

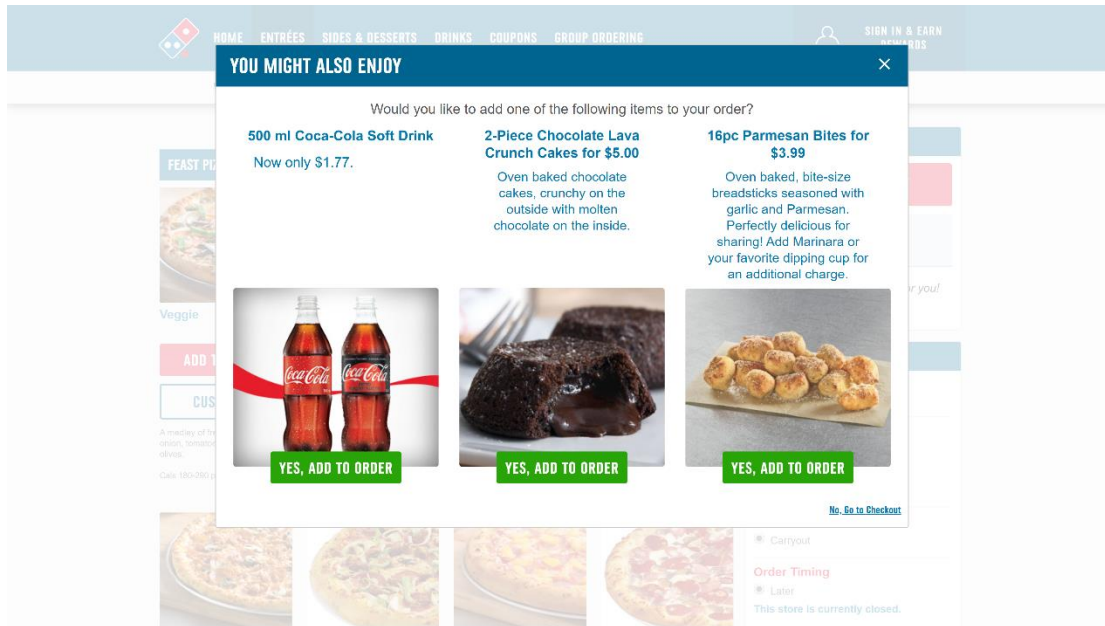
The Importance of Selling Formats: When Integrating Purchase and Quantity Decisions Increases Sales

APPENDICES

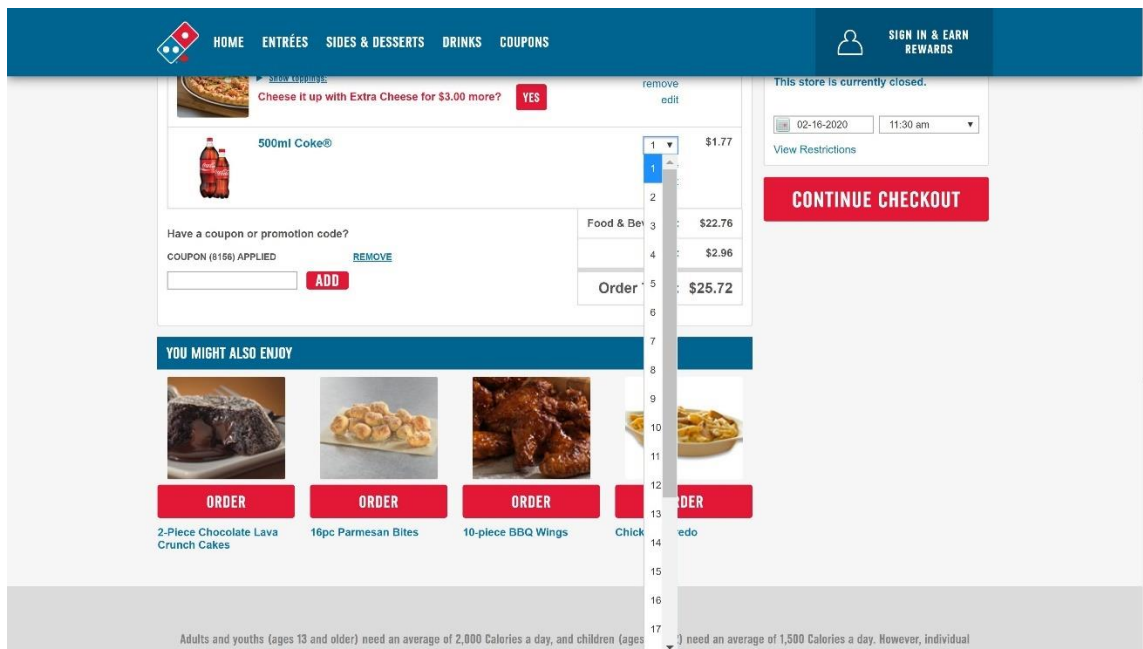
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APPENDIX A: EXAMPLES OF RETAILERS USING THE QUANTITY-SEQUENTIAL SELLING FORMAT

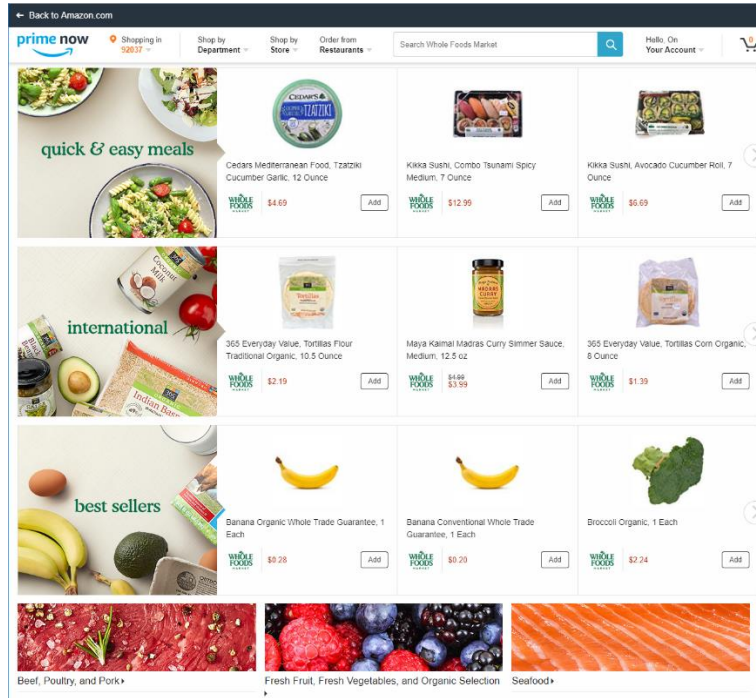
Domino’s Pizza’s Checkout Process. Customers who click the “Checkout” button are confronted with a pop-up message along the lines of the following, which asks if they would like to add featured items to their order. Customers wishing to add items can do so by clicking an “add” button. Those wishing not to must either X out of the pop-up (top right) or click “No, Go to Checkout” (bottom right).



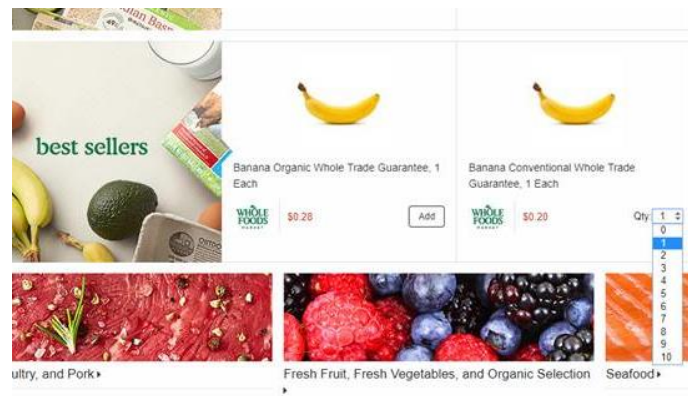
If featured items are added to the order, customers can adjust the desired quantity on the cart page:



Amazon’s display of grocery items available on “PrimeNow”. Customers are given opportunities to “add” an item to the cart, without simultaneously specifying quantity:



After a user clicks the “Add” button next to a product offer, he/she is given an opportunity to specify/modify the quantity using a drop-down menu:



Instacart’s interface options appear upon hovering over a focal product. As with PrimeNow, customers here are only given opportunities to “+Add” an item to the cart, without simultaneously specifying the purchase quantity:

Trending Near You



\$0.99
Arrowhead Mountain
Spring Water
1 l



\$6.49
Drumstick We Love
Chocolate Cookie Dipped
Frozen Dairy Dessert
36.8 fl oz



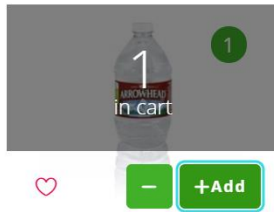
\$3.99
Raid Lemon Scent Ant &
Roach Killer Insecticide
17.5 fl oz



\$1.89
Kroger Family Size Cream
Of Mushroom Condensed
Soup
26 fl oz

After a user clicks the “+Add” button, he/she is given an opportunity to specify/modify the particular quantity by clicking the add button again (or clicking the minus button to adjust downward):

Trending Near You



\$0.99
Arrowhead Mountain
Spring Water
1 l



\$6.49
Drumstick We Love
Chocolate Cookie Dipped
Frozen Dairy Dessert
36.8 fl oz



\$3.99
Raid Lemon Scent Ant &
Roach Killer Insecticide
17.5 fl oz

APPENDIX B: LINEAR PROBABILITY MODELS FOR FIELD EXPERIMENT**Linear Probability Models**

	<i>Focal Product Category (A)</i>			<i>Boundary Condition Category (B)</i>		
	(1)	(2)	(3)	(1)	(2)	(3)
Sequential (vs. Integrated) Format	.002** (.0006)	.002** (.0006)	.002** (.0006)	-.002 (.001)	-.002 (.001)	-.002 (.001)
First-Observed Past Visits		-0.00002 (.00001)	-0.00002* (.00001)		-0.0001*** (.00003)	-0.0001*** (.00003)
Constant	.01*** (.0004)	.01*** (.0004)	.007 (.006)	.08*** (.0009)	.08*** (.0009)	.07*** (.01)
Geolocation Fixed Effects			Yes			Yes
Date Fixed Effects			Yes			Yes
Adjusted R ²	.00004	.00004	.005	3.9e-6	.0002	.02

Note: Ns are omitted at the request of the company. Standard errors in parentheses. Selling Format = 1 for quantity-sequential and 0 for quantity-integrated. Geolocation fixed effects include country and US state. 10% of observations have unobserved geolocation; models 3 include these observations as a separate “unobserved” category.

**APPENDIX C: LAB EXPERIMENT MATERIALS, SUPPLEMENTAL DETAILS, AND
ADDITIONAL ANALYSES**

Experiment 1

Exploratory Analysis: Only Coke Buyers

As mentioned in our preregistration, we also examine only the participants who answered yes to “Do you sometimes buy Coca-Cola?” (70.53% of participants; difference between conditions: $\chi^2(1, N = 397) = 1.39, p = .24$). These results are consistent with the primary results:

Customers’ Clicking Decisions in Each Condition, Among Participants Who Sometimes Buy Coke

<i>Action</i>	<i>Integrated</i>	<i>Sequential</i>	<i>Difference</i>
Add Coca Cola to order	31.94%	16.30%	$\chi^2(1, N = 279) = 9.26, p = .002$
“No, Go to Checkout”	54.86%	68.15%	$\chi^2(1, N = 279) = 5.18, p = .022$
“X” button	13.19%	15.56%	$\chi^2(1, N = 279) = .32, p = .574$

Among these individuals: Conditional on choosing to purchase, participants in the two formats selected similar quantities (sequential: $M = 1.64, SD = .66$ vs. integrated: $M = 1.59, SD = .54; t(66) = -.33, p = .744$). When including non-purchases (i.e., those purchasing a quantity of 0) and thus comparing average quantities sold per respondent, the integrated format “sold” about double the number of bottles. The average integrated participant “bought” 0.50 bottles ($SD = .80$), while the average sequential participant “bought” 0.27 bottles ($SD = .66, t(278) = 2.69, p = .008$).

Experiment 2

Materials: Main Choice Experiment

Participants saw the following information prior to making a choice:

If you are selected, you will receive a \$10 bonus.

If you'd like, you can use this money to purchase bags (6 oz. each) of Lindt milk chocolate truffles for **\$2.50 per bag**. You can buy up to 4 bags.

Any money you do not spend on truffles will be given to you as a bonus.



Materials: Scoring Phase

Prior to beginning the study, these to-be coding participants completed a bot check to weed out any bot-like responses attempting to access the study. Participants answered, “Thank you for participating in this survey. We appreciate your attention. To get started, in the space below, please write the current month we are in. (Just type the one word.)” Individuals who answered incorrectly were exited out of the study. Those who answered correctly were invited to begin the study.

Participants saw this brief explanation of the buying decision process:

Marketing research suggests that people often make purchase decisions in stages. For example, imagine someone who is deciding whether to purchase chocolates.

In the early stages of the decision process, this person would tend to focus on general concerns, asking herself questions such as:

- Do I have a need in this category? (e.g., *Do I need/ want chocolates?*)
- Do I have enough information to make a final decision? Or, should I keep doing research, finding out what other options might exist?

After these matters are settled, she will turn to later stages of the process. This typically involves evaluating the different choice alternatives, weighing their pros and cons and comparing them to each other. In this later evaluation stage, she might:

- compare different chocolate brands based on their relative appeal,
- compare different unit sizes to get,
- or compare different flavors,
- all while also considering the option not to buy anything at all.

Your task today will be to read through other people's explanations of their thought processes, then determine if they are expressing considerations that would arise:

1. **early in the process** (focusing on concerns such as *whether there is a need, or whether there is enough information or if more searching is needed*), or
2. **later in the process** (focusing on *evaluating the specific choice options and comparing them to each other*).

They answered a few questions to ensure their comprehension before beginning the scoring.

Just to make sure the instructions are clear, please take a look at the participants' explanations below. Then, indicate if the participant seems to be listing considerations in *early* or *late* stages of the decision-making process.

If it is helpful, the definitions of early versus late stages are printed again below.

In the early stages of the decision process, one tends to focus on general concerns, asking questions such as:

- Do I have a need in this category? (e.g., *Do I need/ want chocolates?*)
- Do I have enough information to make a final decision? Or, should I keep doing research, finding out what other options might exist?

After these matters are settled, one will turn to later stages of the process. This typically involves evaluating the different choice alternatives, weighing their pros and cons and comparing them to each other. In this later evaluation stage, one might:

- compare different chocolate brands based on their relative appeal,
- compare different unit sizes to get,
- or compare different flavors,
- all while also considering the option not to buy anything at all.

