"Nothing Matters": A "0" Tip Option Increases Consumers' Voluntary Payments

ABSTRACT

This research examines how the choice architecture of tip options used in screen-based payment collection systems affects consumers' tipping behavior. Eight lab and field experiments show that consumers choose to avoid a numerical zero tip option (i.e., 0). Replacing the dominant opt-out default "No Tip" with 0% in a choice set, nudges people to opt-in to tipping. This effect is robust to bill size, ranges of alternatives, service level, order presentation of defaults and is mediated by self-image concerns. Furthermore, replacing a non-zero option (i.e., 1%, 5%, 10%) with 0% when a "No Tip" option is also present as an additional means of opting out, counterintuitively leads consumers to tip higher amounts. This work further builds on the survey method literature to show that the number 0 may not be used as a source of information to make tip judgments as this option is ignored. These results have theoretical implications for choice architecture, numerical cognition, prosocial behavior, and behavioral pricing. Importantly, these findings provide practical implications for consumer and labor welfare, and to businesses within the new age of the digital service economy.

Words: 183

Key words: Choice Architecture, Numerical Cognition, Voluntary Payments, Behavioral Economics, Zero, Framing, Prosocial Behavior, Service Economy, Pricing

When was the last time you were asked to leave a tip? It might have been earlier this morning when you decided to grab a cup of coffee and paid with your credit card on the checkout machine, or at the end of your Uber drive on your way to work, or when you ordered lunch through your favorite food delivery app. In the last few years, electronic tip requests have become a daily practice, and a new age of tipping collection systems has evolved, replacing the old counter "Tip Jars" gratuities with screen-based tipping collection systems, explicitly requesting customers to leave tips for each transaction, large or small. In this new technological age, electronic payments collection systems (i.e., point-of-sale) are becoming increasingly widespread across new contexts which did not require tipping in the past. These systems allow businesses to request tip payments at check-out by presenting customers with multiple default screen options (e.g., 15%, 20%, 25%, Custom Tip, No Tip). In some businesses that use these systems, tipping norms are not established yet (e.g., coffee shops, see Meyersohn, 2023, CNN) and consumers are confused about whether tips are required or not, or about the tip request given they already paid for service (e.g., delivery fees in apps). These new environments are well suited for studying how the architecture of default request options affect consumers' likelihood to tip and amount tipped.

Extensive research on response alternatives in cognitive aspects of survey methodology (e.g., Schwarz et al. 1985), and default options in behavioral economics (Andreoni, Rao and Trachtman 2017, Gneezy et al. 2010, Haggag and Paci 2014), shows that the manner in which options are constructed influences consumers' responses. This work apply these findings to explore the effect of tip options on consumers' voluntary payments decisions. Although the numerical presentation of opt-in tip defaults is an interesting topic of its own (Bluvstein and Raghubir, SSRN), our focus in this exploration is on framing the *opt-out option*; which is the option to ***not*** leave a tip.

Specifically, this research examines the effect of framing an opt-out option using the numeric component: 0 versus other dominant widespread semantic verbal equivalent options (i.e., "No Tip") on consumers' tipping intentions and behavior. Eight lab and field experiments show that presenting a numerical zero tip option (i.e., 0%) in the choice set, either by replacing the dominant opt-out option "No Tip", or by including it along with a "No Tip" option as an additional means of opting out, counterintuitively increases tipping amounts. This effect is replicated when comparing a numerical "0%" option to any other small numbers (e.g., 1%) and to other non-numeric or symbolic descriptions of zero (e.g., "Not Today"). Interestingly, it also appears that people tend to ignore 0 as a piece of information that they could use to make their judgments by giving it less attention.

We first discuss the changes taking place in the voluntary payment economy world and factors affecting these payments. We then describe the literature on default options, and the properties of the number "0" leading to our hypotheses. The empirical evidence will then follow, and we conclude with theoretical implications for nudging mechanisms, survey methods, numerical cognition, prosocial behavior, and behavioral pricing, as well as practical implications for businesses in the new age of the digital service economy.

THE NEW AGE OF DIGITAL VOLUNTARY PAYMENTS

A considerable amount of research in consumer behavior has mainly focused on voluntary market payments in the form of elective and participative pricing, such as pay-what-you-want (i.e., PWYW, Christopher and Machado 2019; Jung et al. 2017; Kim, Natter and Spann 2009; Lee, Baumgartner, and Pieters 2021). However, this literature has largely neglected one of the

largest voluntary payment economies: service fees and tipping. Tipping, identified as a form of voluntary payment (Natter and Kaufmann 2015), has been mainly explored in the fields of behavioral economics and hospitality management mostly in the context of the traditional manner of eliciting tips (e.g., Azar 2011; Lynn 2009, 2015; Schwartz 1997), but very little in the consumer behavior field (Bluvstein and Raghubir 2021, Luangrath, Peck, and Gustafsson 2020). The importance of exploring this voluntary payment form from a consumer behavior perspective is increasing as the service industry in the past few years undergoes a massive technological transformation. Specifically, the service economy has moved in the last few years towards greater use of electronic payment collection systems (point-of sale [POS], Kugel 2019; Stout 2015), providing screen-based check out experiences. This change has three new implications for consumers: *explicitness* of the tip request, *timing of tip request*, and an increase in *contexts* in which tips are requested.

POS Systems. Traditional and older forms of tipping (e.g., tip jars, tip line on a paper receipt) are relatively implicit in their requests, leaving the decision of whether and how much to tip to the customer's discretion. They can be considered "open-ended" responses. In contrast, POS systems *explicitly* include requests as part of the transaction, typically providing several numerical options of tip amounts (e.g., 15%, 20%, and 25%, Custom Tip, No Tip), nudging consumers to choose one of the presented options in a "closed-end" response fashion.

In addition to the explicitness of POS tip collection, the *timing* of the tip request itself is, in many contexts, prior to any service being performed, as is the case at coffee shops, take outs, bakeries, food trucks, and delivery apps (Kugel 2019). Tip requests prior to service disconnect the amount tipped from the quality of the service given, which could lead customers to feelings of being manipulated (Warren, Hansen and Yuan 2021).

Importantly, the implementation of POS and the technological changes that followed made the tip economy a multi-billion-dollar market in the US, driven not only by older contexts where tipping is common (e.g., restaurants, taxis, personal care), but by new sectors and contexts where the *norms* of whether and how much to tip are still evolving. These include contexts where there is little to no service (e.g., self-service establishments), or when there is already a labor charge included (e.g., delivery or service fee). Some of these new sectors include the ride share industry (e.g., Uber/ Lyft) which is expected to reach market volume of $285 billion by 2030 (Huston 2017), the online food delivery app market which is expected to hit $161.74 billion by the end of 2023 (Adroit Market Research 2019), and the coffee shop industry which is expected to reach $244.4 billion by 2027 (Maximize 2021), among others.

These changes in the explicit, up-front nature of tips requests in contexts where tips had previously not been solicited (e.g., Uber)—is what the popular media has named "tip creep" (Stout 2015), a reference to how these POS systems annoy and pressure customers to leave a tip where they previously would not have, or to leave a larger tip than they otherwise would have (Levitz 2018; Karabas, Orlowski, and Lefebvre 2020). The absence of established norms in the new tipping domains shifts consumers perception of this unique voluntary payment form. To explore how opt-out options in the tipping world would affect consumers voluntary payments, we first need to understand how default options affect consumers decision making.

THE EFFECT OF DEFAULT OPTIONS WITHIN GRATUITY GUIDELINES

There is growing interest in how choice architecture influences people's behavior (Johnson 2021;Thaler and Sunstein 2009) and their voluntary payments decisions (e.g., Anik,

Norton and Ariely 2014, Barasz et al. 2017, Kraft-Todd et al. 2015, Kessler and Milkman 2018; Saccardo et al. 2021). While prior research has examined the effect of various psycho-social factors on consumers' choices to tip, scholars have only recently turned their attention to the role of tip suggestions. Past studies examining the effect of electronic and non-electronic tip suggestions in contexts where tipping norms are well established (e.g., restaurants), have found that gratuity guidelines increase payments (Seiter, Brownlee and Sabders 2011), though this effect is modest in contexts where the majority of customers do not tip (e.g., Uber; Chandar et al. 2019), and setting defaults too high can backfire (Haggag and Paci 2014).

