wernerfelt, 1990; Shah & Ludwig, 2016). Because options that receive greater attention, visibility, or deliberation are often more likely to be chosen (e.g., Atalay, Bodur, & Rasolofoarison, 2012), menu partitioning may increase the appeal of desirable options by redirecting attention toward them.

We suspect that attention may play some role in how menu partitions influence choice, but what form this takes is unclear. According to some attention-based accounts of choice (e.g.,

positioning effect ($\chi^2(1) = 1.31, p = 0.252$). The random effects model estimates a 7.9 percentage point difference across menu positions (i.e., a larger difference than that estimated by the fixed effects model), but also contains more uncertainty in that estimate.

Krajbich, 2019), our core findings should reverse when participants are asked to choose between a set of unpleasant options. In such contexts, attention is expected to lead to aversion rather than attraction: negative stimuli that receive disproportionate attention are often avoided rather than chosen (Armel, Beaumel, & Rangel, 2008; Janiszewski, Kuo, & Tavassoli, 2013). The increased attention or elaboration due to unpacking a menu of unpleasant options should, according to this account, make those options especially unappealing and less likely to be selected (see also Brenner, Rottenstreich, Sood, & Bilgin, 2007).

We tested this prediction using a new sample of participants ($N = 201$) who chose one of six hour-long household chores to perform. The menu included three indoor chores (kitchen cleaning, vacuuming, washing and folding laundry) and three outdoor chores (cleaning rain gutters, mowing the lawn, weeding). As in our other studies, participants chose from menus in which either the indoor chores were listed individually and the outdoor chores were grouped, or the reverse (see Section 4 of the Supplemental Material for details). Contrary to attention-based accounts that predict a negative partitioning effect, participants were in fact more likely to choose household chores that were individually listed compared to when those chores were grouped together (38 percentage point difference, 95% CI: 24–51 pp, $p < 0.001$).

This result should not, however, be taken as definitive evidence that attention plays no role in how menu grouping affects choice. The relationship between attention and choice is complex: in some cases, increased attention can make even unpleasant stimuli more likely to be chosen (Bhatnagar & Orquin, 2022). Moreover, menu partitions may shape both attention and inferred descriptive norms, with the two processes operating in tandem. For example, partitions may draw attention to particular options or categories, and this attentional prominence may itself be interpreted as a cue that the unpacked options are frequently chosen by others (analogous to the tendency to infer popularity from an option's central placement in an array; see Valenzuela & Raghubir, 2009). Future research should clarify whether and when attention amplifies descriptive-norm inferences, and when it operates independently of such inferences.

Random Responding Menu partitions may also capitalize on random, thoughtless, or haphazard responding. If some participants are indifferent between options or are not sufficiently motivated to think through their decision, then the options they select may be essentially chosen at random. To the extent that some participants choose at random over partitions (and then perhaps randomly choose within partitions), this would produce a pattern of results similar to those we report in our studies.[18]

As with attention, it seems plausible that random responding plays a role in how menu partitions influence choice, especially in many naturalistic contexts. In our studies, however, we took active steps to minimize the influence of random responding. In all studies we asked participants to explicitly write out their preference rather than select a response from a list, and such prompts are thought to reduce mindless responding (e.g., Bernhard-Harrer & Pfaff, 2025). Further, in Studies 2A-2C we used incentive-compatible tasks which also tend to reduce thoughtless responding (Camerer & Hogarth, 1999), and continue to observe sizable menu partitioning effects.

While such steps may minimize the role of random responding, they do not definitively rule out its contribution to our results. To investigate this issue more directly, we performed an audit of all studies to examine whether empirical proxies of random or thoughtless responding were correlated with menu partitioning effects. For instance, participant completion times serve as one indirect measure of potentially mindless responding — those who speed through a study are perhaps more likely to answer in a random or cursory manner. If random responding contributes to our results, then we should see especially large menu partition effects among those who complete a study relatively quickly. However, when looking across studies we fail to find support for this account (see Section 12 of the Supplemental Material for full details). In most studies, proxies of random responding were not reliably correlated with menu partition effects, and in all studies we continue to observe single-item partition dependence across the entire range of our sample (i.e., even among those least likely to be responding randomly). This analysis suggests that random

[18] As a point of clarification, the random responding account still assumes some form of partition dependence. For instance, if participants in our studies were unaffected by how menu items were grouped but respond randomly over all items, this could not explain our results as the menu partitions in our studies are symmetric across treatment conditions (three unpacked items versus three packed items).

responding is likely not necessary to observe single-item partition dependence.