Participant Explanation: *"I don't really like chocolates."*

Is this participant more likely expressing considerations that arise **early** or **late** in the decision-making process?

Early in the process (focusing on concerns such as whether there is a need, or whether there is enough info or if more searching is needed)

Later in the process (focusing on evaluating the specific choice options and comparing them to each other, including the non-purchase option)

It's too hard to tell

Participant Explanation: *"This product is fairly expensive, but seems to be a good value for the price. Although it is not the brand I usually buy, I still think it is a good deal to buy some of these chocolates rather than just taking the money. I need the money but would really enjoy some chocolate."*

Is this participant more likely expressing considerations that arise **early** or **late** in the decision-making process?

Early in the process (focusing on concerns such as whether there is a need, or whether there is enough info or if more searching is needed)

Later in the process (focusing on evaluating the specific choice options and comparing them to each other, including the non-purchase option)

It's too hard to tell

The explanation: "I don't really like chocolates" is likely to be **EARLY** in the process.

This is because the response seems to focus on whether there is a **general desire** or need in the product category, rather than focusing on weighing pros and cons of specific choice options.

The explanation: "This product is fairly expensive, but seems to be a good value for the price. Although it is not the brand I usually buy, I still think it is a good deal to buy some of these chocolates rather than just taking the money. I need the money but would really enjoy some chocolate" is likely to be **LATER** in the process.

This is because the response seems to weigh the pros and cons and compare their options (including the option not to purchase), and appears to be evaluating the tradeoffs.

Your task will be to review participants' responses to a purchasing situation, and code whether the response reflects considerations from *early* vs. *late* in the decision process.

On the next page, we'll show you the purchasing situation.

RA Coding for Nonsense

RAs were given these instructions: "Mark answers that are total nonsense (something totally unrelated to the question prompt, or really bad English that you can't understand, or not really an answer to the question)." As mentioned, we excluded responses that at least 2 RAs marked as nonsense from scoring:

# RAs that marked this response as nonsense	0	1	2	3	4
# of responses meeting this criterion	325	17	5	7	20

Robustness Checks

Results with Different Exclusion Rules

Dropping responses that any RA deemed nonsense (remaining $N = 325$)

Difference in average scores between formats:

When treating "too hard to tell" as midpoint: $QI = .453$ vs. $QS = .387$, $t(323) = 2.97$, $p = .003$

When excluding "too hard to tell": $QI = .451$ vs. $QS = .383$, $t(323) = 2.99$, $p = .003$

Difference in average scores between purchasers and non-purchasers:

When treating "too hard to tell" as midpoint: Non-purchasers = $.353$ vs. purchasers = $.591$, $t(323) = -11.39$, $p < .001$

When excluding "too hard to tell": Non-purchasers = $.349$ vs. purchasers = $.594$, $t(323) = -11.22$, $p < .001$

Mediation analysis:

When treating "too hard to tell" as midpoint: $b = .07$, 95% CI [.02, .12]

When excluding "too hard to tell": $b = .07$, 95% CI [.0, .12]

Including non-fluent scorers (so that scoring $N = 570$)

Difference in average scores between formats:

When treating “too hard to tell” as midpoint: $QI = .452$ vs. $QS = .397$, $t(340) = 2.62$, $p = .009$

When excluding “too hard to tell”: $QI = .449$ vs. $QS = .393$, $t(340) = 2.50$, $p = .013$

Difference in average scores between purchasers and non-purchasers:

When treating “too hard to tell” as midpoint: Non-purchasers = .359 vs. purchasers = .582, $t(340) = -11.23$, $p < .001$

When excluding “too hard to tell”: Non-purchasers = .353 vs. purchasers = .584, $t(340) = -10.87$, $p < .001$

Mediation analysis:

When treating “too hard to tell” as midpoint: $b = .06$, 95% CI [.01, .11]

When excluding “too hard to tell”: $b = .05$, 95% CI [.01, .10]

Other Ways of Analyzing Scores

Treating each score as an observation in mixed-effect models

Recall that each of the original explanations was rated by 28-35 individuals, who, in turn, each provided 20 such ratings. To ensure robustness, we report an additional treatment of the data where each explanation-score is its own observation (for a total of 10,960 observations). We conducted a linear mixed-effects model predicting these individual scores from the selling format, with random intercepts for the explanation and for the scorer. P-values and degrees of freedom are approximated using the Satterthwaite method as implemented in the lmerTest R package (Kuznetsova and Christensen 2017). This analysis yielded consistent results, such that participants in the sequential condition gave explanations coded as earlier in the buying process than participants in the integrated condition ($b_{\text{Sequential}} = -.05$, $t(339.68) = -2.47$, $p = .014$). A model excluding the random intercepts for explanation yields convergent results ($b_{\text{QS}} = -.05$, $t(10685.30) = -6.10$, $p < .001$). For robustness, we also repeated the analyses when treating the “too hard to tell” scores as N/A and excluding them from analysis. That method yields consistent results, both in the model with random intercepts for explanation and rater ($b_{\text{QS}} = -.05$, $t(338.58) = -2.37$, $p = .019$) and in the model with only random intercept for rater ($b_{\text{QS}} = -.06$, $t(10066.02) = -5.95$, $p < .001$).

Relaxing the assumption that these responses should exist at exactly the halfway point and instead endogenously determining cutoffs

To further ensure robustness, we also conducted an ordered logistic regression (cumulative link mixed model, implemented with the ordinal R package; Christensen 2019) to relax the assumption that the “too hard to tell” responses should exist at the midpoint (0.5 on a scale from 0 to 1). This method instead endogenously determines cutoffs between the three levels of scores (“early,” “too hard to tell,” and “late”). This analysis yielded consistent results, finding that the sequential format responses were again scored as expressing considerations from earlier stages more so than the integrated format ($b = -.28$, $SE = .11$, $z = -2.50$, $p = .013$).

Replication of Experiment 2, Without Participants Making a Choice

Both parts of this replication were preregistered: first is the explanation collection (https://aspredicted.org/Z4T_QXV), and second is the coding of these explanations (https://aspredicted.org/VHP_52F). This experiment is not included in the pooled analysis because it does not include any purchasing decisions.

Explanation Collection Phase

We posted the survey to Prolific Academic for 400 participants and excluded individuals who incorrectly answered our attention check (after exclusions, $N = 345$, 40.3% male, $M_{\text{age}} = 31.0$ years). Participants were assigned to one of two conditions (selling format: sequential vs. integrated) in a between-subjects design. All participants were asked to imagine being presented with a purchase opportunity. They viewed a screenshot of the Lindt chocolate choice participants made in Experiment 2.

Then, they read, “Imagine you are asked to make the following choice:” and saw a screenshot of the choice question (“What would you like to do?”) with choice options corresponding to their condition. In the sequential format, the options were: “Not buy any truffles” or “Buy truffles.” In the integrated format, the options were, “Not buy any truffles,” “Buy 1 bag of truffles,” “Buy 2 bags of truffles,” “Buy 3 bags of truffles,” and “Buy 4 bags of truffles.” Importantly, participants could not click on any options, and were not making an actual choice.

Instead, all participants answered, “Imagine you have been presented with this choice, and are thinking about what to do. What is the first question you would ask yourself when thinking over this choice?” Finally, participants answered an attention check (about which product they had seen) and provided demographic information.

Removing Nonsense Responding

As in Experiment 2, to avoid drawing conclusions from low-quality responses, we had independent hypothesis- and condition-blind research assistants (RAs) examine the responses and mark “answers that are total nonsense (something totally unrelated to the question prompt, or really bad English that you can’t understand, or not really an answer to the question).” Two RAs marked these responses, and any explanation that both RAs marked as total nonsense was excluded, as preregistered (1 response was excluded).

Consideration Scoring Phase

We posted the scoring survey to Prolific for 550 participants (after preregistered fluency exclusions, $N = 522$, 31.6% male, $M_{\text{age}} = 32.0$ years). Prior to beginning the study, participants completed a bot check to weed out any bot-like responses attempting to access the study. Participants answered, “Thank you for participating in this survey. We appreciate your attention. To get started, in the space below, please write the current month we are in. (Just type the one word.)” Individuals who answered incorrectly were exited out of the study. Those who answered correctly were invited to begin the study.

These condition- and hypothesis-blind scorers were guided through the same information and explanation as the coders in Experiment 2 (they read an overview of the buying decision process and its different stages, including the distinction between concerns that arise early versus later in the funnel). They then viewed the chocolate truffles purchasing situation that participants from the consideration collection phase had seen. They read, “Participants were asked, ‘What is the first question you would ask yourself when thinking over this choice?’” Next, they scored 20 randomly selected consideration responses. For each one, they answered, “Is this participant more likely expressing considerations that arise early or late in the decision-making process?” with three choice options: “Early in the process (focusing on concerns such as whether there is a need, or whether there is enough info or if more searching is needed)”, which we scored as 0; “Later in the process (focusing on evaluating the specific choice options and comparing them to each other, including the non-purchase option)”, which we scored as 1; and “It’s too hard to tell”, which we scored as 0.5 (as preregistered, and just as in Experiment 2). After coding, these participants answered three questions assessing their English fluency (the same as in Experiment 2) and reported demographic information.

Results and Robustness Checks

Each explanation was scored by between 26 and 32 scorers. We predicted and found that participants would receive a lower average score in the sequential ($M = .354$, $SD = .22$) than in the integrated condition ($M = .407$, $SD = .22$, $t(342) = 2.23$, $p = .026$). That is, the first question participants asked themselves when facing the sequential format was earlier in the buying decision process than the first question participants asked themselves when facing the integrated format. This conceptually replicates Experiment 2.

We also consider other treatments of the data, as in Experiment 2 (and as mentioned as exploratory analyses in our preregistration), for robustness:

- This result holds when treating the “too hard to tell” responses as N/A and hence excluding them from analyses (integrated: $M = .403$ vs. sequential: $M = .348$, $t(342) = 2.22$, $p = .027$).
- This result holds when controlling for the length of the explanation ($b = -.05$, $t(341) = -2.23$, $p = .027$).
- This result holds when analyzing the data including all scorers, including those who fail the fluency checks (integrated: $M = .409$, $SD = .22$, vs. sequential: $M = .355$, $SD = .21$, $t(342) = 2.31$, $p = .021$).
- This result holds when treating each individual explanation-score as an observation in mixed-effect models, predicting these individual scores from the initial condition, with random intercepts for the explanation and for the scorer ($b_{\text{Sequential}} = -.05$, $t(341.64) = -2.20$, $p = .028$). The result is similar without the intercept for explanation ($b_{\text{Sequential}} = -.05$, $t(10238.56) = -5.85$, $p < .001$) or when excluding the “too hard to tell” responses ($b_{\text{Sequential}} = -.06$, $t(342.30) = -2.21$, $p = .028$).
- This result holds when conducting an ordered logistic regression (cumulative link mixed model, Christensen 2019) to relax the assumption that the “too hard to tell” responses should exist at the midpoint ($b_{\text{Sequential}} = -.29$, $z = 2.17$, $p = .030$).

Experiment 3

Prior to beginning the study, participants completed a bot check to weed out any bot-like responses attempting to access the study. Participants answered, “Thank you for accepting this HIT. Just to get started, please type the current year as a 4 digit number.” Individuals who answered incorrectly were exited out of the study. Those who answered correctly were invited to begin the study.

APPENDIX D: DETAILS ON ALL POOLED ANALYSIS EXPERIMENTS**Methods**

All of our lab experiments designed to test the purchasing difference between formats follow a similar structure. Details of all experiments are in the table on the following page. Column 2 lists the number of participants; unless mentioned otherwise, participants were Mechanical Turk workers. Participants were assigned to condition in a between-subjects design; Column 3 outlines the factorial design of each experiment. All participants either imagined being in a shopping scenario or entered an actual incentive-compatible purchase situation. Column 4 presents the scenario or purchase opportunity description. Then, to provide greater context, all participants viewed an image of a pop-up advertisement, a sign advertising a sale, or an image of the product available for purchase. The product and its price are in Columns 5 and 6. Column 7 presents the quantity limit (i.e., the maximum number of units that participants they could purchase), and notes whether or not this limit was described explicitly (e.g., a statement specifying “The maximum purchase quantity is X” or “you can buy up to X”). All participants then made a purchase decision by selecting a choice option, according to their selling format. Columns 8 and 9 present these questions and choice options.

Several experiments were designed with a secondary goal beyond simply demonstrating the effect in a new setting. Accordingly, we often orthogonally layered an additional manipulation on the design. In some cases, the results of this additional manipulation yielded meaningful insights about potential psychological mechanisms; for these experiments, we provide a concise description of the methods and results in Appendix F.