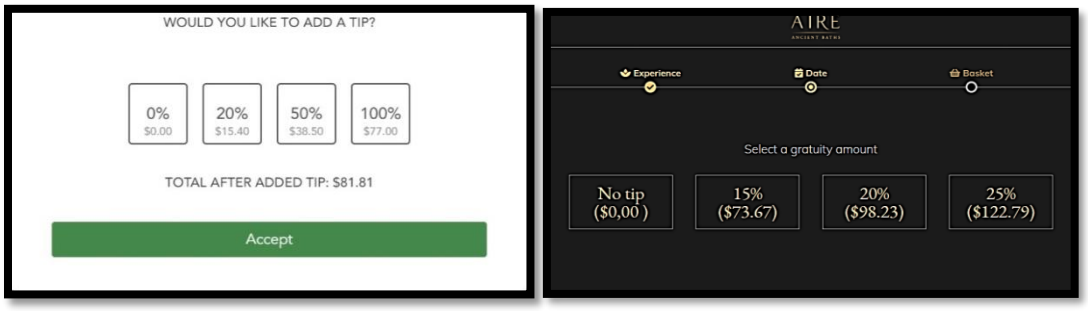
Recent research on electronic tip suggestions in contexts where norms are not yet established, such as laundry businesses, has found that larger suggested tips (in the 5% - 25% range), significantly increased amount tipped without affecting customer satisfaction or re-patronage intentions (Damon, Boon and Lynn 2020), while other research found similar effects in the ride-share market when tips were first introduced (Chandar et al. 2019).

While most of the research examines the default opt-in options presented to consumers, it has not examined the effects of how an opt-out option is framed. This is an important managerial component because Chandar et al. (2019) found that only 1% of customers "always" tipped for Uber. In fact, only 59% of customers always tip for food delivery, with this proportion reducing the younger the age cohort.[1] The NY Times reports that "*In May 2019, customers paying with cards tipped 42 percent of the time that tipping was available to them*."[2] The creditcards.com website continues with the report: "*The service categories least likely to get an "always tip" response from all generations in the survey: Coffee shop baristas (23% always tip and 24% never*

[1] https://www.creditcards.com/credit-card-news/tipping-poll/
[2] https://www.nytimes.com/2019/09/15/travel/ipad-tipping-gratuity.html

do) and restaurant cashiers ringing up takeout meals (17% always tip and 33% never do.)" Thus, in our empirical work, we focused on these contexts, to assess how reframing the opt-out option would affect consumers tipping.

Another managerially important reason to examine how different opt-out options affect consumers is that the gratuities industry has started to use different opt-out framing options Including zero) on their default screens shown to customers. See below examples from the industry using the number 0%, or "No Tip" as opt-out options, interchangeably, but the effect of this substitution has not been systematically studied.



Reframing the Opt-out Option

The effect of opt-out options has been shown in other domains: consumers' likelihood to opt-in or -out of service subscriptions (e.g., insurance, health or retirement plans), privacy preferences, and donations (Bellman, Johnson and Lohse 2001; Johnson and Goldstein 2003, 2004; Madrian and Shea 2001; Samuelson and Zeckhauser 1988). We discuss this literature in terms of defaults and framing effects:

The Default option: Johnson et al. (2002) showed that having to act to opt-out leads more people to agree to a service versus having to act to opt-in. Similarly, Johnson et al. (1993) found that having to opt- in led to lower participation than having to opt-out of additional coverage in the auto insurance domain. These findings show that consumers default to the option that requires

no action on their part. However, in POS systems, consumers must choose one of the presented options; thus, in order to opt-out from tipping, consumers must actively do so. This begs the question as to whether the way the opt-out option is framed, matters.

Framing effects of Defaults: Seminal research in decision-making shows that preferences are reversed when the frame emphasizes a loss vs. gain and that the cost of a loss looms larger than the pleasure of an identical gain (Kahneman and Tversky 1984; Tversky and Kahneman 1989). In the prosocial domain, it was documented that consumers actively look for ways to opt-out of giving; however, when they cannot, they end up giving more (Andreoni, Rao and Trachtman 2017). This suggests that, when it comes to making voluntary payments, the idea of a loss (e.g., paying a tip) will be salient, potentially leading people to look for an easy way to opt-out. However, in a norm driven phenomenon such as tipping, opting out could also be a function of the frame of the opt-out option, and especially the number "0" which has found to have counterintuitive effects on people's choices in different literatures.

PERCEPTION OF THE NUMBER "0" VS. OTHER EMPTY NULL SETS

The number 0 has been found to have numerous counterintuitive effects in different literatures. Some literatures referred to zero and other equivalent empty sets as equal, and some introduced findings which evoke the notion that the number zero is qualitatively different.

Absence and Zero in Psychology: Absence of something is an example of an empty set. In terms of absence in rewards and motivation, the absence of a reward has a surprisingly counterintuitive effect: Rather than decreasing motivation, people can become more motivated when there is no expectation of reward (Festinger and Carlsmith 1959; Gneezy and Rustichini

2000a, 2000b), as their intrinsic motivation increases (Lepper et al. 1973). For example, Gneezy and Rustichini (2000a) examined the effect of monetary compensation on performance, comparing the effects of rewards of different quantities, including zero. They found that school children collected less donation money when they were given performance incentives (vs. not), suggesting that the absence of a reward (i.e., zero reward) increased motivation and behavior.

"*None" and "Zero" in Behavioral Economics:* We have known for nearly a half century, that in the realm of gambling and probabilities, people perceive a zero probability as substantially different from a very small one (Kahneman and Tversky 1979). Examining people's evaluation of life-saving decisions, Zhang and Slovic (2019) found that people prefer decisions that could potentially result in no loss of life (zero loss), even if the overall risk (in terms of total lives lost) may be greater, as this decision is easier to justify. Moreover, they found that this effect of the unique effect of zero interacted with frame: When framed in terms of lives saved, people give similar ratings of support to decisions that save all people as they do to decisions that save only most people (e.g., 90% or 98%); however, when framed in terms of lives lost, people express considerably more support for decisions that lose very few lives than they do for decision that lose more lives (e.g., 10% or 2%). In addition to suggesting that people are particularly sensitive to the loss of valuable things, these findings show that deviations from zero (or "none") are judged as more significant than are equivalent deviations from 100% (or "all").

Other work has found that people are particularly sensitive to zero endpoints (Hsee et al. 2013). As Palmeira (2011) argues, this is because any positive number is infinitely larger than zero, thereby rendering comparison meaningless. In other words, a zero value makes a poor reference point, because it is nearly impossible to tell what it represents or how good or bad it is.

"Free" and "Zero" in Consumer Behavior: The way people perceive zero and the effect these perceptions have on consumer decisions, has been investigated by consumer behavior researchers in the domain of pricing. The special qualities of paying in different forms containing empty sets (e.g., the word nothing) have been shown to be counter intuitive. For example, Shampanier, Mazar, and Ariely (2007) found that consumers find free products attractive, so they forego a better-value alternative. In their studies, individuals were more willing to choose a free product than an inexpensive product that offered greater value. The authors argue that free products have extra value in the form of positive affect, which is driven by the perception that free products are also free from costs, meaning that a cost-benefit analysis will always weigh in favor of benefits; in contrast, any other non-zero price introduces both benefit and cost considerations.

However, people are not so narrowly focused on cost that they forget social ramifications: Even though more people demand a product when it is free, each individual seems to demand a smaller quantity of zero priced products (vs. when the price is very small) out of etiquette concerns (Ariely, Gneezy, and Haruvy 2018). This suggests that, although zero seems to have unique effects and strong preference among consumers, these effects of social norms is stronger. In norm driven situations, people choose to avoid zero prices. The effects of zero are also not so strong as to be impervious to other social conscience and context effects, as evidenced by findings from the PWYW literature. When given the option to pay an indicated value (the "anchor") for doughnuts or to pay what they want, people pay considerably more when the anchor is zero than when it is a nominally small value (e.g., $0.01 or $0.25; Jung, Perfecto and Nelson 2016). That is, people are so sensitive to zero that values that deviate even in a minor way from zero are not as powerful. Showing that people react differently to frames of empty sets in the consumer behavior

field, we now turn to differences between the various norms of zero: numeric versus its equivalent semantic representations from a numerical cognition perspective.

"0" and "Zero" in Cognitive Science: Research from cognitive science suggests that the representation of the number zero has a unique status (Zaks-Ohayon, Pinhas, and Tzelgov 2021a). Namely, the evidence suggests that zero has both a verbal code (*i.e.*, the word zero) and a symbolic code (*i.e.*, the digit 0) and that it is not connected to a certain quantity, but rather, to a lack thereof. The work demonstrated (1) an inherent conflict in processing the digit 0 as a number and (2) the understanding that a so-called "empty set" is represented differently from zero. The authors suggest that people perceive zero not as a quantity in itself, but as an absence of quantity; that is, zero may not be an inherently numerical concept. Other research conducted by the same authors (Zaks-Ohayon, Pinhas, and Tzelgov 2021b) demonstrates that other empty sets are also not perceived as zero, as shown by different reaction times between zero and other empty sets. Given that zero does not merely represent an arithmetic value, it makes sense that people would be sensitive to the differences between zero and any other numerical options and between zero and other descriptions of empty sets (i.e., verbal analogs of zero).