Alternative Forms of Information Leakage Another avenue for future research is whether menu partitions signal decision-relevant information other than descriptive norms. One natural candidate is whether menu partitions also communicate information about injunctive norms, since descriptive and injunctive norms often travel together (Deutchman, Kraft-Todd, Young, & McAuliffe, 2024; Eriksson, Strimling, & Coultas, 2015; Yip & Schweitzer, 2022). For instance, the default option in a choice set is often viewed as recommended or endorsed by the choice architect (Dinner, Johnson, Goldstein, & Liu, 2011; McKenzie, Liersch, & Finkelstein, 2006; Tannenbaum & Ditto, 2021), and perhaps items that are packed or grouped together are seen as a signal that the choice architect views these items as less suitable for most individuals. One implication is that if unpacked menu items are viewed as tacit endorsements, then decision makers will likely only find such endorsements persuasive to the extent they trust the choice architect (see Krijnen et al., 2017; Tannenbaum & Ditto, 2021).

Relatedly, grouping or clustering a set of options may also signal to individuals that such options are relatively similar to each other, compared to ungrouped items in the choice set (e.g., Murphy & Brownell, 1985). To the extent that perceptions of similarity reduce attractiveness of all items being considered (e.g., Brenner et al., 1999), it is possible that menu partitioning effects also operate through this channel. However, we note that while other types of menu-based inferences may contribute to partitioning effects, such additional mechanisms are unlikely to account for our complete set of results. For instance, in Study 2B all features of each option (i.e., the payoffs and probabilities associated with each gamble) were transparent, and so it is unlikely that inferences of similarity can explain the results we observe. Likewise, in Study 2C, where participants were asked to split a fixed amount of money with another participant, it is not clear how perceptions of similarity of dollar amounts would affect final decisions.

Future Directions

Beyond the list of candidate mechanisms discussed above, an open question is whether single-item partition dependence is only observed among novice decision makers, who may be uncertain

how to best choose for themselves. In a related project (Tannenbaum et al., 2015), we found that partitioning the response menu had a significant effect on prescription decisions among practicing physicians. In hypothetical medical vignettes that described a patient's symptom history, physicians were more likely to prescribe "aggressive" treatment options when those treatment options were individually listed than when grouped together. Although these effects were smaller than those observed in the current paper (on average, physicians in that sample showed an 11 percentage point difference), the findings suggest that partitioning effects can be found even among experienced decision makers, in a domain with considerable consequences for public health. A fruitful avenue for future research would be to examine whether single-item partition dependence is less pronounced among those with greater task expertise or better-defined preferences, who are therefore less in need of such guidance or nudging (Camerer, Issacharoff, Loewenstein, O'Donoghue, & Rabin, 2003; Thaler & Sunstein, 2003).

Another promising direction for future research is in applying single-item partitioning to increase compliance for various public priorities. For instance, choice architects often wish to nudge decision makers on a binary decision, such as whether to donate to a charity or to be vaccinated. Instead of simply asking whether an individual, say, wishes to donate or consents to vaccination, choice architects can more finely partition the desired response option as a way of nudging compliance. Taking the donation example, charitable organizations could provide respondents with many ways of saying "yes" to donation while providing only one way of saying "no" (e.g., "Yes, I would like to donate $10/$20/$30/$40/$50 dollars" vs. "No, I would not like to donate"). Similarly, to increase vaccination rates, public health officials could individually list out the different types of vaccines available for inoculating against a particular virus (e.g., "I consent to receiving the Pfizer/Moderna/Johnson & Johnson vaccine" vs. "I do not consent to vaccination"). Indeed, similar approaches have been successfully applied in marketing contexts (Duke & Amir, 2023; Moon & VanEpps, 2023; Tavassoli & Visentin, 2021). Our results suggest that such interventions — which more finely partition the ways decision makers can say "yes" to public priorities — are likely to increase participation rates in consequential real-world domains.

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