Methods Details for Lab Experiments

(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
1	397	2 (selling format: QS vs. QI)	"Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up. What would you click? Please select what you would click next in this situation. Whenever you click an area of the screen, it will highlight in green. You can click it again to un-highlight that area."	Coca-Cola	\$1.99	3 (No)	"Would you like to add the following item(s) to your order?"	QS: "Yes, add to order," "No, go to checkout," X button. QI: "Add 1 to order," "Add 2 to order," "Add 3 to order," "No, go to checkout," X button.
2	342 (only ps who were scored)	2 (selling format: QS vs. QI)	"If you are selected, you will receive a \$10 bonus. If you'd like, you can use this money to purchase bags (6 oz. each) of Lindt milk chocolate truffles for \$2.50 per bag. You can buy up to 4 bags. Any money you do not spend on truffles will be given to you as a bonus."	Lindt milk chocolate truffles	\$2.50	4 (Yes)	"What would you like to do?"	QS: "Not buy any truffles" and "Buy truffles" QI: "Not buy any truffles," "Buy 1 bag of truffles," "Buy 2 bags of truffles," "Buy 3 bags of truffles," and "Buy 4 bags of truffles"
3	399	2 (selling format: QS vs. QI)	"Imagine you are shopping on Amazon's website when you see that one of the body washes you like is on sale. You already have a few different body washes at home, but you take a look. Amazon allows you to purchase the same products from multiple sellers. There are 2 sellers who sell this body wash: Beauty Care and For Your Beauty. Both have 100% positive lifetime customer ratings. This body wash normally retails for \$5.00 a bottle, but is currently offered at a discounted price of \$3.99. You can buy up to 2 bottles."	Body wash	\$3.99	2 (Yes)	"What would you do?"	QS: "Not make a purchase," "Make a purchase from Beauty Care," "Make a purchase from For Your Beauty" (counterbalanced). QI: "Not make a purchase," "Buy 1 bottle from Beauty Care," "Buy 2 bottles from For Your Beauty" (counterbalanced)
AA	801	2 (selling format: QS vs. QI)	"If you are selected, you will receive a \$4 bonus. If you'd like, you can use this some of this money to purchase 6 oz. of Lindt milk chocolate truffles for \$2.50 per bag. You can buy up to 1 bag. Any money you do not spend on truffles will be given to you as a bonus."	Lindt milk chocolate truffles	\$2.50	1 (Yes)	QS: "Would you like to buy truffles with your bonus money?" QI: "How many truffles would you like to buy with your bonus money?"	QS: "No" and "Yes" QI: "None" and "1 bag"
AB	403	2 (selling format: QS vs. QI)	"If you are selected, you will receive a \$20 bonus. If you'd like, you can use this money to purchase Lemome notebooks (pictured below) for \$6 per notebook (current price on Amazon: \$9). You can buy up to 3 notebooks. Any money you do not spend on notebooks will be given to you as a bonus."	Small notebooks	\$6	3 (Yes)	"What would you like to do?"	QS: "Not buy any notebooks" and "Buy" QI: "Not buy any notebooks," "Buy 1 notebook," ... "Buy 3 notebooks"
AC	800	2 (selling format: QS vs. QI)	"If you are selected, you will receive a \$10 bonus. If you'd like, you can use this money to purchase bags (6 oz. each) of Lindt milk chocolate truffles	Lindt milk chocolate truffles	\$2.50	4 (Yes)	"What would you like to do?"	QS: "Not buy any truffles" and "Buy truffles"

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(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
			for \$2.50 per bag. You can buy up to 4 bags. Any money you do not spend on truffles will be given to you as a bonus."					QI: "Not buy any truffles," "Buy 1 bag of truffles," ... "Buy 4 bags of truffles"
AD	655 (lab under-grads)	2 (selling format: QS vs. QI) X 2 (prime: lack of closure vs. high sense of closure)	"At the end of the lab session today, you'll receive \$1 in quarters. This money is yours to keep. Or, if you'd like, you can use this money to purchase packs of Extra Spearmint gum (15 sticks) for 50 cents per pack."	Extra spearmint gum	\$0.50	2 (No)	"What would you like to do?"	QS: "Make a purchase" and "Not make a purchase" QI: "Purchase 1 pack," "Purchase 2 packs," and "Not make a purchase"
AE	867 in 3 conditions; 582 in main 2	3 (selling format: QS, QI, articulated binary)	"If you are selected, you will receive a \$20 bonus. If you'd like, you can use this money to purchase Lemome notebooks (pictured below) for \$6 per notebook (current price on Amazon: \$9). You can buy up to 3 notebooks. Any money you do not spend on notebooks will be given to you as a bonus."	Small notebooks	\$6	3 (Yes)	"What would you like to do?"	QS: "Not buy any notebooks" and "Buy" QI: "Not buy any notebooks," "Buy 1 notebook," ... "Buy 3 notebooks". Articulated: "Not buy any notebooks," "Buy 1, 2, or 3 notebooks"
AF	400	2 (selling format: QS vs. QI)	"Imagine you are waiting in line to check out at a store. As you're waiting, you see the following sign."	Extra spearmint gum	\$0.88	2 (Yes)	"Please indicate what you would do in this situation."	QS condition, there were 3 choice options: "Not buy gum," "Buy gum," "Buy gum with excitement!" QI: "Not buy gum," "Buy 1 pack of gum," "Buy 2 packs of gum with excitement!"
AG	433 (lab under-grads)	2 (selling format: QS vs. QI)	"Please imagine you are actively navigating this website, and click the next thing that you would click in this situation."	Avocados	\$0.99	3 (No)	N/A	QS: "+Add", Arrow button, heart icon, Product category. QI: "+ Add 1," "+ Add 2," "+ Add 3," arrow button, heart icon, Product category.
A	593	2 (selling format: QS vs. QI)	"As part of your participation today, you will receive a 50 cent bonus. You can use any amount of this money to purchase raffle entry tickets toward winning \$200..."	Raffle tickets	\$0.05	10 (No)	QS: "Please select your preference below." QI: "How many raffle entry tickets would you like to purchase toward winning the \$200?"	QS: "Yes: I would like to purchase some tickets" and "No: I would not like to purchase any tickets" QI: 0... 10 (sliding scale)
B	790	2 (selling format: QS vs. QI) X 2 (product:	"Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up."	2-Liter bottles of Coca-Cola or "soda" (label only included the word SODA)	\$2.49	5 (No)	QS: "Would you like to add any 2 Liter bottles of Coke (soda) to your order?" QI: "How many 2 Liter bottles of Coke (soda)	QS: "Yes" and "No" QI: 0, 1, ...5 (sliding scale)

Appendix p. 16

(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
		Coke vs. "soda" ¹					would you like to add to your order?"	
C	773	2 (selling format: QS vs. QI) X 2 (product: Coke vs. randomly chosen soda) ¹	"Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up."	2-Liter bottles of Coca-Cola or a randomly chosen soda (Coke, Pepsi, Sprite, Dr. Pepper, or Mtn. Dew)	\$1.99	5 (No)	QS: "Would you like to add any 2 Liter bottles of Coke (soda) to your order?" QI: "How many 2 Liter bottles of Coke (soda) would you like to add to your order?"	QS: "Yes" and "No" QI: 0, 1, ...5 (sliding scale)
D	1175	2 (selling format: QS vs. QI) X 2 (commitment : normal vs. low vs. normal + maximum quantity info) ²	"Imagine you are online shopping at home. After some browsing, the following box pops up."	Scented candles	\$6.99	5 (No [Yes in "normal + maximum quantity info" condition])	QS: "Would you like to purchase any candles?" QI: "How many candles would you like to purchase?" Low commitment: above + "You can always change your mind later before purchasing."	QS: "Yes" and "No" QI: 0, 1, ...5 (sliding scale)
E	394	2 (selling format: QS vs. QI) X 2 (commitment : normal vs. low) ²	"Imagine you are online shopping at home. After some browsing, the following box pops up."	Scented candles	\$6.99	5 (Yes)	QS-normal: "Would you like to purchase any candles?" QI-normal: "How many candles would you like to purchase?" QS-low: above, plus "You can always change your mind later before purchasing." QI-low: above, plus "You can always change your mind later before purchasing."	QS: "Yes" and "No" QI: 0, 1, ... 5 (sliding scale)
F	261 (lab undergrads)	2 (selling format: QS vs. QI)	Participants learned they would receive \$2 in quarters and could use any amount of this money to purchase raffle tickets toward winning a \$200 Amazon gift card.	Raffle tickets	\$.25	8 (No)	"Place a check mark on the line next to your choice."	QS: "Yes: I would like to purchase some tickets" and "No: I would not like to purchase any tickets" QI: "0 tickets," "1 ticket," ... "8 tickets"
G	402	2 (selling format: QS vs. QI) ⁶ X 2 (recipient:	Self: "Imagine you are online shopping for a razor, and have chosen one that comes with two blades." Other: "Imagine a wealthy gentleman has decided to never shop online again, but to outsource his	4-pack of refill razor blades	\$9.99	5 (Yes)	QS: "Do you want to buy any 4-packs of blades?"	QS: "no" and "yes" QI: 0, 1, ... 5 (sliding scale)

¹ These designs were used to determine whether the clarity with which the product is described would moderate the effect; in general, it did not.

² These designs were used to determine whether the extent to which the purchase feels like a commitment would moderate the effect. In general, the effect was usually directionally but not significantly smaller when the purchase was designed to seem "low commitment" rather than "high commitment."

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(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
		self vs. other) ³	shopping to others. Imagine you were asked to shop online for a razor for him, and have chosen one that comes with two blades.” Both: “After adding the item to your shopping cart, a screen pops up advertising additional “blades for purchase.”				QI: “How many 4-packs of blades do you want to buy?”	
H	394	2 (selling format: QS vs. QI) ^H X 2 (recipient: self vs. other) ³	Self: “Imagine you are online shopping for some new bath towels.” Other: “Imagine a wealthy woman has decided to never shop online again, but to outsource her shopping to others. Imagine you were asked to shop online for bath towels for her.” Both: “After choosing towels, the following box pops up.”	Bar soap	\$2.99	5 (Yes)	QS: “Do you want to buy [her] any bars of soap?” QI: “How many bars of soap do you want to buy [her]?”	QS: “no” and “yes” QI: 0, 1, ... 5 (sliding scale)
I	399	2 (selling format: QS vs. QI) X 2 (deferral: not mentioned vs. available)	“Imagine you are online shopping for some new bath towels. After choosing towels, the following box pops up.”	Bar soap	\$2.99	5 (Yes)	QS: “Do you want to buy any bars of soap?” QI: “How many bars of soap do you want to buy?”	QS: “no” and “yes” [and “I want to decide later” in deferral available condition] QI: “0,” “1,” ... “5” [and “I want to decide later” in deferral available condition]
J	396	2 (selling format: QS vs. QI) X 2 (commitment : normal vs. no commitment) ²	Both: “Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up.” No commitment: “...No Commitment Ordering. If you'd like, our door-to-door delivery specialist can bring up to 5 bottles of Coke along with your order. You can always change your mind and choose not to purchase any bottles.”	2-Liter Coca-Cola bottles	\$2.49	5 (Yes)	QS normal: “Would you like to add any 2 Liter bottles of Coke to your order?” QI normal: “How many 2 Liter bottles of Coke would you like to add to your order?” QS no commitment: “How many 2 Liter bottles of Coke would you like the delivery specialist to bring?” QI no commitment: “Would you like the delivery specialist to bring any 2 Liter bottles of Coke?”	QS: “Yes” and “No” QI: 0, 1... 5 (sliding scale)
K	395 * ^k	2 (selling format: QS vs. QI) X 2 (context: normal vs.	Normal: “Imagine you came across this item.” Next to Other Products: “Imagine you came across this set of items.”	Hand soaps and ballpoint pens (participants made 2 decisions)	Soap: \$.99 Pen: \$3.99	3 (Yes)	QS: “Would you like to add any bottles of the soap [pens] outlined in yellow to your order?” QI: “How many bottles of the soap [pens] outlined in	QS: “Yes” and “No” QI: 0, 1,...3 (sliding scale)

³ These designs were used to determine whether participants would be differently affected by the selling format when choosing for themselves versus others. In general, they were not.

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(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
		next to other products) ⁴					yellow would you like to add to your order?"	
L	401	2 (selling format: QS vs. QI) ^L X 2 (color: normal vs. G&R) ⁵	"Imagine you are waiting in line to check out at a store. As you're waiting, you see the following sign."	Ferrero Rochers	\$.25	5 (Yes)	QS: "Do you want to buy any Ferrero Rocher chocolates?" QI: "How many Ferrero Rocher chocolates do you want to buy?"	QS: "No" (printed in red in G&R condition) and "Yes" (printed in green in G&R condition) QI: "0" (printed in red in G&R condition), "1," ... "5" (all printed in red in G&R condition)
M	605	2 (selling format: QS vs. QI) X 3 (commitment prime: none vs. high vs. low) ²	High, before scenario: "Please recall a time where you have shown great commitment, follow-through, and strength of character." Low, before scenario: "Please recall a time where you have shown a lack of commitment and follow-through: a time when you wiggled back and forth on a decision." All, scenario: "Imagine you are waiting in line to check out at a store. As you're waiting, you see the following sign."	Extra spearmint gum	\$.99	5 (Yes)	"Please indicate what you would do in this situation."	QS: "Not buy any" and "Buy" QI: "Buy 0 packs," "Buy 1 pack," ... "Buy 5 packs"
N	1003	2 (selling format: QS vs. QI) X 2 (timeframe: short vs. long) ²	"Imagine you are visiting a bank to make a deposit. You walk in and wait in the lobby area to meet a teller. You look around and read a few of the posters. You notice one poster with the following offer."	Short: 1-month CD (2.88% APY) Long: 25-year CD (2.88% APY)	\$200	5 (Yes)	QS: "Would you open \$200 one-month [25-year] CDs?" QI: "How many \$200 one-month [25-year] CDs would you open?"	QS: "No" and "Yes" QI: "0," "1," ... "5"
O	811	2 (selling format: QS vs. QI) X 2 (time pressure: normal vs. pressure) ⁶	Time Pressure: "We would like you to work as quickly as you can. The top 10 fastest responders on the next page will each earn a 50-cent bonus. Therefore, on the next page, please work as quickly as you can, while still reading the scenario instructions." Both, scenario: "Imagine you are waiting in line to check out at a store. As you're waiting, you see the following sign."	Ferrero Rochers	\$.25	5 (Yes)	"Please indicate what you would do in this situation."	QS: "Not buy any" and "Buy" QI: "Not buy any," "Buy 1," ... "Buy 5"
P	806	2 (selling format: QS vs. QI) X 2 (time pressure:	Time Pressure: "We would like you to work as quickly as you can. The top 10 fastest responders on the next page will each earn a 50-cent bonus. Therefore, on the next page, please work as	2-Liter Coca-Cola bottles	\$1.49	5 (Yes)	"Please indicate what you would do in this situation."	QS: "Not buy any" and "Buy" QI: "Not buy any," "Buy 1 bottle," ... "Buy 5 bottles"

⁴ This design was used to determine whether presenting a focal item in isolation vs. in a set of options would moderate the effect.; it did not.

⁵ This design was used to determine if presenting the non-purchase option in red and the purchase option(s) in green (thus, highlighting the difference between them) would influence the effect; it did not.

⁶ This design was used to determine whether time pressure would moderate the effect. In Experiment O, time pressure amplified the effect, but this pattern did not replicate in a second experiment (Experiment P).