The literature in psychology, behavioral economics and consumer behavior has referred to the number zero as equivalent to other verbal empty sets (free, none, nothing, absence). However, the recent finding showing that the number zero may be perceived differently from other verbal descriptions of it can enrich the literatures that use it or other empty sets interchangeably. As the number zero and descriptions of it are processed differently, and as it was shown that consumers avoid zero prices in social circumstances, we next develop hypotheses to be tested in this work.

HYPOTHESES

The number 0 and an equivalent non-numerical empty set: Prior literature suggests a strong, yet socially conscious, pull towards paying nothing (Ariely et al. 2018, Jung et al. 2016, Shampanier et al. 2007). However, these findings explored the zero effect when the consumers' experience is framed as a gain (*i.e.*, getting a product for free). The domain of the voluntary payment of tipping provides an opportunity to examine these established effects when consumers suffer a loss (i.e., payment).

Literature has also shown that people avoid choosing zero priced product in situations due to social norms, and that the zero number is qualitatively different than any other verbal description of it. As tipping is a norm driven behavior, we predict that consumers will avoid choosing a 0 tip option. Since people want to conform to the social norm, choosing a 0 tip option, much like choosing a $0 product, may make consumers feel inappropriate and have lower self-image. We, thus, predict:

H1: *The number "0" (vs. non-numerical semantic equivalents) such as "No Tip") as an opt-out option in a set will lead consumers to avoid it, and as a result will lead to greater tips.*

Image concerns: Prior literature has documented that tipping is due to consumers being motivated by norms and image concerns (Akerlof and Kranton 2000; Azar 2004; Cox et al. 2018; Bluvstein and Raghubir 2021). Tipping, which is both prosocial, and motivated by social norms, is affected by social influences and associated feelings, such as pride, guilt, and a sense of

rightness (Azar 2004; Lynn 2009, 2015; Ruffle 1999). For example, approximately 20% of U.S. consumers report they tip to avoid feelings of guilt, while 50% say they tip to feel satisfaction from doing what is right (Lynn 2009). Research in behavioral economics has yielded similar findings: Rather than giving from a desire to promote others' welfare, people give to not violate others' expectations of them (Dana et al. 2006), and they give more consideration to situational factors when giving than they do to the value of the outcome (Dana et al. 2007). Thus, motivation to signal one's generosity and to preserve one's positive image are potential antecedents of consumers' tipping decisions. Tipping "0" is inconsistent with signaling generosity and preserving a positive self-image. Therefore, we suggest that the presence of the number "0" will lead consumers to care more about how they are seen in the eyes of others, leading them to avoid this option. We expect:

H2. *Image concerns will mediate the effect of the presence of 0 on tipping decisions.*

Schwarz et al. (1985) demonstrated that people make inferences about the population's average behavior from the options they are presented with and their own behavioral judgments (i.e., people average the options they are presented with). This effect is attenuated in the presence of memory-based cues (Menon, Raghubir, and Schwarz, 1995). This provides a theoretical lens to explore whether consumers indeed rely on the tip options presented to them to form their tip norms. In the case of POS systems in new tipping contexts, consumers do not have memory-based cues and so they may rely on the presented options to guide their tip judgment. Thus, when the mean range of tipping options is higher (e.g., 15%, 20%, 25% versus 10%, 15%, 20%),

consumers should tip more. Indeed, this is what scholars have found when the range of tips was within an acceptable range (Haggag and Paci 2014).

In case that the number "0" is included as a piece of information consumers use to come up with the average norm, then the calculated average of the set (i.e., 0%, 15%, 20%; M = 11.66%) would be lower compared to a set where a non-zero option is provided (i.e., 10%, 15%, 20%; M = 15%) which should lead to lower tips. However, if the number 0 is indeed avoided (H1), then people may not use it as a source of information to include into the computation of the average norm. If the numerical "0 "is ignored as a source of information then the average would be based on the remaining two non-0 tip options (15%, 20%; M = 17.5%) and thus should lead to higher tips. We hypothesize:

H3: *Replacing any numerical option (e.g., 1%, 5%, 10%) with the number 0 in a choice set will lead to greater tip amounts.*

Attention saliency: Prior literature has shown that visual saliency, fixation and attention has a significant positive effect on the value of alternatives and choices (Krajbich, Armel, and Rangel 2010; Mormann et al. 2020; Towal, Mormann, and Koch 2013). This begs the question "Do consumers pay less attention to the number 0 option in the tipping choice set? As such, examining whether increased attention to the "0" option may lead to a greater choice share of it would contribute to understanding the mechanism behind why the presence of "0" increases tipping. If, indeed, consumers are not including the 0 option when averaging the options to form a norm due to less attention they give to it, then making this option salient should increase the likelihood to choose it. We hypothesize:

H4. *Increased attention to 0 (vs. not) will lead to a greater likelihood to choose it, leading to lower tips.*

OVERVIEW OF THE STUDIES

We first conducted a pilot study examining image perceptions of a customer who left a "0" tip versus opted-out using a non-numeric symbol (crossing the tip line), in a non-POS environment (paper receipt). The rest of the studies use POS environments. Study 1 used a food delivery app context, examining the likelihood to tip when the opt-out options were: 0%, "No Tip," "Zero" and "Not Today," (H1 and H2). Study 2A replicated Study 1 results in a coffee shop context and extended the enquiry to different mean ranges of tipping options, testing the effect of "No Tip" vs. "0%" (H1 and H2). Studies 2B and 2C test the effect across levels of service and order presentation of defaults. A field experiment, Study 3A, used a 2 x 2 design manipulating the mean range of response alternatives as well as whether 0% replaced a non-zero tipping option in the set (5%, 10%; H3). Study 3B replicates the field experiment in the lab to show that "0" is a less preferred out-out option compared to "No Tip", when both are in the set. Study 4 used a 2 x 2 design manipulating whether the lowest tip option is 0% or 1%, and whether "No Tip" is present vs. absent (H2, H3). Study 5 examined whether increased attention to the 0% option increased its choice share and led to less tips (H4).

A pilot study provided initial evidence that that tippers who give 0 vs. cross-out the tip area on a tip receipt are perceived more negatively and judged less likeable, providing initial evidence that tipping 0 is associated with impression management concerns (for study description

and results see Web Appendix C). While the pilot looked at tipping in an open-ended "paper and pencil" format, all other studies reported in this work were conducted in the context of the new age of tipping in a POS environment, where customers choose tip options from those presented. For all studies, we report the main findings while other exploratory measures are reported in the Web Appendix.

STUDY 1: NUMERICAL 0 VS. VERBAL EMPTY SETS

Study 1 examined whether people are avoiding choosing the 0 tip option by testing the likelihood to tip when the opt-out option was a numerical "0%" versus other semantically equivalent opt-out options. Although our focus in this work is on the difference between the number 0 and No Tip (as the dominant label in the marketplace), Study 1 explored people's reactions to a few other representations of empty sets, specifically: "Not Today," and the word "Zero." We chose to use the option "Not Today" because it is a dominant label used in the screen (POS) donation contexts (another voluntary payment form) where consumers are asked how much they would like to donate (if any). We chose to use the word Zero to explore a potential difference between the numeric 0 and the exact verbal representation of it. Using a delivery app context, Study 1 tests H1 and explores the role of self-image concerns (H2).

Method

Participants: 405 students at a northeastern university (M_{age} = 21.16, SD = 1.40; 51.7% female) participated in this study in exchange for course credit. 12 participants were excluded (11 who did not complete the survey and one outlier who gave over 100% tip).

Design and Procedure. Participants were asked to imagine that they were ordering food delivery using their favorite app for a total bill of $15.10. They were then assigned at random to one of the experimental conditions: 0%, "No Tip," "Not Today," and "Zero," that preceded: 15%, 20%, 25% and "Custom Tip," and were asked to choose one of the tip options (See Figure 2 for stimuli presentation across conditions). Participants then answered a single item measuring *image concerns* ("I tipped the way I did because I did not want to look cheap;" 1=not at all – 7=very much). Participants then answered an attention check item asking them to recall the total bill amount and indicated their household income level, gender, and age.

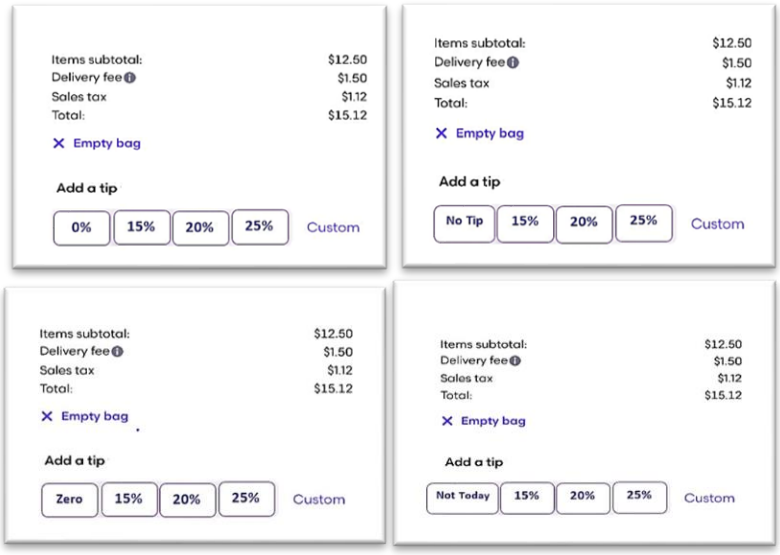


Figure 2: Stimuli Study 1.