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(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
		normal vs. pressure) ⁶	quickly as you can, while still reading the scenario instructions.” Both, scenario: “Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up.”					
Q	399	2 (selling format: QS vs. QI) X 2 (concreteness: normal vs. with image) ⁷	“Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up.”	2-Liter Coca-Cola bottles	\$2.49	3 (Yes)	“Please indicate what you would do in this situation.”	QS: “Not buy any” and “Buy” (in With Image Condition, included image of coke bottle) QI: “Not buy any,” “Buy 1 bottle,” ... “Buy 5 bottles” (in With Image Condition, included image of coke bottle with each purchase option)
R	808	2 (selling format: QS vs. QI) X 4 (maximum purchase quantity: 1, 3, 5, or 10)	“Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up.”	2-Liter Coca-Cola bottles	\$1.49	1, 3, 5, or 10 according to condition (Yes)	QS: “Would you like to add any 2 Liter bottles of Coke to your order?” QI: “How many 2 Liter bottles of Coke would you like to add to your order?”	QS: “Yes” and “No” QI: “0” and “1” (when max = 1); “0,” “1,” “2,” and “3” (when max = 3); etc.
S	201 (301 ^{*5})	3 (selling format: QS vs. QI “buy 0” vs. QI “not buy any”) ⁸	“Imagine you are waiting in line to check out at a store. As you’re waiting, you see the following sign.”	Extra spearmint gum	\$.99	5 (Yes)	“Please indicate what you would do in this situation.”	QS: “Not buy any” and “Buy” QI: “Buy 0” (or “Not buy any”), “buy 1 pack,” ... “Buy 5 packs”
T	266 (lab undergrads)	2 (selling format: QS vs. QI)	“Imagine you are online shopping at home. After some browsing, the following box pops up.”	Scented candles	\$6.99	3 (Yes)	QS: “Would you like to buy any candles?” QI: “How many candles would you like to buy?”	QS: “Yes” and “No” QI: 0, 1, 2, 3 (sliding scale)
U	300	3 (selling format: QS vs. QS-same-page vs. QI) ⁹	“Imagine you are online shopping at home. After some browsing, the following box pops up.”	Scented candles	\$6.99	3 (Yes)	“What would you like to do?” QS, second stage: “Please specify the quantity.”	QS: “Not buy any” and “Buy” QI: “Not buy any,” “Buy 1 candle,” ... “Buy 3 candles”
V	793	3 (selling format: QS vs. QI slider vs. QI drop-down) ^{*V}	“Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up.”	2-Liter Coca-Cola bottles	\$2.49	5 (No)	QS: “Would you like to add any 2 Liter bottles of Coke to your order?”	QS: “Yes” and “No” QI: “0,” “1,” ... “5”

⁷ This design was used to determine if making the product purchase seem more concrete (by including an image of the product in the choice option buttons) would moderate the effect; it did not.

⁸ This design was used to assess whether the phrasing of the non-purchase option (as including vs. excluding the number “0”) in QI would influence the effect; it did not.

⁹ This design was used to assess whether the effect would still arise when the two QS decisions are presented on the same page; it did.

(1) Study	(2) N	(3) Design	(4) Choice Description	(5) Product	(6) Price	(7) Quantity Limit (Explicit?)	(8) Question(s)	(9) Choice Options (for QS, this represents the first stage)
							QI: "How many 2 Liter bottles of Coke would you like to add to your order?"	
W	1210	2 (selling format: QS vs. QI) X 3 (prime: implemental, deliberative, control)	"Imagine you are online shopping at home. After some browsing, the following box pops up."	Scented candles	\$6.99	3 (Yes)	"What would you like to do?"	QS: "Not buy any" and "Buy" QI: "Not buy any," "Buy 1 candle," "Buy 2 candles," "Buy 3 candles"
X	424	2 (selling format: QS vs. QI)	"If you are selected, you will receive a \$10 bonus. If you'd like, you can use this money to purchase discounted \$5 Starbucks gift cards, at a price of \$3 each. The gift card(s) will be emailed to you. Any money you do not spend will be given to you as a bonus."	Starbucks gift cards (\$5.00)	\$3.00	3 (Yes)	"What would you like to do?"	QS: "Not buy any gift cards" and "Make a purchase" QI: "Not buy any gift cards," "Purchase 1 gift card," ... "Purchase 3 gift cards"
Y	798	2 (selling format: QS vs. QI)	"Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up."	2-Liter Coca-Cola bottles	\$2.49	3 (Yes)	"Please indicate what you would do in this situation."	QS: "Not buy any" and "Buy" QI: "Not buy any," "Buy 1 bottle," ... "Buy 3 bottles"
Z	603	2 (selling format: QS vs. QI)	"Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up."	2-Liter Coca-Cola bottles	\$2.49	3 (Yes)	"Please indicate what you would do in this situation."	QS: "Not buy any" and "Buy" QI: "Not buy any," "Buy 1 bottle," ... "Buy 3 bottles"

Notes

QS = Quantity-Sequential; QI = Quantity-Integrated.

Although we targeted round numbers of participants (e.g., N = 600), at times, participants completed the survey without submitting for payment, resulting in additional responses (e.g., N = 603). Additionally, only participants who responded to the purchase solicitation question (the DV) were retained in each experiment. These two features explain why some sample sizes are not round numbers.

*K Note that all participants made choices about both products (soaps and pens), and therefore each participant appears twice in the pooled analysis.

*S Because this design was unbalanced in terms of selling format (there were twice the number of QI than QS participants), we chose to drop one of the QI conditions, retaining the ever-so-slightly more conservative condition (with slightly lower purchase; retaining "buy 0" and dropping "not buy any") for the pooled analysis.

*V The QI slider and QI drop-down conditions were combined into a single QI selling format for comparison in the pooled analysis.

Results for All Experiments

As mentioned previously, the prior table includes several experiments that had an additional, orthogonal manipulation beyond the manipulation of selling format. Accordingly, as described in the main text, we split each such experiment into separate smaller experiments, each with only two conditions: the sequential format or the integrated format. The following table presents the percentage of participants purchasing in each selling format, within each such split experiment. For each experiment that was split, each orthogonal cell is represented with a Roman numeral in parentheses (e.g., Experiment 2 (I)) that is described in Column 2. Columns 3 and 4 present the Ns in each selling format, and 5 and 6 present the percentage of participants purchasing in each selling format. Column 7 presents the χ^2 statistic analyzing the difference between the two selling formats and indicates the level of significance.

Percentage of Participants Purchasing in Each Experiment

Experiment	Experimental Condition	QS N	QI N	QS % Purchasing	QI % Purchasing	X ² and Significance
1		199	198	11.56	23.23	9.42**
2		165	177	18.79	40.11	18.56***
3		198	201	64.65	74.13	4.23*
A		300	293	39.00	58.36	22.25***
AA		400	401	13.00	20.70	8.47**
AB		201	202	29.35	39.60	4.69*
AC		399	401	26.57	35.91	8.13**
AD (I)	Lack of closure	157	170	33.76	53.53	12.95***
AD (II)	High sense of closure	171	157	50.29	53.50	0.34
AE		294	288	26.53	39.24	10.65**
AF		201	199	51.24	63.32	5.96*
AG		217	216	30.88	43.06	6.89**
B (I)	Product = Coke	201	191	18.41	32.46	10.25***
B (II)	Product = soda	199	199	16.08	36.18	20.83***
C (I)	Product = Coke	201	186	27.36	44.09	11.81***
C (II)	Product = randomly chosen soda	198	188	26.77	43.62	12.04***
D (I)	Normal	195	194	23.08	45.36	21.46***
D (II)	Low commitment	200	195	29.00	48.72	16.18***
D (III)	Normal + maximum quantity	197	194	33.50	47.42	7.87**
E (I)	Normal	101	99	34.65	49.49	4.52*
E (II)	Low commitment	97	97	28.87	50.52	9.50**
F		133	128	45.11	65.62	11.10***
G (I)	Recipient: self	100	101	84.00	89.11	1.13
G (II)	Recipient: other	101	100	84.16	92.00	2.94^
H (I)	Recipient: self	97	99	28.87	55.56	14.30***
H (II)	Recipient: other	102	96	27.45	59.38	20.57***
I (I)	Deferral not mentioned	100	98	24.00	40.82	6.40*

I (II)	Deferral available	101	100	24.75	36.00	3.01 [†]
J (I)	Normal	101	96	26.73	44.79	7.01**
J (II)	No commitment	100	98	26.00	50.00	12.12***
K (I)	Normal: pens	100	100	23.00	45.00	10.78**
K (II)	Next to other products: pens	93	102	48.39	64.71	5.28*
K (III)	Normal: soaps	100	100	55.00	70.00	4.80*
K (IV)	Next to other products: soaps	93	102	70.97	81.37	2.92 [†]
L (I)	Normal	98	101	68.37	80.20	3.65 [†]
L (II)	G&R	101	101	73.27	82.18	2.32
M (I)	No prime	114	110	47.37	55.45	1.47
M (II)	Prime high commitment	97	92	42.27	51.09	1.48
M (III)	Prime low commitment	86	105	45.35	52.38	0.94
N (I)	Short timeframe	251	252	55.38	80.16	35.37***
N (II)	Long timeframe	248	252	25.81	59.13	56.75***
O (I)	Normal	203	203	70.44	68.97	0.1
O (II)	Time pressure	203	202	66.01	82.18	13.78***
P (I)	Normal	202	202	45.05	53.47	2.86 [†]
P (II)	Time pressure	202	200	55.94	61.00	1.06
Q (I)	Normal	100	99	21.00	36.36	5.75*
Q (II)	With image	100	100	14.00	24.00	3.25 [†]
R (I)	Maximum quantity = 1	100	101	37.00	51.49	4.27*
R (II)	Maximum quantity = 3	100	101	38.00	59.41	9.22**
R (III)	Maximum quantity = 5	101	102	42.57	64.71	10.00**
R (IV)	Maximum quantity = 10	102	101	42.16	51.49	1.77
S		101	100	44.55	66.00	9.35**
T		132	133	26.52	51.13	16.89***
U		199	101	41.21	60.40	9.89**
V		395	398	21.77	35.93	19.35***
W (I)	Control	197	212	32.99	37.26	0.82
W (II)	Implemental	210	182	28.10	45.05	12.18***
W (III)	Deliberative	198	211	28.28	41.23	7.53**
X		213	211	34.74	35.07	0.01
Y		398	400	19.60	30.25	12.09***
Z		302	301	22.19	30.56	5.45*

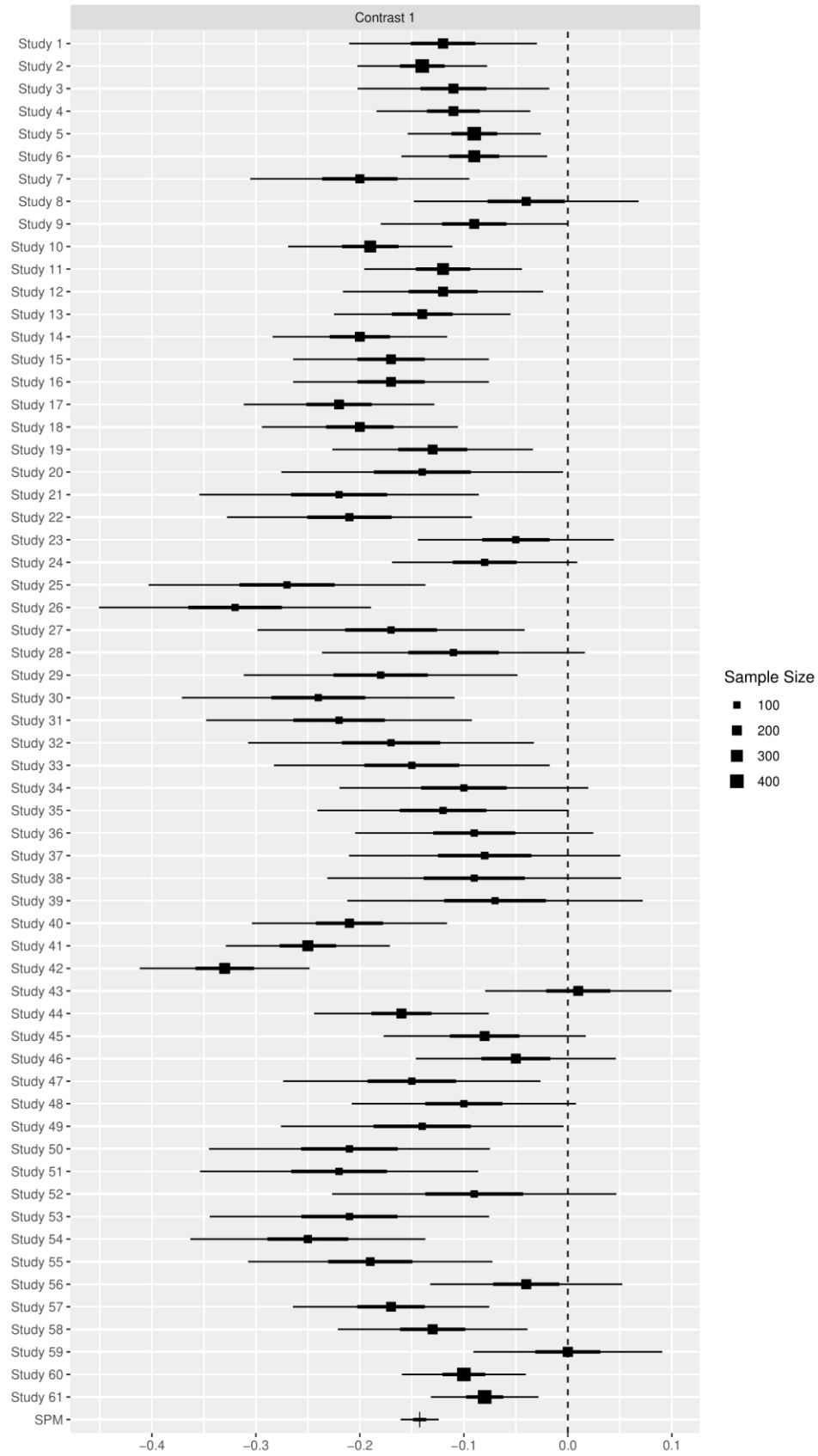
Note: [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Experiment U's N combines the two QS conditions (same page and different page).

APPENDIX E: SUPPLEMENTAL ANALYSES, POOLED ANALYSIS OF EXPERIMENTS**Single-Paper Meta-Analysis, Purchasing**

Following the procedures outlined by McShane and Böckenholt (2017), we conducted a single-paper meta-analysis via <https://blakemcshane.shinyapps.io/spmeta/>. It revealed a significant effect of selling format on participants' likelihood of purchasing across all (split) experiments. According to this analysis, quantity integration led to a 14.25 percentage-point increase in likelihood of purchase as compared to quantity-sequential processes ($SE = .009$ (.93 percentage-points), $z = 15.83$, $p < .001$).

The point estimates were a 37.60% average purchase rate in the QS condition ($SE = 2.19\%$) in our studies and a 51.85% average purchase rate in the QI condition ($SE = 2.19\%$). Thus, this tool estimates that quantity integration produced an average 38% relative increase in purchasing. This analysis corroborates a robust effect of selling format. The figure below shows the magnitude of the effects of selling format in each split experiment.

Difference In Purchase Rates (Integrated- Sequential), Lab Experiments SPM.