Results and Discussion

Manipulation Check. Overall, 96.4% of participants passed the manipulation check (97.0%, 94.9%, 97.9% and 95.8% in the No Tip, Not Today, Zero and 0% conditions

respectively). Results did not change when excluding or including those who failed the manipulation check, as such we report the results for the whole sample.

Likelihood to Tip. Overall, 82.1% of consumers tipped. A logistic regression with opt-out condition on tip likelihood showed a significant difference between the 0% (91.7%) and "No Tip" (74.7%; b = .27, SE = .43, 95% CI = (.11, .63), p = .003) and "Not Today" (78.8%; b = .34, SE = .44, 95% CI = (.14, .80), p = .01) conditions. The effect between the number 0% and word "Zero" (83.8%; b = .47, SE = .45, 95% CI = (.89, 1.14), p = .10) is directional. No other comparisons were significant (ps > .12). Comparing the 0% condition with all other conditions (No Tip, Not Today and Zero) using a logistic regression showed a significant effect (b = .29, SE = .39, 95% CI = (1.34, 6.33), p = .007).

Tip Percentage. A one-way ANOVA with tip percentages as the dependent variable showed a similar pattern (F(3, 388) = 2.44, p = .064, η^2 = .019) as tips were significantly higher in the 0% condition (M = 13.47%, SD = 4.93) compared to both the "No Tip" (M = 11.13%, SD = 7.09; t(193) = 2.66, p = .004, d = .38) and the "Not Today" condition (M = 11.83%, SD = 6.84; t(193) = 1.90, p = .029, d = .27), and directionally so versus "Zero" (M = 12.67%, SD = 6.55; t(193) = .95, p = .171, d = .13). No other differences were significant (ps > .18). A one-way ANOVA comparing the 0% condition with all other conditions combined (No Tip, Not Today and Zero) showed a significant effect (F(3, 390) = 4.45, p = .036, η^2 = .002). However, when examining only those who tipped there was no difference across conditions (F(3, 323) = .27, p = .847), with no pairwise comparison significant (ps > .34) indicating that the differences in tip percentages were driven by tip likelihood.

Image Concerns. A one-way ANOVA with image concerns as the dependent variable revealed a marginal effect (F(3, 388) = 2.31, p = .076, η^2 = .018). Pairwise comparisons showed

that participants had greater image concerns when the opt-out option was 0% (M = 3.77, SD = 1.57), compared to "No Tip" (M = 3.22, SD = 1.75; $t(193) = 2.27$, p = .012, d = .32, or "Not Today" (M = 3.33, SD = 1.69; $t(193)= 1.84$, p = .033, d = .33), but not "zero." No other differences were significant.

Mediation. Mediation analyses using SPSS Macro PROCESS, Model 4 with 10,000 bootstrap samples (Hayes 2009) showed that image concerns mediated the relationship between 0% and "No Tip" conditions and tip likelihood (b = -.42, SE = .23, 95% CI = [-.96, -.05]). No other mediation models were significant.

Discussion: Study 1 shows that the way the opt-out option is presented affects consumers' likelihood to tip. Supporting H1, the 0% opt-out option, compared to the other equivalent non-numerical descriptions of it (e.g., No Tip, Not today, and Zero) resulted in higher overall tips; driven by a higher likelihood to tip, but conditional on the decision to tip, tip amounts were the same across conditions. .These effects suggest that consumers avoid choosing 0% when they make tipping decisions, but the presence of 0% does not necessarily nudge them to a higher option in the tipping choice set. Supporting H2, image concerns mediated the effect between 0% and its verbal non-numeric equivalent "No Tip". As the opt-out option "No Tip" is the predominant option in the marketplace, the rest of our studies will focus on the effect of 0% vs. "No Tip."

STUDY 2A: PRESENCE OF 0% IN DIFFERENT MEAN RANGES

In the absence of memory-based information (i.e., norms) that consumers could retrieve to make a tip judgment, consumers are likely to use contextual cues to the extent that they are

relevant or diagnostic (Menon et al. 1985). Therefore, consumers may use the tipping alternatives presented as a source of information to infer what is expected, which could affect their response. In line with this, Haggag and Paci (2014) found that ranges with a higher mean, yielded higher tips, but that this backfired when the options were set too high, leading to consumers opting-out of tipping. Accordingly, Study 2A is designed to attempt to replicate the effect that higher default ranges lead to higher tips to suggest that consumers, indeed, rely on the presented options to guide their tipping judgments. Importantly, Study 2A will test the robustness of the effect of 0 to higher mean ranges of tipping alternatives,

Method

Participants. We recruited 439 respondents from Amazon Mechanical Turk platform (M age = 36.49, SD = 10.17; 41.9% female) who participated in the study for monetary compensation. 26 participants were excluded from analyses for not completing the survey.

Design and Procedure. This study employed a 2 (opt-out frame: 0% vs. No Tip) × 2 (range mean: lower vs. higher) between-subjects design. The scenario was a coffee-shop where consumers purchased coffee and a muffin for a total of $10.15 and were asked to choose a tip option. The lower mean range options were: 0% [“No Tip”], 10%, 20%, 30%, and “Custom Tip,” and the higher mean range options were: 0% [“No Tip”], 30%, 40%, 50%, and “Custom Tip” (See Figure 3 for stimuli presentation). Participants then completed an *image* concern scale using the same item from Study 1 and two additional items for a more comprehensive scale (“I tipped the way I did because” “… I did not want to look cheap,” “… I care about what others think of me”, “… it is important to me that others see me in a positive light” 1=*not at all* – 7=*very much;* α = .85). Finally, participants reported their gender, and age.

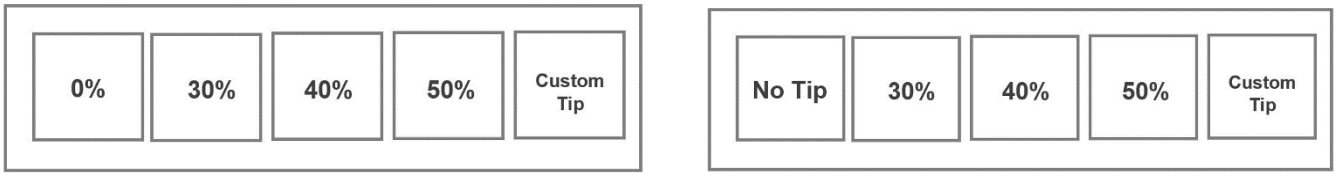


Figure 3: Stimuli presentation of 0% vs. No Tip (high range condition). Study 2

Results and Discussion

Tip Likelihood. Overall, 86.7% of participants tipped. A logistic regression showed a significant effect of 0% vs. "No Tip" on likelihood to tip, such that, supporting H1, the likelihood to tip was greater in the 0% condition (52.2%) than the "No Tip" condition (47.8%; b = .26, SE = .48, 95% CI = (.10, .69), p = .007), no main effect of range (b = .49, SE = .52, 95% CI = (.17, 1.3), p = .177), or interaction effect (b = 2.52, SE = .63, 95% CI = (.72, 8.75), p = .145).

Tip Percentage. A two-way ANOVA with opt-out condition and range on total tip amount revealed a significant main effect of opt-out frame condition, such that overall tip amount was larger in the 0% (M = 32.81%, SD = 24.94) compared to the "No Tip" condition (M = 26.73%, SD = 22.55; $F(1, 409) = 7.30$, p = .007, η^2 = .018). The main effect of range was significant with participants giving higher tips in higher ranges (M = 37.40%, SD = 23.32) compared to lower ranges (M = 21.84%, SD = 23.32; $F(1, 409) = 48.97$, $p < .001$, η^2 = .107). The interaction ($F(1, 409) = .63$, p = .426, η^2 = .002) was not significant.

Tip Percentage among Tippers. Looking at only the sub-sample who tipped, the two-way ANOVA showed a main effect of opt-out frame with higher tips in the 0% (M = 35.96%, SD = 23.84) versus "No Tip" condition (M = 26.73%, SD = 22.55; $F(1, 391) = 18.55$, $p < .001$, η^2 = .045). The main effect of range was significant, with higher tips in the high range condition (M =

39.66%, *SD* = 22.06) compared to the low range condition (*M* = 22.50%, *SD* = 21.95; $F(1, 391) = 62.87$, $p < .001$, $\eta^2 = .13$), and the interaction effect was not significant ($F(1, 391) < .001$, $p = .985$, $\eta^2 < .001$).