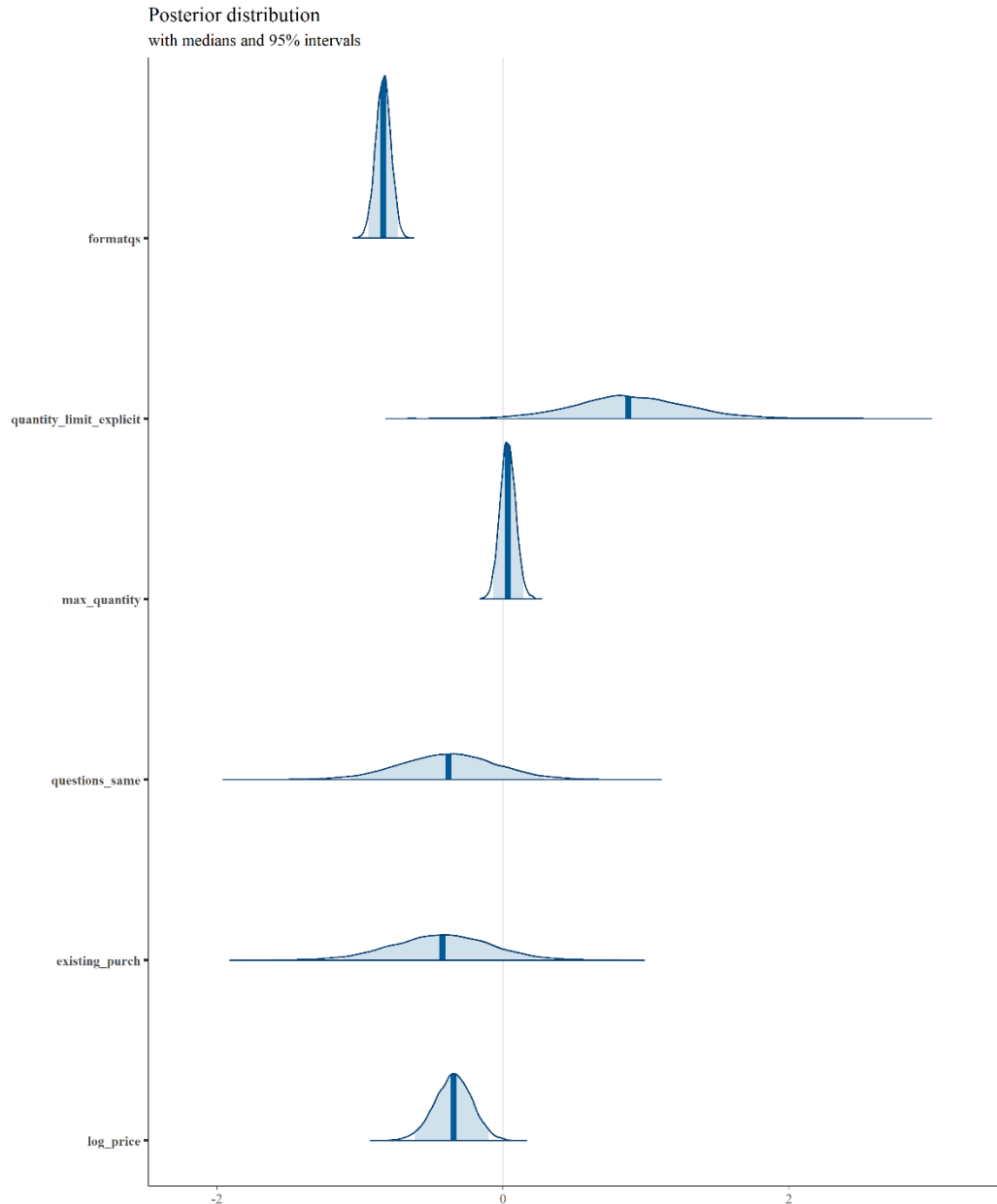
Note: This figure was generated using the tool provided at <https://blakemcshane.shinyapps.io/spmeta/>. The point estimated size of the quantity integration effect (i.e., difference in proportion of participants who purchase between the QI format and the QS format) are presented in squares, and this difference is represented on the x-axis. 50% and 95% confidence intervals of the magnitude of the effect are presented with the thick and thin lines, respectively. 95% confidence intervals that overlap the dashed vertical line at zero represent effects that are not significant at $\alpha = .05$.

This meta-analytic tool also revealed that I^2 was estimated at 96.49% (95% CI [96.13%, 96.81%]), suggesting a substantial level of heterogeneity. Thus, method factors (e.g., the operationalization of the experimental manipulation, or unaccounted-for substantial moderators in this analysis such as what the product is) contribute to a high percentage of the variation in observations.

Bayesian GLM Models Predicting Purchase

The specified model estimated the posterior distribution of the selling format parameter, with random effect controls for individual, split-experiment, full-experiment, and experimental condition, as well as fixed effects for: whether an explicit maximum was provided, the maximum purchase quantity, whether the call to action was the same across formats, whether the context was part of an existing purchase, and the product's price (log-transformed). The average estimated coefficient on selling format (where 1 = QS and 0 = QI) was -0.84, with 0 lying outside the 95% credibility interval and with >99.99% of the posterior values being negative. The posterior distribution for each predictor is depicted in the figure below. These results converge with those reported in the main paper.

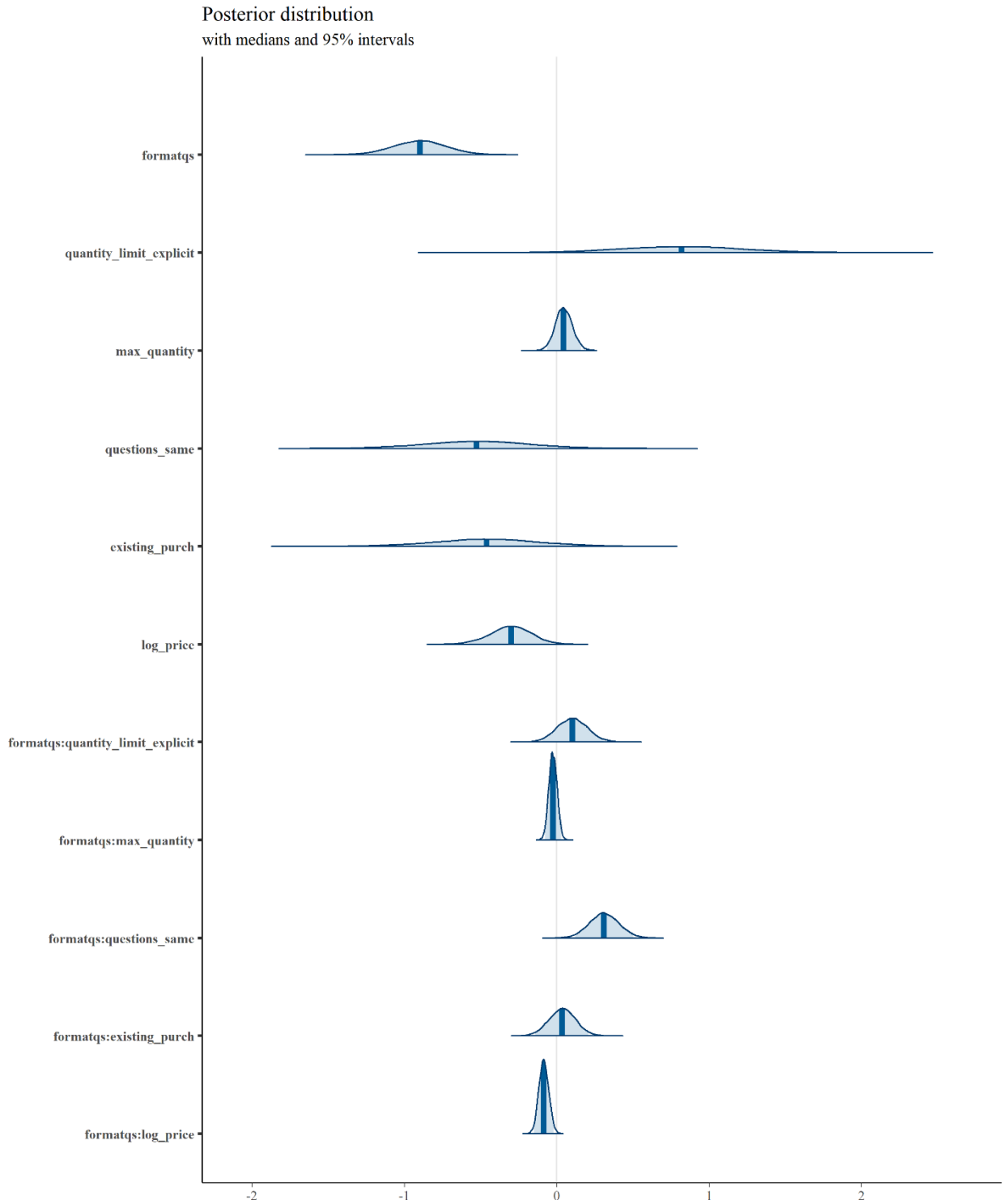
Posterior Distribution of Selling Format Parameter, Pooled Analysis with Main Effects



Note. The 95% credibility intervals are displayed in light blue, with the medians represented by thick blue lines.

Further, we conducted a supplementary analyses with the same parameters in addition to interactions between format and: whether an explicit maximum was provided, the maximum purchase quantity, whether the call to action was the same across formats, whether the context was part of an existing purchase, and the product's price (log-transformed). The posterior distribution for each predictor is depicted in the figure below. These results converge with those reported in the main paper.

Posterior Distribution of Selling Format Parameter, Pooled Analysis with Interaction Terms



Within-Person Models, Purchasing

An alternative way to examine within-person effects in the pooled analysis is to include an indicator denoting whether it is the participant's first time participating in an experiment, or the second time, or third, and so on. We test whether this "observation number" interacted with the selling format in

a few ways. First, in the generalized linear mixed-effects model (1), we test whether participants behaved differently when it was their first time appearing in an experiment versus when they were repeating. Next, in model (2), we treat observation number as a continuous variable. In both, we find no statistically significant interaction with the selling format.

	(1)	(2)
Sequential (vs. Integrated) Format	-.81*** (.07)	-.72*** (.07)
First Partic Obs.	-.04 (.05)	
Sequential x First Obs.	.10 (.07)	
Observation Num (Cont.)		-.01 (.02)
Sequential x Obs. Num		-.02 (.03)
Constant	.03 (.15)	.02 (.15)
Split-Experiment Random Effects	✓	✓
Full-Experiment Random Effects	✓	✓
Experimental-Condition Random Effects	✓	✓
Individual Random Effects	✓	✓
Observations	20,214	20,214
Akaike Inf. Crit.	24,737.12	24,737.15
Bayesian Inf. Crit.	24,800.43	24,800.46

Note: *p<0.05; **p<0.01; ***p<0.001

Note for this table and the following tables: Standard errors in parentheses.

Finally, in model (3) below, we treat observation number as a categorical variable, rather than assuming linearity, and again uncover no significant interactions:

Sequential (vs. Integrated) Format	-.72*** (.05)
Obs 2	.05 (.06)
Obs 3	.10 (.10)
Obs 4	.02 (.13)
Obs 5	.01 (.17)
Obs 6	-.33 (.23)
Obs 7	-.07 (.33)
Obs 8	-.39 (.46)
Obs 9	.21 (.61)
Obs 10	-.02 (.71)
Obs 11	-.90 (.98)
SF x Obs 2	-.07 (.09)
SF x Obs 3	-.22 (.13)
SF x Obs 4	-.14 (.18)
SF x Obs 5	-.03 (.24)
SF x Obs 6	.39 (.32)
SF x Obs 7	-.14 (.44)
SF x Obs 8	-.11 (.59)
SF x Obs 9	-.24 (.78)
SF x Obs 10	-.49 (1.04)
SF x Obs 11	1.29 (1.54)
Constant	-.01 (.15)
Split-Experiment Random Effects	✓
Full-Experiment Random Effects	✓
Experimental-Condition Random Effects	✓
Individual Random Effects	✓
Observations	20,214
Akaike Inf. Crit.	24,764.89
Bayesian Inf. Crit.	24,970.66

Note: *p<0.05; **p<0.01; ***p<0.001

These results are consistent with a null effect.

Regressions Examining Quantity Purchased
Quantity Purchased, Conditional on Purchase

	(1)	(2)	(3)
Sequential (vs. Integrated) Format	.17*** (.03)	.17*** (.03)	.03 (.12)
Mentioned Quantity Limit		-.14 (.33)	-.17 (.33)
Max Quantity		.15*** (.03)	.14*** (.03)
Same CTA		.06 (.27)	.06 (.27)
Add-on Purchase		-.82** (.27)	-.75** (.27)
Price		-.37*** (.09)	-.35*** (.09)
SF x. Ment. Limit			.10 (.07)
SF x Max Quantity			.04* (.02)
SF x Same CTA			.003 (.06)
SF x Add-On			-.17** (.06)
SF x Price			-.05* (.02)
Constant	1.97*** (.18)	2.04*** (.36)	2.09*** (.36)
Split-Experiment Random Effects	✓	✓	✓
Full-Experiment Random Effects	✓	✓	✓
Experimental-Condition Random Effects	✓	✓	✓
Individual Random Effects	✓	✓	✓
Observations	8,639	8,639	8,639
Akaike Inf. Crit.	28,318.13	28,296.57	28,316.54
Bayesian Inf. Crit.	28,367.58	28,381.34	28,436.63
<i>Note:</i>	*p<0.05; **p<0.01; ***p<0.001		

Note: Standard errors in parentheses. All binary variables (all variables except for price) are dummy-coded. Selling Format = 1 for quantity-sequential and 0 for quantity-integrated. Mentioned Quantity Limit indicates whether or not the maximum purchase quantity was explicitly mentioned in both selling formats. Max Quantity indicates the highest number of units that participants could purchase. Same CTA indicates whether the question/call to action was identical in both selling formats (format-neutral) or if the questions differed. Add-On Purchase indicates whether the purchase opportunity was framed as part of an existing purchase (e.g., adding a bottle of soda to an existing pizza order) or a standalone purchase. Price was log-transformed to contend with skew.

Results reveal that on average, sequential purchasers generally purchased a higher quantity than integrated purchasers. This makes sense, because sequential purchasers should have a priori higher purchase intent. Furthermore, the average purchase quantity was lower for add-on purchases than for standalone purchases, and also lower for higher-priced goods. Additionally, the quantity maximum exerted a greater impact on quantity purchased in the integrated than the sequential format, as did whether or not the purchase was an add-on setup. Finally, price exerted a greater impact on purchase quantity in the integrated (vs. sequential) format.

Quantity Purchased, Including Non-Purchase

Below are the results in terms of aggregate quantity. Across the board, the integrated format yielded substantially higher purchase quantities (including zero-quantity non-purchases).