Image concerns. A two-way ANOVA showed a main effect of opt-out frame ($F(1, 409) = 4.70$, $p = .031$, $\eta^2 = .011$) with higher image concerns in the zero condition (M = 5.14, SD = 1.32) compared to the "No Tip" condition (M = 4.83, SD = 1.52). The effect of range was not significant ($F(1, 409) = .524$, $p = .470$, $\eta^2 = .001$) and neither was the interaction ($F(1, 409) = .099$, $p = .754$, $\eta^2 < .001$). Mediation (model 4, PROCESS) using 10,000 bootstraps showed that the effect of "0" presence on tip likelihood was mediated through image concerns (b = -.16, SE = .07, CI [-.31, -.01]).

Discussion: Replicating Study 1, when the opt-out option was framed as 0%, more consumers opted to tip. Study 2 showed that effect is robust to a higher mean range of tip options. The main effect of 0 in the sub-sample who tipped, along with a main effect of range, suggests that consumers do rely on the options presented to them to make a judgment of how much to tip. It is plausible that in addition to consumers avoiding choosing the 0% opt-out option, the mere presence of 0% nudges them, in some contexts, towards choosing higher tip options. Image concerns in this study mediated the effect found.

STUDY 2B-C: ACROSS SERVICE LEVELS AND ORDER PRESENTATION

Study 2B and 2C attempted to replicate the effect of 0 vs. No Tip across level of service provided and descending order-of-presentation of tip options.

Participants. In Study 2B 623 respondents (M_{age} = 38.69, SD = 11.61, 46.4% females) participated for monetary compensation using the Amazon Mechanical Turk platform. 28 participants were excluded from the analysis, 15 for not completing the survey and 13 outliers for giving tips larger than 100%. In Study 2C, 401 students (M_{age} = 20.07, SD = 1.40; 50.4% female) from a northeastern university completed the study in exchange for course credit. 93 participants were excluded from the analysis, 34 for not completing the survey and 59 responses with duplicate IDs, who completed the survey twice (due to a glitch in the system).

Design, Procedure, and Results. In Study 2B we manipulated the presence of 0 (vs. No Tip) and service levels in a 2 (opt-out frame: 0% vs. No Tip) × 3 (level of service: higher, lower, no-information control) between-subjects design using tip options: "No Tip" [0%], 5%, 10%, 15%, and "Custom Tip". For tip likelihood, a logistic regression showed a significant effect of opt-out presentation (b = .25, SE = .30, p < .001). No other main effect or interaction were significant. Per tip percentages a main effect of opt-out frame on total tip amount was significant, such that overall tip amount was higher in the 0% condition (M = 9.44%, SD = 10.15) compared to the "No Tip" condition (M = 7.60%, SD = 6.51; $F(1, 589) = 6.75$, p = .01, η^2 = .01). No other effects were significant, suggesting that the 0% effect is not driven by level of service received. Study 2C examined whether the results are contingent on the order of presentation of tip options. In order to rule out that ascending presentation order led to the effects of higher tipping in the presence of 0%, we examined whether the effect of 0% replicates when the order of the options is descending. We conducted a 2 (opt-out frame: 0% vs. No Tip) × 2 (range mean: lower vs. higher) between-subjects design. The lower mean range options were: 20%, 15% 10%, 0% ["No Tip"], and "Custom Tip," and the higher mean range options were: 25%, 20%, 15%, 0% ["No Tip"], and "Custom Tip." Logistic regression on tip likelihood showed an effect of opt-out frame (b = .52,

SE = .33, 95% *CI* = (.27, .99), *p* =.049) such that respondents were less likely to opt-out from tipping in the 0% frame condition compared to the No Tip condition. No other effects were significant. A two way ANOVA on tip percentages showed a significant main effect of opt-out frame, such that overall tip amounts were higher in the 0% (*M* = 8.94%, *SD* = 7.70) versus the "No Tip" condition (*M* = 7.15%, *SD* = 7.53; *F*(1, 304) = 4.28, *p* = .039, η^2 = .01). No other effects were significant.

Taken together, the effect of 0% as an opt-out option, as compared to the verbal equivalent "No Tip" is robust to the mean range of response alternatives, the level of service provided, and when the order of tip options is both ascending as well as descending. The next studies will examine H3 and H4; whether consumers include 0% as a source of information to construct their tip responses (Schwarz et al. 1995). Study 3, has the additional goal of examining the external validity of the effect of 0% as a tip option, by examining actual tip choices made by real consumers in a coffee shop, using a field experiment.

STUDY 3A: IS "0" EXCLUDED AS INFORMATION SOURCE? A FIELD EXPERIMENT

To test whether 0 is excluded as a source of information, we designed a field study in a coffee shop. The tip options manipulate both the mean range, as well as whether 0 versus a non-zero numeric tip option is the lowest tip option presented on the POS system. If consumers ignore the 0 option to form their judgment, then tips should be higher in the 0 condition, where the mean is higher accordingly, compared to the condition where the lowest numeric tip option is higher than 0 (e.g., 10%). Thus, the design explicitly tests a) whether the mean range of tip options is

used as information to guide judgments in a real consumption context; and b) whether 0% leads to greater tips compared to a non-zero option and whether it is included or excluded as a piece of information to make a tip judgment (H3).

Method

Participants. Actual coffee shop transactions (N = 1796, excluding 773 cash transactions where POS systems do not record tips, leaving a usable sample = 1023 transactions),

Design and Procedure. The setting was a coffee shop in large city in the northeast, which uses a POS system which uses three numerical options: 15%, 20%, and 25%, together with "Custom Tip" and "No Tip" options for debit and credit card transactions. The coffee shop offers drinks, meals, and premade snacks. Consumers pay in full, including gratuity, at the time of placing the order and can either dine in or take the order to go. There is no table service. The average net sale of the coffee shop is $6.63 (*SD* = 5.00). The experiment was conducted over 8 days: two business days each for four different experimental conditions.

Figure 4. Stimuli Manipulation of zero and non- zero conditions in High Range (Study 3)

The design was a 2 (0%: present vs. absent) × 2 (mean range: lower vs. higher) between-subjects design. In the 0% absent conditions, the lower mean range was 5%, 10%, 15%, "Custom Tip," and "No Tip," and the higher mean range was 10%, 15%, 20%, "Custom Tip," and "No Tip." The mean tips in these two conditions for the numerical options presented are 10% and 15% respectively. In the 0% present conditions, the first option (5% or 10%) in the set was replaced by 0% (See Figure 4 for stimuli presentation). If "0%" is included as a piece of information to construct the tip judgment, the means of the low and high range are 8.33% and 11.67% respectively, or lower than the means when 0% is absent. Thus, if 0% is included as a piece of information to construct a tip judgment, there should be lower tips in the 0% condition. However, if 0% is ignored as a piece of information to construct a tip judgment, the means of the two ranges are 12.5% and 17.5%, both higher than the respective means when 0% is absent from the set. Thus, if 0% is ignored as a piece of information to make a judgment, tips should be higher in the 0% condition.

Results and Discussion

Tip Likelihood. Overall, 52.1% of consumers tipped. A logistic regression with zero condition and range mean condition on likelihood to tip showed no significant effects (presence of zero b = .71, SE = .42, CI = (.31, 1.62), p = .417, range b = 1.30, SE = .32, 95% CI = (.68, 2.45), p = .460, interaction b = .95, SE = .06, 95% CI = (.83, 1.07), p = .378). Table 1 shows the results by condition: number of transactions, tip rate and percentage, both for the full sample ("All Customers") and for the subset who tipped ("Tippers").

Tip Percentages. A two-way ANOVA on tipping percentage revealed a marginal main effect of presence of zero ($F(1, 1019) = 3.37$, p = .067, $\eta^2 < .01$), with tips being higher in the

zero-present condition (M = 7.56%, SD = 9.88) compared to the zero-absent condition (M = 6.42%, SD = 7.98). The main effect of range was not significant ($F(1, 1019) = 2.41$, $p = .121$, $\eta^2 < .01$), and neither was the interaction ($F < 1$; see Figure 5 for presentation of results).