	(1)	(2)	(3)
Sequential (vs. Integrated) Format	-.22*** (.03)	-.22*** (.03)	-.03 (.10)
Mentioned Quantity Limit		.24 (.26)	.21 (.26)
Max Quantity		.09** (.03)	.13*** (.03)
Same CTA		-.10 (.21)	-.12 (.21)
Add-on Purchase		-.46* (.21)	-.51* (.21)
Price		-.32*** (.07)	-.30*** (.07)
SF x. Ment. Limit			.07 (.06)
SF x Max Quantity			-.07*** (.02)
SF x Same CTA			.02 (.05)
SF x Add-On			.12* (.05)
SF x Price			-.03 (.02)
Constant	1.07*** (.13)	.99** (.30)	.89** (.31)
Split-Experiment Random Effects	✓	✓	✓
Full-Experiment Random Effects	✓	✓	✓
Experimental-Condition Random Effects	✓	✓	✓
Individual Random Effects	✓	✓	✓
Observations	20,571	20,571	20,571
Akaike Inf. Crit.	69,294.14	69,288.11	69,296.08
Bayesian Inf. Crit.	69,349.66	69,383.28	69,430.92

Note: *p<0.05; **p<0.01; ***p<0.001

APPENDIX F: ALTERNATIVE PSYCHOLOGICAL MECHANISMS AND RELEVANT EXPERIMENTS

Below, we present a more detailed table elaborating on the points made in Table 1 in the main text:

Difference	How This Could Influence Purchasing	Our Empirical Evidence
I. Call to action	Sometimes, the CTA is implicit. At other times, marketers ask direct questions (e.g., “Do you want to buy [product]?”). In practice, marketers may conversationally adapt these questions to the format, as conversational norms dictate using the clearest and most relevant wording (Grice 1975). For example, “How many slices of pizza do you want, if any?” may better fit with the integrated format, while “Do you want any slices of pizza?” may fit the sequential format better. However, asking different questions could cue different types of considerations (Schwarz 1999), activate conversational norms of appropriate responding (Grice 1975), or leak information about what other customers tend to do (Tannenbaum et al. 2021), impacting purchase.	Some experiments do not present any question at all (e.g., field experiment), and others hold constant the CTA in both formats (E1-E3). Thus, the CTA is not integral to the effect. However, when considering deploying quantity integration in practice, marketers may wish to know if it makes a difference to ask more conversationally natural questions tailored to match the answer options. Appendix D presents some experiments that do so, and the pooled analysis compares the effect size between same-CTA and different-CTA experiments. It finds that conversationally adapted CTAs can further amplify the quantity integration effect.
II. Information about quantities	When a choice presents multiple potential quantities (as in the integrated format), there is naturally one highest value, which respondents may interpret as a purchasing quantity limit. The first choice in the sequential format does not necessarily provide any quantity information. Quantity limits may increase purchase (e.g., due to anchoring; Lessne and Notarantonio 1988; Inman, Peter, and Raghurib 1997; Wansink, Kent, and Hoch 1998). More generally, including information about quantities in a choice set, as the integrated format naturally does, may leak information about other buyers or about the retailer/experimenter (e.g., that it’s normal to purchase 3 ink cartridges; Tannenbaum et al. 2021; Prelec et al. 1997).	E2 show the effect persists even when explicitly stating a maximum purchase quantity in both formats (hence providing this same quantity anchor for both). Further, the pooled analysis shows no meaningful differences in the size of the effect between studies with and without an explicit maximum quantity. Finally, Experiments A1 and A2 in Appendix F directly test for information leakage/inferences.
III. Number of choice options	The sequential format typically presents only one purchasing option in the initial purchase phase, whereas the integrated format typically presents multiple (e.g., “Buy 1,” “Buy 2,” and “Buy 3”). Purchasing a small quantity in the integrated format may be seen as a compromise option between not purchasing and purchasing a large quantity (Simonson 1989), while no such compromise exists in the sequential format’s binary choice set. Having multiple purchase options could also draw proportionally more visual attention toward purchasing (Armel et al. 2008; see also Brenner, Rottenstreich, and Sood 1999) or increase the odds that someone choosing randomly will end up purchasing (Krosnick 1991). Appendix F further explains how these mechanisms could influence choice.	E3 finds the effect even when equating the number of choice options in the two formats, and Appendix F presents Experiments AE and AF that conceptually replicate it. The pooled analysis also shows that increasing the maximum quantity (thus increasing the # of purchase options in the integrated format, and enlarging the difference between formats) does not have a measurable influence on the effect.
IV. Process costs/ Effort required	The integrated format typically involves just one action, while purchasing in the sequential format involves two separate actions (choosing to buy and choosing an amount). Sequential customers may choose to minimize consideration effort, reduce time spent, or avoid the “cost of clicking” by opting not to buy (Shugan 1980), avoiding a subsequent quantity decision. On the other hand, an effort minimization account could also make the opposite prediction: the “buy” decision in the sequential format is technically easier (it requires fewer alternatives, it does not require giving a final answer, etc.) than the more complex choice in the integrated format, which requires simultaneously answering two questions. Hence, this mechanism could also predict that the sequential format would yield more purchasing.	Experiment AE in Appendix F shows that equating the search/clicking costs by requiring integrated purchasers to make two clicks still shows the effect. Further, Experiment AB in Appendix F shows that the effect persists even when tightly controlling the amount of time spent in each format, and Experiment U shows that whether the two QS choices are on the same or different pages does not influence the effect.

The following subsections discuss supplemental psychological explanations for the quantity integration effect. Where we have relevant evidence that can speak to the listed mechanism, we include it.

More Details on Theories Tied to Information Leakage (Table 1, Difference II)

Past literature (e.g., Prelec, Wernerfelt, and Zettelmeyer 1997; Tannenbaum, Fox, and Goldstein 2013) shows that choice option information can signal information to individuals about what is “normal” or “typical.” For example, Prelec et al. (1997) suggest that people infer that the “middle” option in a product line should correspond to middling preferences (e.g., if a sweatshirt comes in 3 sizes, then the middle option should fit an average person). Tannenbaum et al. (2013) show that the arrangement of choice options can signal the descriptive norms in the context (what other people tend to do).

It is possible that because QI shows multiple ways of purchasing (i.e., multiple different quantities available for purchase all at once), the QI format could be signaling information—perhaps, that customers typically do tend to buy this product, which could increase purchasing. Customers may infer that purchasing this product is *so* appealing that some customers buy even two or three units! To some extent, including explicit quantity information in both formats should mitigate this difference between them, because providing a maximum quantity also implicitly provides information about the full set of choice options. Nevertheless, it’s possible that some difference may still remain. We conducted two experiments to assess various forms of social norm/experimenter inferences.

Experiment A1: Measuring Descriptive Social Norms and Experimenter Expectations

Here, participants report (a) what they infer to be the normative behavior and (b) their perceptions of the experimenter’s expectations. Note also that a null effect on perceived norms would imply that consumers do not intuit the differential effectiveness of the two selling formats. This experiment is excluded from the pooled analysis because it does not include purchase decisions. We predicted a null effect on perceived norms and expectations. However, a null effect could arise if participants simply do not attend to or understand the question or situation. To demonstrate that participants are indeed responding to the stimuli in a meaningful way, we include a third condition in which participants view the quantity-sequential selling format, but the product they see is on a promotional sale price. If they are attending to the stimuli and responding appropriately, their responses in this condition should reflect higher norms and expectations of purchase.

Method. One hundred fifty Mechanical Turk workers (49.0% female; $M_{\text{age}} = 32.8$ years, $SD_{\text{age}} = 10.2$ years) participated. Participants were randomly assigned to one of three conditions (selling format: quantity-sequential, quantity-sequential sale, or quantity-integrated) in a between-subjects design. All participants read, “Imagine you are online, ordering some pizza to be delivered. After choosing your food items and adding them to your cart, the following box pops up.” An image displayed a pop-up with the words, “You might also enjoy:” above a photo of a Coca-Cola bottle, with the words, “2 Liter: \$2.49” and “Customers can purchase up to 3 bottles” beneath. For participants in the quantity-sequential sale condition, this image also contained a slash through the price, with the words “Special Price: \$0.99” written in red. Participants read, “Imagine you see the following question,” above a screenshot of a question and answer options. All participants saw the question, “Please indicate what you would do in this situation.” For quantity-sequential and quantity-sequential sale participants, the answer options were, “Not buy any” and “Buy.” For quantity-integrated participants, the answer options were, “Not buy any,” “Buy 1 bottle,” “Buy 2 bottles,” and “Buy 3 bottles.” In this way, participants imagined themselves in the shoes of a participant in our other experiments, without actually making a choice.

While imagining this experience, participants reported their perceptions of the descriptive norm. Specifically, they answered, “Out of every 100 participants who see this question, how many do you think choose to buy?” on a sliding scale from 0 to 100. On the next page, participants reported what they

believed the experimenters expected. Specifically, participants read, “Now, we would like you to think about the people who designed the Coke purchasing survey. Think about what these survey designers expect participants will do in the situation you saw. How many people, out of every 100 participants, do the survey designers think will choose to buy?” on a sliding scale from 0 to 100. Finally, they provided demographic information.

Results: Descriptive social norm perceptions. Participants believed that a similar proportion of participants would buy in the quantity-sequential ($M = 46.84\%$, $SD = 24.94\%$) and quantity-integrated conditions ($M = 44.12\%$, $SD = 24.73\%$; $t(98) = .55$, $p = .59$). However, this result does not reflect participants’ lack of attention or understanding: they proved to be sensitive to the scenario’s details. Specifically, participants in the quantity-sequential sale condition expected that significantly more participants would buy ($M = 70.86\%$, $SD = 19.36\%$) than did both the quantity-sequential ($t(99) = 5.40$, $p < .001$) and quantity-integrated ($t(97) = 6.00$, $p < .001$) participants. Thus, participants do not seem to perceive different descriptive social norms under the two selling formats, and accordingly do not hold a lay theory that the two selling formats differ in their ability to solicit purchase. However, they do intuit that cheaper products entice more purchasing.

Results: Perceived experimenter expectations. Participants did not anticipate any differences in experimenter demand/expectancies in the two selling formats (quantity-sequential: $M = 54.80\%$, $SD = 22.54\%$; quantity-integrated: $M = 51.43\%$, $SD = 21.96\%$; $t(98) = .76$, $p = .45$). As with social norm perceptions, participants in the quantity-sequential sale condition reported significantly higher experimenter expectations ($M = 70.84\%$, $SD = 16.54\%$) than both the quantity-sequential ($t(99) = 4.06$, $p < .001$) and quantity-integrated ($t(97) = 4.97$, $p < .001$) participants, suggesting they indeed adjusted to the details of the scenario.

Discussion. Participants perceived similar descriptive social norms and experimenter expectations in the two selling formats. If anything, these measures were directionally higher in the quantity-sequential (vs. quantity-integrated) format, in the opposite direction of the quantity integration effect. These findings do not simply reflect inattention or lack of understanding, as participants appropriately adjusted their norm perceptions and perceived experimenter expectations in response to a change in the product’s price. Instead, they suggest that consumers do not seem to draw meaningfully different norm inferences from the two formats, and also do not seem to intuit the quantity integration effect.

Experiment A2: Measuring “Normalcy” of (a) Purchasing and (b) Purchasing Multiples

A slightly different inference is whether customers perceive (a) purchasing and (b) purchasing multiple units to be “normal” or “typical.” To test these two specific inferences, we conducted an additional experiment (excluded from the pooled analysis because it does not include purchase decisions). This experiment varies two features: (a) the selling format (QI vs. QS), and (b) whether or not a quantity maximum is explicitly mentioned. We additionally included a fifth QI condition that included both an explicit quantity maximum *and* explicit information about the behavior of others. We made the following predictions, as preregistered (https://aspredicted.org/V63_Z8F):

- When the quantity maximum is mentioned, there should be no difference between selling formats in either normalcy DV. In other words, we expected that equating quantity maximum information would eliminate any possible differences in norm perceptions between the two, reducing any concerns about this alternative explanation.
- Providing explicit information about the behavior of others would enhance (at least multiple-item purchasing) normalcy compared to both these conditions. This would suggest that neither condition on its own is leaking full information about normalcy, further reducing concerns about this alternative explanation. More pragmatically, this condition was also included to ensure that our normalcy measures were sensitive to “normalcy” information, as one would hope.
- We made additional predictions that are not relevant for this alternative-explanation test. (When no maximum quantity is mentioned, we reported competing predictions. Either the two conditions

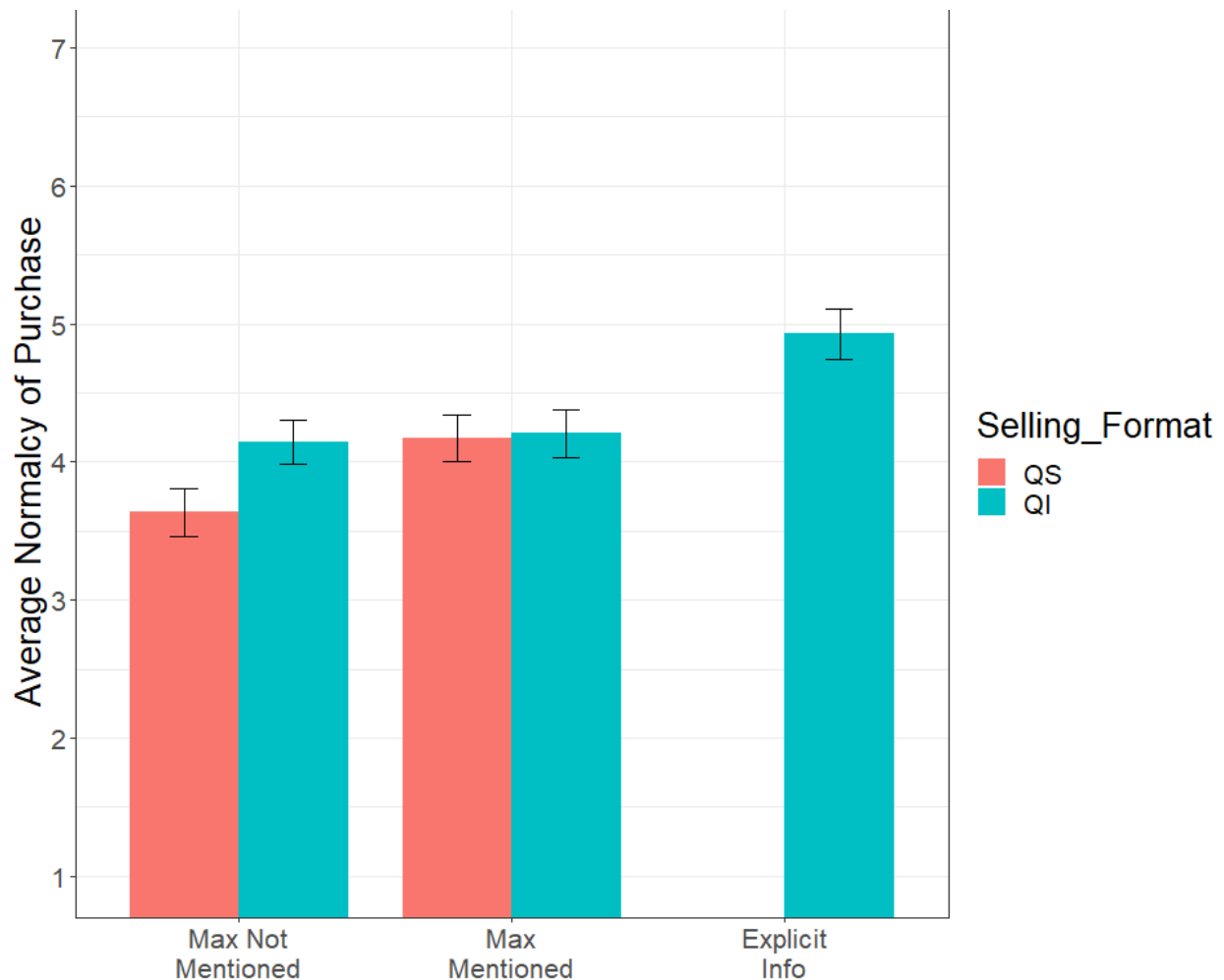
would be flat, or the QI condition would have higher normalcy perceptions. This is not important for our theorizing because the majority of our studies provide explicit quantity information. Within the QS condition, mentioning a quantity maximum would increase multiple-purchasing normalcy. This question is unrelated to the impact of QI vs. QS.)

Method

600 Prolific participants (35.0% male, $M_{\text{age}} = 28.8$ years) were randomly assigned to condition in a 2 (selling format: QI vs. QS) \times 2 (quantity maximum: not mentioned, mentioned) + 1 (“explicit norm information” [QI + maximum + explicit statement]) between-subjects design. Participants were presented with the truffles purchasing situation participants saw in Experiment 3, along with a screenshot of the selling format corresponding to their condition. Participants in the quantity maximum mentioned conditions additionally saw, “You can buy up to 4 bags of chocolate truffles with this monetary bonus.” Finally, participants in the explicit-norm-information condition additionally saw, “Most participants buy all 4 bags.” They then answered two questions: *normalcy of purchasing*, “How normal/typical is it to purchase any chocolate truffles in this situation?” (1: extremely abnormal/unusual, 4: Neutral, 7: Extremely normal), and *normalcy of purchasing multiple units*, “How normal/typical is it to purchase multiple bags of chocolate truffles in this situation?” (1: extremely abnormal/unusual, 4: Neutral, 7: Extremely normal). They then answered an attention check and provided demographic information.

Results

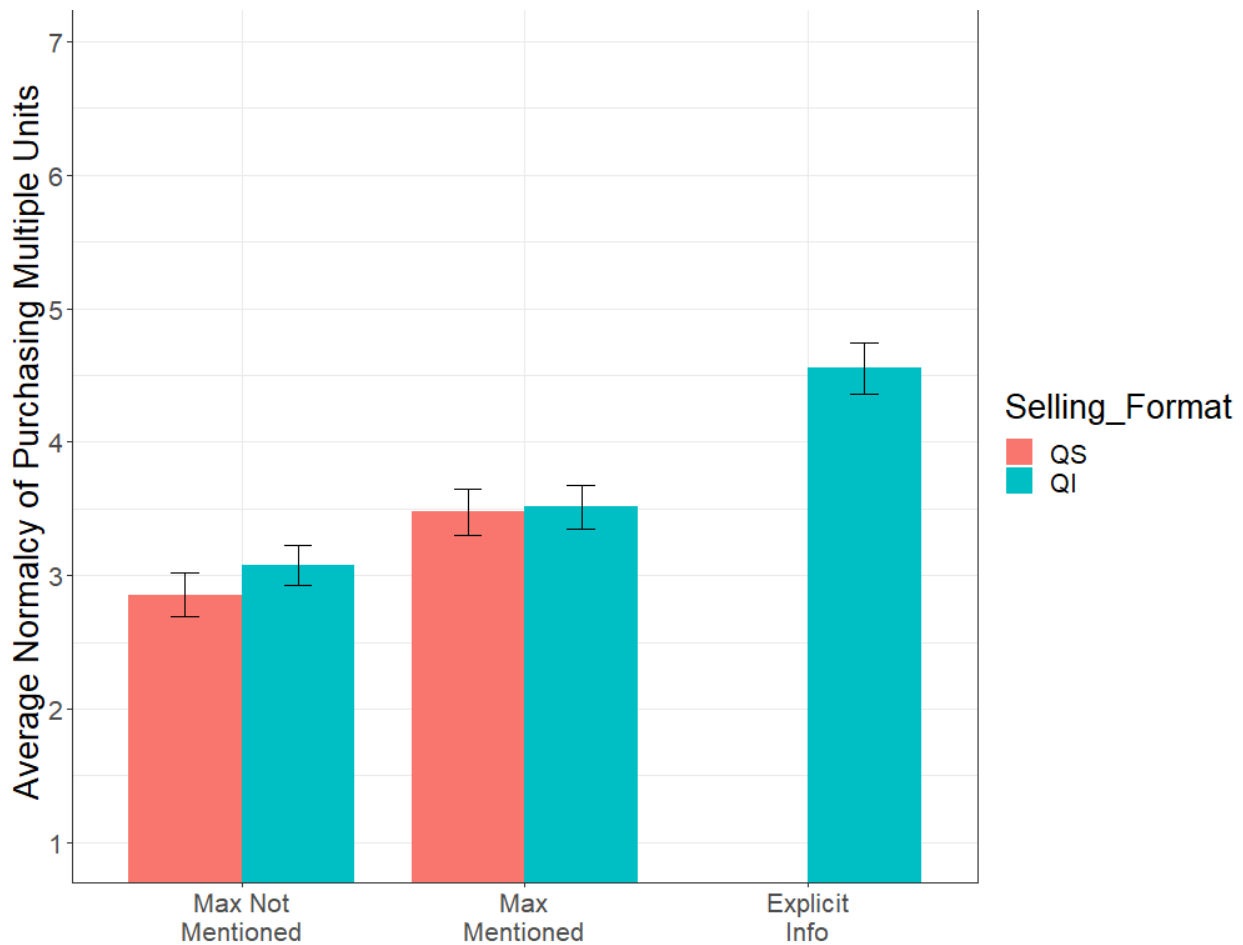
Normalcy of purchasing. An ANOVA revealed that there was a significant effect of condition on perceived normalcy ($F(4, 595) = 7.25, p < .001$). We present the means graphically:



Planned contrasts revealed the following results that are relevant for our theory:

- When the quantity maximum is *not mentioned*, people perceive purchasing to be more normal in QI than in QS ($F(1, 595) = 4.26, p = .039$). That is, the natural presence of quantity information in QI may cue some inferences about the normalcy of purchasing.
- When the quantity maximum is *mentioned*, there is no significant difference between selling formats ($F(1, 595) = .02, p = .897$). Equating quantity maximum information seems to eliminate any such differences in norm perceptions between the two formats.
- Providing explicit information about the behavior of others increases normalcy compared to both QI-maximum ($F(1, 595) = 8.93, p = .003$) and QS-maximum ($F(1, 595) = 9.77, p = .002$). Hence, neither format on its own is leaking full information about the normalcy of buying.

Normalcy of purchasing multiple units. An ANOVA also revealed that there was a significant effect of condition on perceived normalcy of buying multiple bags of truffles ($F(4, 595) = 14.93, p < .001$). We present the means graphically:



Planned contrasts revealed the following results that are relevant for our theory:

- When the quantity maximum is *not mentioned*, there was no significant difference between formats ($F(1, 595) = .77, p = .382$).
- When the quantity maximum is *mentioned*, we see the same ($F(1, 595) = .02, p = .876$).
- Providing explicit information about the behavior of others increases normalcy of purchasing multiple units compared to both QI-maximum ($F(1, 595) = 19.11, p < .001$) and QS-maximum ($F(1, 595) = 20.58, p < .001$). Hence, neither format on its own is leaking full information about the normalcy of buying multiple units.

Discussion

First, providing explicit information about others' behavior greatly increased perceived normalcy of (a) buying and (b) buying multiple units. This suggests that neither selling format sufficiently leaks this information on its own. Further, it also suggests that our normalcy measures are appropriately sensitive to norm information. Second, when the quantity maximum was mentioned, there was no difference between selling formats in either normalcy DV. In other words, equating quantity maximum information would eliminate any possible differences in norm perceptions between the two, reducing any concerns about this alternative explanation.

More Details on Theories Tied to the Number of Choice Options (Table 1, Difference III)

As mentioned in the text, the integrated format (QI) tends to offer more purchasing options than the sequential format (QS) does, which could possibly increase purchase likelihood. Multiple psychological mechanisms would make this prediction. These include:

- Random choosing (Krosnick 1991): In QI, there are more options involving purchase than non-purchase. So if a participant were to choose randomly, they would have greater odds of striking an option that involves purchasing. By contrast, the QS format tends to offer equal # of purchasing and non-purchasing options (i.e., 1 each), which does not confer this random-choice advantage.
- Biased visual attention (Armel, Beaumel, and Rangel 2008): this research shows that people have a higher likelihood of choosing options that they focus on visually. If the presence of more purchasing options in QI leads customers to visually attend more to these options, this could increase purchasing.
- Compromise effect or extremeness aversion (Simonson 1989; Simonson and Tversky 1992): this literature suggests that customers have a bias toward choosing middling compromise options and avoiding choosing endpoints on scales. For example, customers will be more apt to choose a middle-cost/middle-quality choice option in a trinary set that also includes a high-cost/high-quality option and a low-cost/low-quality option than a binary set with either of the latter options. Because QI offers multiple purchasing options (along with the non-purchase option), perhaps customers could be more apt to consider “buying a little”—purchasing a small quantity—in QI, an idea that does not come to mind as readily in QS (which at first, only presents “buying” or “not buying” and no middle compromise option).

As described, these mechanisms rely upon there being more purchasing options in QI than in QS so as to create an asymmetry between the two. If the two formats presented equal numbers of choice options, then there would be no possibility for differences in random choice (because participants would have similar chances in both formats of randomly landing upon a purchase option), no obvious possibility for differences in attracting visual attention (because again there would be equal options to draw their gaze), and no differences in customers’ ability to choose a compromise option/ avoid endpoints (because again, the choice options would be equivalent in both formats). There are 2 ways we can equate the number of choice options in the two formats:

- One is to artificially reduce the number of choice options in the integrated format, offering only one purchase option (to match the sequential format). Experiment AE below tests this setting, and shows that even here, we still observe a significant quantity integration effect.
- The second way is to artificially increase the number of choice options in the sequential format, offering multiple purchase options (to match the integrated format). This is what we did in Experiment 4 in the main text. We also present an additional experiment here, Experiment AF, that tests this in an alternative setting.

These findings, coupled with the null result of the quantity-maximum in the pooled analysis as presented in the main text, suggest that mechanisms rooted in different numbers of choice options between the two formats are unlikely to be primary drivers of the quantity integration effect.

Experiment AE: Reducing the number of choice options in the integrated format

Method

Participants ($N = 867$) were assigned to one of three conditions. In all conditions, participants learned about an opportunity to purchase notebooks in an incentive-compatible choice. They read that if they are randomly selected, they would win a \$20 bonus, and that they could use part of this money to buy notebooks for \$6 each. They could buy up to 3 notebooks. All participants answered, “What would you like to do?” What differed across conditions was the choice options presented to participants. Participants in the sequential condition chose between “Not buy any notebooks” and “Buy,” while participants in the integrated condition chose among “Not buy any notebooks,” “Buy 1 notebook,” “Buy 2 notebooks,” or “Buy 3 notebooks.” In a third condition, participants chose between two options, like the sequential format. However, like the integrated format, this condition explicitly articulated the full choice set—in other words, it listed out the different quantity alternatives. Specifically, participants in this articulated-binary-integrated condition chose between “Not buy any notebooks” and “Buy 1, 2, or 3 notebooks.” After making a choice, sequential purchasers specified their desired quantity by answering “You indicated you will make a purchase. What would you like to do?” with choice options “Buy 1 notebook,” “Buy 2 notebooks,” or “Buy 3 notebooks.” Thereafter, participants answered an attention check and provided demographic information.

Results and Discussion

If the quantity integration effect is caused by the different number of choice options in the two formats, then the articulated-binary-integrated condition should approximate the sequential format, as it included the same number of choice options (2). But instead, it yielded higher purchasing (36.93%) than did the sequential format (26.47%; $\chi^2(1, N = 579) = 6.66, p = .01$), at a rate similar to the integrated format (40.07%; $\chi^2(1, N = 573) = .46, p = .50$). As usual, the integrated format also yielded higher purchasing than the sequential format ($\chi^2(1, N = 582) = 10.65, p < .001$). Together, these findings suggest that even in a variant of the integrated format where there are only 2 choice options (just like the sequential format), the integrated format can still significantly increase purchasing. This experiment is included in the pooled analysis (“AE”), but the third condition (articulated-binary-integrated) is omitted.

Experiment AF: Increasing the number of choice options in the sequential format

Method

Participants ($N = 401$) were assigned to one of two between-subjects conditions: QS vs. QI. All participants saw a hypothetical choice to purchase Extra spearmint gum for a discounted price (88 cents, with a maximum purchase quantity of 2 packs). Then, participants all answered the same prompt: “Please indicate what you would do in this situation.” In the QS condition, there were 3 choice options: “Not buy gum,” “Buy gum,” and “Buy gum with excitement!” In this way, we created multiple purchasing options that do not involve/specify purchase quantities (as that would make this condition into a QI condition). In the QI condition, there were also 3 choice options, one also containing the qualifier “with excitement!” Specifically, the options were: “Not buy gum,” “Buy 1 pack of gum,” and “Buy 2 packs of gum with excitement!” After making their choice, QS purchasers specified their desired quantity by answering “You indicated you would buy gum. How many packs would you buy?” without choice options “1 pack of gum” and “2 packs of gum.”

Results and Discussion

We predicted that the QI format would still increase purchasing relative to the QS condition, even though both contained two purchasing options and one non-purchase option. Indeed, QI participants were

significantly more likely to indicate that they would purchase any packs of gum (63.17%) than were QS participants (51.24%; $\chi^2(1, N = 401) = 5.96, p = .015$). Thus, even when there are multiple purchasing options in both formats, the integrated format still prevailed. Together, experiments AE and AF suggest that it is not the mere number of choice options driving this effect; rather, it matters if those quantities are directly integrated into the choice set. This experiment is included in the pooled analysis.

More Details on Theories Tied to the Number of Steps (Table 1, Difference IV)

Another key difference between the two formats is the number of steps or “clicks” they involve. Purchasing in the sequential (QS) format involves more actions than does purchasing in the integrated (QI) format. If customers are averse to decision effort or to the “cost of clicking,” this could reduce purchasing in the sequential format: QS customers may choose to minimize consideration effort or time spent and opt out of the impending second quantity decision by choosing not to buy (Shugan 1980). Yet, Experiment AE rules this out as the primary mechanism. It finds that even in a modified version of the integrated format where customers explicitly *cannot* resolve the choice in a single action, this format still prevails over the sequential format. As further evidence, we also conducted Experiment AA, described below. Experiment AA tightly controlled the amount of time participants spent in each format, eliminating any potential time-saving benefits of opting not to purchase.