Table 1: Study 3 Results

		Range	**All Customers**			**Tippers**	
			N	Tip Rate	Tip %	*N*	Tip %
Zero Absent	Low	5% 10% 15%	286	49.2%	6.04%	134	12.90%
	High	10% 15% 20%	299	42.3%	6.79%	147	13.82%
Zero Present	Low	0% 10% 15%	175	49.7%	6.95%	87	13.99%
	High	0% 15% 20%	263	46.4%	7.96%	122	17.16%

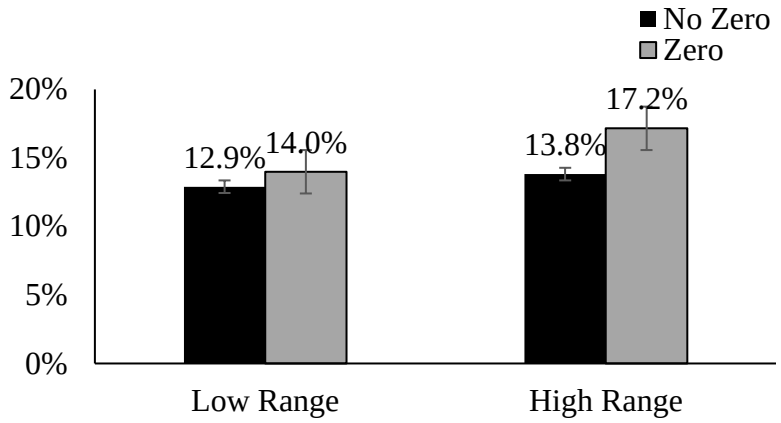


Figure 5. Tip % for Tippers as a function of presence of zero and mean range.

Tip Percentages among Tippers. A two-way ANOVA on the subset of the sample who tipped revealed a significant main effect of the presence of zero ($F(1, 486) = 10.90$, $p < .001$, $\eta^2 = .02$), with tips being higher in the zero present condition (M = 15.84%, SD = 8.57) compared to the zero absent condition (M = 13.38%, SD = 6.28). The main effect of mean range was also

significant ($F(1, 486) = 9.30$, $p = .002$, $\eta^2 = .019$), reflecting greater tips in the higher mean range condition ($M = 15.33\%$, $SD = 7.53$) compared to the lower mean range condition ($M = 13.33\%$, $SD = 7.18$). The interaction was marginal ($F(1, 486) = 2.81$, $p = .094$, $\eta^2 = .01$), and was driven by a larger difference between the zero present condition ($M = 17.16\%$, $SD = 9.77$) and the zero absent condition ($M = 13.82\%$, $SD = 4.47$) in the higher mean range ($t(1, 267) = 3.70$, $p < .001$, $d = 0.43$), than the lower mean range conditions ($Ms = 13.99\%, 12.90\%$, $SDs = 6.11, 7.79$ for 0% present vs. absent respectively; $t(1, 219) = 1.10$, $p = .272$, $d = 0.15$).

Discussion. Study 3 showed that although the likelihood to tip does not change based on the presence or absence of a 0% option when a "No Tip" option is present, the tip amount, counterintuitively, increases in the presence of a 0% option for those who choose to tip. If consumers were to choose tip option randomly, having both 0% and No Tip should have doubled the opt-out rate. This study shows that this was not the case. The 0 number is special in the way consumers avoid it. Importantly, the field experiment provides evidence consistent with the idea that consumers use provided tip options to construct their tipping decisions as tips were higher in the higher mean range condition (replicating Study 2). Critically, supporting H3, this study also provides evidence consistent with the idea that the presence of 0% tip option provides a caveat to the prediction that people use the entire range of response alternatives to make a judgment, as people appear to use the only the non-zero response alternatives provided to them to make a tip judgment (Schwarz et al. 1985). Thus, counter-intuitively, having a 0% option instead of a greater non-zero option in the set led to higher tips.

In a follow-up study, to confirm that consumers ignore 0%, we found that comparing two sets with the same average when 0% is ignored: 0%, 10%, 15%, 20% vs. 10%, 15% 20% (N = 186/ Amazon Mechanical Turk), did not affect either the likelihood to tip (91.2% vs. 95.8% for

0% and "No Tip," respectively, $\chi^2 = 1.61$, $p = .204$), or tip amount (19.68% vs. 18.52% for 0% and "No Tip," respectively, $t(184) = .35$, $p = .728$).

STUDY 3B: OPT-OUT PREFERENCE: NO TIP VS. 0

The limitations of the field experiment are that the coffee shop POS system cannot distinguish between customers who chose the 0% option and those who chose the "No Tip" to opt-out, nor can it identify whether customers selected one of the provided tip options or used the custom tip option to write 0. Thus, we replicated Study 3A in the lab to confirm that the effects were driven by avoiding the 0% option.

Study 3B employed a 2 (0%: present vs. absent) × 2 (total bill: lower [$5.15] vs. higher [$10.15]) between-subjects design using 250 participants from Amazon Mechanical Turk (M_{age} = 35.48, SD = 12.23; 46.8% female). 3 participants were excluded from analysis for leaving tips higher than 100%. The tip options were 10% [0%], 15%, 20%, "Custom Tip" and "No Tip." Replicating H3 and H4, a two-way ANOVA revealed the significant main effect of 0% presence ($F(1, 243) = 7.03$, $p = .009$, $\eta^2 = .03$), with tips higher in the 0% ($M = 15.86\%$, $SD = 21.03$) versus the 10% (non-zero) condition ($M = 10.28\%$, $SD = 6.90$). Bill amount did not exert a significant main ($F(1, 243) = 2.41$, $p = .121$, $\eta^2 = .01$), or interaction effect ($F(1, 243) = .04$, $p = .847$, $\eta^2 < .01$). Importantly, among non-tippers, in the 0% condition, a significantly lower percentage of respondents (7.5%) chose the 0% option versus "No tip" option (25.0%, $\chi^2(1, N = 40) = 28.90$, $p < .01$).Study 3B confirms that when both 0% and No Tip are in the set, people who wish to opt-out from tipping prefer to do so using No Tip.

STUDY 4: HOW UNIQUE IS THE NUMBER ZERO?

We next turn to examine the extent to which the effect documented is unique to 0% or can by comparing it to 1%. According to the *Automatic End Effect*, the number 0, and 1 in the absence of zero, represent the smallest members of the mental number line, which is defined as the neural system for magnitude representation (Dehaene 1992; Gallistel and Gelman 1992, 2000; Pinhas and Tzelgov 2012; Verguts, Fias, and Stevens 2005). Thus, examining the effect of zero compared to its immediate positive neighbor, the number 1, will provide further evidence that the effect is robust and unique to 0%, and not due to any other unfamiliar small-magnitude number.

In a pretest study using 315 Amazon Mechanical Turk participants who completed the study for monetary compensation (M_{age} = 36.19, SD = 10.30; 38.7% female) we compared the effect of lowest tip value (0% vs. 1%) in a coffee shop context. The tip options were 0% [1%], 10%, 15%, 20%, "Custom Tip," and "No Tip" (See Figure 6 for stimuli presentation). Tip likelihood did not differ as a function of whether 0% or 1% was the lowest value (b = 1.11, SE = .38, 95% CI = (.52, 2.36), p = .786). The tip percentage for the full sample showed a significant effect of 0% on total tip amount, with tips higher in the 0% condition (M = 18.98%, SD = 21.92) compared to the 1% condition (M = 13.78%, SD = 14.37; $t(306) = 2.45$, p = .015, d = .28). The analysis with only those who tipped, also showed higher tips in the 0% (M = 21.12%, SD = 22.12) versus the 1% condition (M = 15.19%, SD = 14.36; $t(276) = 2.64$, p = .009, d = .31). Importantly, significantly fewer respondents chose 0% (3.8%) as compared to 1% (10.1%; $\chi^2(1, N = 315) = 4.81$, p = .023), attesting to the unique quality of the number 0, showing that 1) people do not merely choosing the first non-zero option in the set (as only 10.1% chose 1%), 2) the effect is not due to 0% being a non-familiar option (as 1% is equivalently not familiar), and 3) adding to the

recent findings from the numerical cognition literature (Zaks-Ohayon et al. 2021) suggesting that 0 evokes different reactions compared to any other number.

Figure 6: Stimuli presentation Study 4 Pretest

Study 4 was then designed to examine how the number of opt-outs affects the likelihood of tipping and tipping amount differentially. We manipulated the presence of 0% (vs. 1%) in addition to the presence and absence of "No Tip," expecting to see higher tip likelihoods in the 0% condition in the absence of "No Tip," (replicating studies 1-2), and higher tip percentages in the presence of "No Tip" (replicating the field experiment, Study 3). The study was preregistered on AsPredicted.org and is available on https://aspredicted.org/MPJ_X5L.

Method

Participants. 463 Amazon Mechanical Turk respondents (M_{age} = 37.24, SD = 10.37; 41.9% females) participated in the study for monetary exchange. 42 participants were excluded from the analyses for not completing the entire survey.

Design and Procedure. The study used a 2 (lowest value: 0% vs. 1%) × 2 ("No Tip": present vs. absent) between-subjects design in coffee shop scenario (total bill = $10.15). The tip options were 0% [1%], 10%, 15%, 20%, and "Custom Tip," either with or without "No Tip." Those choosing

"Custom Tip" were asked to indicate the tip amount. Participants completed an *image concern scale* ("To what extent do you … "…feel obligated to tip in coffee shops?" "… tip in coffee shops in order to impress the server?" "… tip in coffee shops in order to impress other customers?" and "… feel embarrassed to not tip in coffee shops?" from 1 – not at all to 7- very much; α = .83). Participants indicated their household income level, age, and gender.

Results and Discussion

Tip Likelihood. Overall, 87.9% of participants tipped. A logistic regression showed a marginal difference of 0% vs. 1% (b = .47, SE = .43, 95% CI = (.20, 1.10), p = .085) with a directionally but non-significant greater likelihood to tip in the 0% (91.8%) versus the 1% condition (84.1%). The effect of the presence of "No Tip" option was not significant (b = 1.19, SE = .50, 95% CI = (.44, 3.28), p = .721), and neither was the interaction (b = 1.00, SE = .63, 95% CI = (.29, 3.45), p = .996).

Tip Percentage. A two-way ANOVA on total tip amount revealed a significant main effect of zero presence (F(1, 417) = 10.54, p = .001, η^2 = .025), with tips significantly higher in the 0% (M = 17.24%, SD = 18.15) compared to the 1% condition (M = 12.52%, SD = 10.79). Interestingly, the main effect of "No Tip" was also significant (F(1, 417) = 4.73, p = .030 η^2 = .011), with higher tips when it was present (M = 16.38%, SD = 17.92) versus absent (M = 13.23%, SD = 11.10; see discussion). The interaction was not significant (F(1, 417) = .349, p = .555, η^2 = .001; see Figure 7).

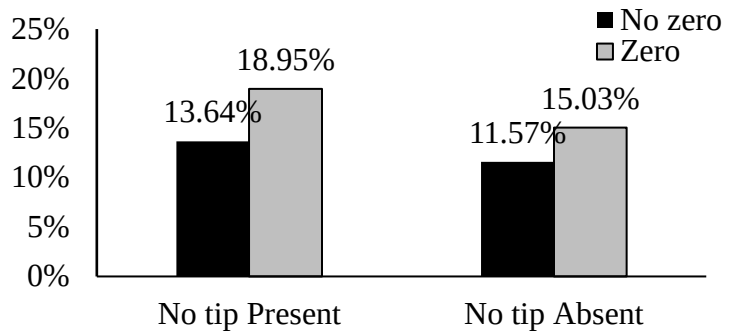


Figure 7. Tip amount presented as % as a function of presence of zero and "No Tip"

Tip Percentage among Tippers. A two-way ANOVA among the sub-sample who tipped revealed similar results: significant main effects for zero presence ($F(1, 397) = 15.98$, $p < .001$, $\eta^2 = .039$), with participants giving higher tips in the 0% condition ($M = 18.68\%$, $SD = 18.17$) than in the 1% condition ($M = 12.76\%$, $SD = 10.75$); and marginal effects for the presence of "No Tip" ($F(1, 397) = 3.75$, $p = .053$, $\eta^2 = .009$), with tips being higher when it was present ($M = 16.93\%$, $SD = 17.96$) versus absent ($M = 14.13\%$, $SD = 10.94$; see discussion). The interaction was not significant ($F(1, 397) = .474$, $p = .492$, $\eta^2 = .001$)

Choosing 0% and 1%. The likelihood to choose 0% (6.9%) was directionally lower but not significantly lower than the likelihood to choose 1% (9.1%; $\chi^2(1, N = 421) = .44$, $p = .505$) and is possibly attributable to the overall high tipping likelihood (87.9%).

Image concerns. A two-way ANOVA on image concerns showed a significant main effect of 0% ($F(1, 417) = 3.94$, $p = .048$, $\eta^2 = .009$) with higher means in the 0% ($M = 4.34$, $SD = 1.54$) versus the 1% condition ($M = 4.02$, $SD = 1.73$). The main effect of the presence of "No Tip" was not significant ($F(1, 417) = .477$, $p = .490$, $\eta^2 = .001$) and neither was the interaction ($F(1, 417) = .018$, $p = .894$, $\eta^2 < .001$). Mediation (model 4, PROCESS) using 10,000 bootstraps showed that

the effect of 0% presence on total tip amount was mediated via image concerns (b = -.85, SE = .45, CI [-1.81, -.01]).

Discussion: Study 4 showed that the effect of 0 (vs. No Tip) replicates when it is the only opt-out option in the set and when it is added together with the No Tip. Moreover, people tend to give greater tips when both opt-out options are "in the set. Furthermore, overall likelihood to tip was larger when the zero option was present in the choice set, both when the "No Tip" option was present and when it was absent. Interestingly, the presence of "No Tip" also led to higher tip amounts.

STUDY 5: INCREASED ATTENTION TO 0%

Study 5 was designed to test whether increased attention to the 0% option will lead to greater likelihood to choose it (H4), to add to the evidence that people are ignoring the 0 option, giving it less attention, and, therefore, not considering it when constructing a tipping judgment. We first confirmed through a pretest that consumers exclude "0" from their consideration by showing that participants are equally likely to tip and tip the same amount when faced with two tip menus with an equal tip average (if one excluded 0), one with zero added to it, and the other without a zero. 200 participants were asked to imagine that they have purchased a few items in a coffee shop for a total bill of $10.15, considered the tip options presented and to choose the tip amount they would like to leave. In the zero condition the tip options were 0%, 10%, 15%, 20%, Custom Tip and No Tip [total numerical average of the set excluding the zero equals 15%], and in the non-zero condition the tips were 10%, 15%, 20%, Custom Tip and No Tip [total numerical average equals 15%]. We predicted that tip amounts would not differ between these conditions.

Results supported this prediction. The likelihood to tip did not differ as a function if zero presence (b = 2.21, SE = .63, 95% CI = (.64, 7.62), p = .207), nor did tip amount (t(184) = .348, p = .364).Given these results, Study 5 was designed to test whether increased attention to the 0% tip option would lead to greater likelihood to choose it. Neuro-economic studies have shown that the values assigned to stimuli at the time of choice depend on the amount of attention that they receive during the decision process (Krajbich et al. 2010; Armel, Beaumel, & Rangel 2008; Shimojo et al. 2003). According to the visual saliency biases, independent of consumers' preferences, more visually salient options are more likely to be chosen due to the specific way in which the brain processes visual information (Milosavljevic et al. 2012). We predict that increasing participants' attention to the number 0% will result in more people choosing it, which will lead to lower tips compared to when the number 0% is not salient. Testing the visual saliency theory, we further predict that increasing attention to the highest numerical opt-in option in a tip set (i.e., 25%) will similarly increase the likelihood to choose it and so lead to the highest tip amounts. The study was preregistered on AsPredicted.org and is available on https://aspredicted.org/bn3h8.pdf.

Method

Participants. 324 Amazon Mechanical Turk respondents (M_{age} = 35.33, SD = 10.39; 31.2% females) participated in the study for monetary exchange. 32 participants were excluded from the analyses for not completing the entire survey.

Design and Procedure. The study used a 3 condition (0% salient, 25% salient, control) between-subjects design. The tip options were 0%, 15%, 20%, 25%, "Custom Tip," and "No Tip." Those choosing "Custom Tip" were asked to indicate the exact tip amount in US dollars.

Participants were asked to imagine that they were in a coffee shop ordering items for a total sum of $8.86. They were then assigned at random to one of the three conditions, where we manipulated the attention to different alternatives in the set. Participants in the 0% salient condition saw the 0% tip option appear first on the screen for 4 seconds before the full tip menu was shown. The survey was designed to look as if there was a glitch in the tip menu screen such that only one option was shown first. Participants in the 25% salient condition saw the 25% tip option first for 4 seconds before the full menu appeared, and participants in the control condition saw a clear screen for 4 seconds before the complete tip menu was shown. Participants were asked to choose a tip option from the menu and reported their age and gender.

Results and Discussion

Tip Likelihood. Overall, 77% of participants tipped. Logistic regression showed a significant effect of condition saliency on likelihood to tip (b = 1.86, SE = .18, 95% CI = (1.30, 2.66), $p < .001$) with a lower likelihood to tip in the 0% salient condition (60.6%) versus the control condition (81.3%, χ^2 (1, N = 195) = 10.04, p = .001), and versus the 25% salient condition (90.7%, χ^2 (1, N = 196) = 20.02, $p < .001$). Likelihood to tip was also greater in the 25% salient condition compared to control condition (χ^2 (1, N = 193) = 3.59, p = .045). This means that more people opted out of tipping by choosing 0%, when 0% was salient, as compared to the control, and as compared to when 25% was salient.