A related possible mechanism is that perhaps, customers are unaware about “what is coming up” in the QS format or have some uncertainty over what the ultimate purchase options will be. This could potentially deter them from choosing to purchase. If so, the quantity integration effect should be weaker in situations where the two QS decisions are presented right beside one another than when they are presented separately (with the second choice only revealed upon clicking). Experiment U from the pooled analysis was designed to test this possibility; we present a summary of this study below.

Experiment AB: Controlling the Time Spent

Method

Four hundred three Mechanical Turk workers (46% female; $M_{\text{age}} = 35.6$ years, $SD_{\text{age}} = 11.5$ years) were randomly assigned to one of two conditions (selling format: QS vs. QI) in a between-subjects design. All participants read that they would make a purchase decision and that one worker would be selected to receive a monetary bonus and any products that he/she purchased. They then learned that the main sections of the survey “will take a total of 30 seconds, regardless of what you choose. So, please take your time and choose carefully.” Next, participants read, “If you are selected, you will receive a \$20 bonus. If you'd like, you can use this money to purchase Lemome notebooks (pictured below) for \$6 per notebook (current price on Amazon: \$9). You can buy up to 3 notebooks. Any money you do not spend on notebooks will be given to you as a bonus.” All participants then responded to the same call to action, “What would you like to do?” The choice options in QS were “Not buy any notebooks” and “Buy,” while the choice options in QI were, “Not buy any notebooks,” “Buy 1 notebook,” “Buy 2 notebooks,” and “Buy 3 notebooks.” There was a hold timer on this page requiring participants to spend at least 10 seconds on it.

On the following page, QS participants who had chosen to purchase then selected the quantity, answering, “You indicated you will make a purchase. What would you like to do?” with choice options matching the QI condition: “Not buy any notebooks,” “Buy 1 notebook,” “Buy 2 notebooks,” and “Buy 3

notebooks”.¹⁰ On the same page, all participants (in both formats, regardless of whether they purchased) also answered a free-response question, “Why did you make the purchase decision you made?” There was a hold timer on this page that required participants to spend at least 20 seconds on it. Thus, regardless of what decisions participants had made and regardless of their condition, they had to spend the same required minimum amount of time. Finally, participants provided demographic information.

Results and Discussion

QS participants were significantly less likely to purchase (29.40%) than were QI participants (39.60%; $\chi^2(1, N = 403) = 4.69, p = .03, \phi = .11$); quantity integration promoted a 35% relative increase in purchase likelihood. Among purchasers, QS participants bought a similar number of notebooks ($M = 1.41, SD = .75$) as did QI participants ($M = 1.31, SD = .59; t(137) = -.83, p = .41$), suggesting that the selling format did not discernibly affect the purchase quantity. Overall, the QS condition sold fewer total notebooks (83; $N = 201$) than did the QI conditions (105; $N = 202$). In sum, changing from a QS to a QI format increased total volume sold by 27%. Thus, even when required to spend a set amount of time decision-making, participants were more likely to purchase in QI than in QS.

Experiment U: Putting the Two QS Decisions on the Same versus Different Pages

Method

Participants imagined online shopping at home and encountering a sale on scented candles. They could purchase up to 3 candles. All participants answered, “What would you like you do?” For QI participants, the options were, “Not buy any,” “Buy 1 candle,” “Buy 2 candles,” and “Buy 3 candles.” For QS-different-page and QS-same-page participants, the initial purchase options were “Not buy any” and “Buy.” For QS-same-page participants, a second question was presented immediately beneath this first question on the same page. It asked participants to, “Please specify the quantity” with choice options of “1 candle,” “2 candles,” and “3 candles.” If QS participants selected the “Not buy any” option on the first question, this second quantity question disappeared (from there, selecting the “Buy” button would make it reappear). Thus, for QS-same-page-participants, the quantity decision appeared at the same time as the purchase question. For the QS-different-page participants, the quantity question was presented to purchasers on a second page after the initial purchase decision.

Results and Discussion

Significantly more QI participants made a purchase (60.40%) than both the QS-different-page participants (40.00%; $\chi^2(1, N = 201) = 8.36, p = .004$) and the QS-same-page participants (42.42%; $\chi^2(1, N = 200) = 6.46, p = .01$). The two QS conditions did not meaningfully differ from one another ($\chi^2(1, N = 199) = .12, p = .73$). Thus, regardless of whether the two questions were displayed together, QS still yielded lower purchase rates than QI, suggesting it is unlikely that uncertainty about the second choice in the QS condition is driving the effect.

Other Psychological Mechanisms and Theories

Purchasing Mindsets: “Whether to Buy” versus “Which to Buy”

¹⁰ One participant chose to buy in the first choice but selected “Not buy any notebooks” in the second; coding this response as either a purchase or non-purchase does not affect the results.

When approaching a purchasing situation, consumers may adopt a mindset, in which a set of cognitive processes and judgment criteria are triggered, that subsequently guide decision-making. Xu and Wyer (2007) coin and explore “which-to-buy” versus “whether-to-buy” mindsets. They compare two ways of approaching a choice. In one case, people may begin by not at all considering the possibility of non-purchase. For example, in Study 1 of Xu and Wyer (2007), participants view two computers and are required to choose between the two, without any regard for the possibility of choosing “none” (this design is also used for the other studies in that paper). Conceptually, this is what Parker and Schrifft (2011) define as a “forced choice” paradigm without a “no-choice option.” Xu and Wyer (2007) find that after engaging in such a forced choice without a no-choice option, consumers subsequently act as if they have pre-decided to buy. That is, consumers who first consider “which option to buy,” without considering the possibility of buying none, are more likely to subsequently purchase their preferred option than are consumers who do not first engage in this comparison process; this carry-over pattern is evidence for the distinct mindsets.

The key difference between Xu and Wyer (2007)’s mindsets and our work is that in all of our experiments, there is always an option not to buy. It is conceptually important that non-purchase is always allowed in both formats, as Parker and Schrifft (2011) show that customers react quite differently to choices involving a “no choice” option than those that do not allow a “no choice” option. (The presence of the no-choice option changes how consumers resolve the decision, such as by changing which features draw attention and how consumers compare across choice options.) And in practice, non-purchase is commonly chosen in both formats in our experiments. Thus, the work of Xu and Wyer (2007) and Parker and Schrifft (2011) provided helpful theoretical grounding for our predictions, but their settings are distinctly different from the present investigation.

Goal-Oriented Mindsets: Deliberative Versus Implemental

Drawing on Gollwitzer (1990)’s theory of action phases in goal attainment, prior literature establishes that consumers often approach a situation with either a deliberative or an implemental mindset (Chandran and Morwitz 2005; Dhar, Huber, and Khan 2007). Consumers in a deliberative mindset weigh the pros and cons of pursuing an action—in this case, evaluating the desirability of a purchase opportunity and deliberating over whether to buy. Consumers in an implemental mindset instead focus on the means and actions necessary to implement the decided goal, such as the details of where, when, and how to buy. Consumers are more likely to purchase when in an implemental mindset, because they focus less on deliberating whether to act and attend instead to information about how to do so (Dhar et al. 2007).

It is possible that when encountering a quantity-integrated choice, the presence of quantities induces consumers to focus first on the means of goal attainment—here, evaluating which quantity is the best—and only thereafter decide whether or not to purchase, which could increase their tendency to buy. To address this possibility, Experiment W from the pooled analysis tests whether inducing an implemental mindset would attenuate the quantity integration effect. We present Experiment W after the following mechanism (construal level) because Experiment W also addresses construal.

Construal Level/ Concreteness

The formats may differ in the level of construal (Trope and Liberman 2003) they invoke. A quantity-integrated option that includes a specific quantity may be more concrete (vs. abstract) than a sequential option merely indicating purchase. Note that a more concrete construal does not necessarily

increase likelihood of purchase; in some circumstances, concreteness reduces purchasing (Cho, Khan, and Dhar 2013; Goldsmith, Xu, and Dhar 2016). Nevertheless, we test this possibility by measuring construal.

Experiment W: Testing Deliberative versus Implemental Mindsets and Construal Level Mechanisms

Method. One thousand, two hundred ten Mechanical Turk workers (50% female; $M_{\text{age}} = 36.8$ years, $SD_{\text{age}} = 12.3$ years) participated. Participants were randomly assigned to one of six conditions in a 2 (selling format: QS vs. QI) X 3 (prime: implemental, deliberative, control) between-subjects design. All participants began by completing a task designed to prime one of three mindsets: implemental, deliberative, or control (no specific mindset). We adapted this priming procedure from Dhar, Huber, and Khan (2007)'s Study 4. As in that study, participants were asked to imagine that they were thinking about buying a car. Then, those in the deliberative condition then wrote down three pros and three cons of buying a car, and those in the implemental condition instead wrote down six steps they would need to take to buy a car. Those in the control condition instead wrote down six things they could do with a car. We expected that most participants would not actively be currently concerned with how to buy a car, and therefore expected that the control condition would match the deliberative condition (consistent with prior research, e.g., Henderson, De Liver, and Gollwitzer 2008). Thereafter, participants responded to a manipulation check (adapted from Brandstätter and Frank 2002): "Imagine you are about to buy a new car. Do you have a clear sense of what needs to be done to make this happen?" (1: Not at all to 9: Completely). Those in an implemental mindset should score higher on this measure.

On the following page, all participants read a scenario description, "Imagine you are online shopping at home. After some browsing, the following box pops up." An image displayed a pop-up with the words, "Scented Candle Sale! ~~\$24.50~~ only \$6.99!" Text beneath displayed, "in this store, you can buy up to 3 candles per purchase." Then, all participants answered, "What would you like you do?" For QS participants, the options were "Not buy any" and "Buy." For QI participants, the options were, "Not buy any," "Buy 1 candle," "Buy 2 candles," and "Buy 3 candles."

Thereafter, participants completed a 10-item Behavior Identification Form (BIF) questionnaire (Vallacher and Wegner 1989), which has been used to measure participants' momentary construal level (e.g., Burgoon, Henderson, and Markman 2013; Han, Duhachek, and Agrawal 2016). For each item, participants read a behavior (e.g., "Tooth-brushing") and choose one of two labels that they feel best describes the behavior—one that is abstract/high-level (e.g., "Preventing tooth decay") and one that is concrete/low-level (e.g., "Moving a brush around in one's mouth"). Participants received a score of 0 for each concrete construal they selected, and 1 for each abstract construal description; their responses were summed to form a BIF score.

At this point, QS participants who had previously indicated they would make a purchase selected the quantity. They answered, "How many candles would you buy?" with options 1, 2, and 3. We included this question after the BIF to ensure that the BIF could accurately capture differences in construal level after participants' initial purchase decisions, which is the point at which we find our effect. Finally, all participants provided demographic information.

Results: Manipulation check. As expected, participants responded to the priming manipulation check assessing their implemental orientation similarly in the deliberative ($M = 7.58$, $SD = 1.58$) and control conditions ($M = 7.56$, $SD = 1.63$; $t(816) = -.15$, $p = .88$). Thus, to maximize power in testing for a possible interaction with selling format, we combined these conditions and contrasted them against the implemental prime. Implemental participants scored significantly higher on the manipulation check ($M = 7.78$, $SD = 1.43$) than did deliberative and control participants (7.57 , $SD = 1.60$, $t(1208) = -2.15$, $p = .03$).

Results: Purchase rates. QS participants were significantly less likely to purchase any candles (29.8%) than were QI participants (41.0%; $\chi^2(1, N = 1210) = 16.72$, $p < .001$, $\phi = .12$). To test whether the priming manipulation moderated this quantity integration effect, we regressed purchase on selling format (QS vs. QI, effect-coded, i.e., -1 vs. 1), prime (implemental vs. deliberative/control, effect-coded) and their interaction. This analysis revealed a main effect of selling format ($\beta = .28$, $SE = .07$, $z = 4.31$, $p < .001$), wherein QI (vs. QS) participants were more likely to buy, but no significant main effect of the

prime ($\beta = .03$, $SE = .07$, $z = .45$, $p = .66$), and no significant interaction ($\beta = .09$, $SE = .07$, $z = 1.39$, $p = .17$). In fact, the pattern we found is directionally opposite of the one predicted by the above-mentioned mindset account. That is, the implemental mindset directionally increased the size of the effect, rather than attenuating it. These findings suggest that implemental mindsets are unlikely to explain the quantity integration effect.

Results: Construal level. We found no differences in construal level between the QS ($M = 6.42$, $SD = 2.93$) and QI formats ($M = 6.33$, $SD = 2.85$; $t(1208) = -.50$, $p = .62$). This persisted regardless of whether or not participants had made a purchase (p 's $> .54$). Regressing construal level on selling format (QS vs. QI, effect-coded), purchase (purchased vs. did not purchase, effect-coded) and their interaction revealed no significant effect of format ($\beta = -.03$, $SE = .09$, $t(1206) = -.36$, $p = .72$) nor of purchasing ($\beta = .002$, $SE = .09$, $t(1206) = .02$, $p = .99$), and no interaction ($\beta = .03$, $SE = .09$, $t(1206) = .38$, $p = .71$). Consistent with prior research (e.g., Tu and Soman 2014), and even though a full purchasing scenario separated the two, there was also a link between implemental mindsets and construal level, whereby participants who had initially been primed with the implemental mindset showed a marginally less abstract construal level ($M = 6.16$, $SD = 3.00$) than did control/deliberative participants ($M = 6.48$, $SD = 2.83$; $t(1208) = 1.83$, $p = .07$).

Results: Quantity purchased. In this experiment, among those who purchased, QS participants purchased significantly more candles ($M = 2.23$, $SD = .82$) than did QI participants ($M = 1.93$, $SD = .88$; $t(426) = -3.57$, $p < .001$). A regression predicting the amount purchased among purchasers from selling format (effect-coded), prime (implemental vs. deliberative/control, effect-coded) and their interaction uncovered only this main effect of format; there was no significant effect of the prime ($p = .74$) and no interaction ($p = .62$). Despite selling more units per purchaser, the QS format still sold fewer total candles overall (401; $N = 605$) than did the QI format (478; $N = 605$). Changing from a QS to a QI format increased total sales by 19% in this experiment.

Discussion. Implemental mindsets and abstract versus concrete construal do not appear to play a pivotal role in the quantity integration effect. Priming an implemental mindset did not attenuate the quantity integration effect (if anything, it non-significantly accentuated it), and the selling formats did not induce different levels of construal.

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