Tip Percentage. A one-way ANOVA on total tip amount revealed a significant main effect of option saliency (F(1, 417) = 10.54, p = .001, η^2 = .025), showing significantly lower tips when the 0% tip option was salient (M = 13.71%, SD = 14.75), compared to the control condition (M = 19.43%, SD = 15.43; t(192) = -2.64, p = .009, d = .37), or the 25% salient condition (M = 21.60%, SD = 11.653; t(194) = -4.14, $p < .001$, d = .59). Tip amount did not differ between the 25%

saliency condition and control condition; $t(191) = 1.10$, $p = .273$).A one-way ANOVA among the sub-sample who tipped revealed non-significant effects ($F(2, 225) = .234$, $p = .791$) suggesting that the effect of saliency influenced the likelihood to tip, but, subsequently did not nudge consumers to choose higher tip options.

Discussion: Study 5 showed that, as expected by the visual saliency bias theory, the effect of zero presence was higher when attention to the 0% option increased, leading people to choose it more and so to leave overall lower tips compared to when this option was not salient. This provides further evidence that consumers' avoiding the zero might be due to less attention given to this number in the choice set. Evidence for the visual saliency bias was also present when the 25% option was salient, making people more likely to choose it and so to leave the highest tip amounts. It seems that upon deciding to opt-in to tipping, tip amounts did not differ across conditions, which indicates that, in this study, increased attention to zero affects the decision to tip but does not lead participants to choose higher options in the set.

GENERAL DISCUSSION

Across eight studies in the field and in the lab, this work showed that the way the opt-out option is constructed affect consumers tipping behaviors. Specifically, the presence of a 0% option (vs. an equivalent verbal description of empty set "No Tip") results in higher tipping. This was via tipping likelihood when the 0% option replaced the more traditional "No Tip" option in POS systems (Studies 1, 2, 4) and via tipping amount, when it was included as an additional opt-out option along with "No Tip" (Studies 3, 4). This effect held across different tip ranges, bill

amounts, service level and order presentation of defaults. The effect also held when the 0% option was compared to other tip options such as 1%, 5%, 10%, and 15%. The effect was mediated by image concerns (Studies 1, 2, 4), and exacerbated when attention to 0% was increased (Study 5).

Theoretical Implications

This research has implications for the areas of prosocial behaviors, participative pricing, choice architecture, cognitive aspects of survey methodology, and adds to the research on the special properties of the number 0 in cognitive science.

Prosocial Behavior. Taken together, our findings suggest that the presence of a 0% option nudges people to tip more. On the face of it, it may appear that our findings are inconsistent with Andreoni et al.'s (2017) finding that people go out of their way to avoid passing bell ringers so as to avoid donating. However, looked at differently, our findings are consistent with theirs: when there is an easy opt-out option (e.g., exiting through the door with no bell ringer, "No Tip"), more people will take it; but when the only way is to walk past the ringers (in our case, choose 0%), donations (or, in our case, tips) increase. Charitable donations are one form of exhibiting prosocial behavior; participative pricing is another.

Participative Pricing. Previous research on participative pricing has shown that, rather than taking advantage of the opportunity to pay a minimal amount (or nothing), consumers can pay more when given the option to choose how much they want to give (Gneezy et al. 2010; Jung et al. 2017; Kim et al. 2008). This is presumably due to image concerns (Akerlof and Kranton 2000; Azar, 2004; Cox et al., 2018): People want to be seen as being generous and as adhering to social norms. We add to this literature by showing how changing the frame of the opt-out option increases voluntary payments. Recent research has demonstrated that offering customers easier to

use choice options in a participative pricing context can increase purchase intentions (Wang et al. 2021). Future research may examine the effect of adding an explicit 0 to such a choice set on consumers' participative pricing decisions.

Choice Architecture. The studies in this manuscript examined the effect of how a choice set is constructed on tipping. While the effect of defaults has been studied for decades, their use in electronic payment systems is a recent phenomenon, and though they provide a large platform to explore how consumers react to different default options, they have received little research attention from the consumer behavior field. Previous research has demonstrated a preference towards the first option in a set: the primacy effect (Mantonakis et al. 2017; Miller and Krosnick 1998), and the last option: the recency effect (Teppan and Zanker 2015). In many of these studies, consumers' knowledge of the context was limited. For example, Mantonakis et al.'s (2017) study examined people's taste preferences for a series of wine samples, while Miller and Krosnick (1998) examined voters' behavior when they had little knowledge of the political race and the candidates. In such situations, it is not surprising that people look to the order of presentation for information, or they simplify their task by choosing the first or the last option. Similarly, Teppan and Zanker (2015) examined product recommendations, a domain where consumers with insufficient information read recommendations to guide their decision. Thus, the order of the list is itself a source of information. Differently from the above work, we do not find evidence of primacy or recency effects; rather an effect consistent with the idea that consumers draw inferences of what is appropriate, excluding 0% as information, when they make their judgment, which is consistent with the effects found in the literature on the cognitive aspects of survey methods.

Cognitive Aspects of Survey Methodology. Schwarz et al. (1985) demonstrated the effect of the range of response alternatives on people's reports of their TV watching behavior; an effect that is stronger in the absence of memory-based information that can be used to make the judgment (Menon et al. 1995). The underlying reason proposed for this effect is that respondents believe that the researcher constructed the set of alternatives to represent the population of respondents, and, so, respondents infer the frequency of the average person from the scale, and then respond as though they performed the behavior more or less than average. Given that tipping norms are evolving for new contexts like coffee shops and delivery apps, (unlike the well-established tipping norms for restaurants), consumers may have inferred the appropriate norm from the response alternatives presented to them. The results of our set of studies are consistent with this explanation, with the caveat that consumers appear to ignore 0% as a piece of information to construct their judgment. We suggest that this is because 0 is unique, something we turn to next.

Zero as a Special Number. The pilot study and Study 1 showed that not all empty sets are created equal. Studies 2-4 showed that while the outcome of selecting "0%" versus "No Tip" are the same, consumers' choose between these options differently. These findings add to the literature in cognitive science that has shown that zero is unique: people can view zero flexibly as either a numerical value or an abstract concept, and they do not view it as they view other positive whole numbers (Zaks-Ohayon et al. 2021). Zaks-Ohayonet al. (2021) found that while zero can be conceived of as a numerical value and the lowest value on the mental number line, at other times, it is perceived more abstractly as the absence of a quantity. Our results are consistent with these results and extend them by showing that the choice of "No Tip" is a choice to not give a tip in a context, the choice of 0% is choosing to give nothing (i.e., the absence of quantity) as a tip. Given

the prosocial nature of the tipping domain, and the fact that tips can be used as an impression management technique (Bluvstein Netter and Raghubir 2021), this could be the underlying antecedent for the avoidance of 0%.

This finding also adds to the marketing literature on the effect of free (or 0 prices). Shampanier et al. (2007) found that consumers find free products more attractive than their better-value counterparts, and Ariely et al. (2018) found that free products are demanded more. We find that in a context where consumers are asked to pay a tip, a 0% option is chosen less than an equivalent "No Tip" option. Thus, it appears that not all zeros are created equal. Further adding to this literature, we show that 0% can be different from the next larger number (1%, pretest of Study 4), suggesting that "free" and "$.01¢" may also operate in a different manner.

This work further showed that the effects are mediated by image concerns, such that people care about how they are perceived in the eyes of others when they consider their tip choices. We also show that in addition to impression management motives, there is a cognitive aspect behind people's avoiding the 0% option. As the attention given to an option in a choice set affects consumers' choices, we found that the effect exacerbates as attention to the 0% option increases: people opt-out more when the 0% option is salient (vs. not). It is plausible that the motivation to ignore zero involves impression goals which then leads to ignoring this option in the choice set, leading to higher likelihood to tip and tip amounts.

Future research is needed to examine consumers' reactions to the 0% option in social contexts. Do consumers intentionally avoid it? Eye-tracking studies would provide direct evidence. Future research could also compare verbal and numeric empty sets in pricing, by examining differences between "Free" and "$0." These findings may also have implications for financial transactions and donations as these are additional forms of voluntary payments which

are similar in many ways. Finally, future research could disentangle whether the effects are due to the inferencing mechanism we propose (where the mean of the range of response alternatives are used as a source of information to construct a judgment about norms for the average consumer), or due to an anchoring effect, where "0" is ignored, but the rest of the numeric information is used to form an anchor which leads to higher tips in the presence of higher anchors.

Managerial Implications

As tipping is a steadily growing, multi-billion-dollar industry (Azar 2011), and as modern technology continues to advance and electronic payments become increasingly prevalent (Kabir, Saidin and Ahmi 2015), consumers' use of such electronic POS systems will increase. Businesses across the service sector, from large corporations to small business owners, will be faced with decisions about how to construct their tip menus using such systems. The present findings have implications for businesses in terms of how they decide to present their customers with requests for tips—what ranges they should use, and what they should use as minimum values—especially as electronic payment systems continue to increase in popularity. We found that having a zero option in the set does not influence the way people perceive the overall business, and so may not diminish loyalty. People did not rate the set of options more negatively or positively when zero was included in the set, providing initial evidence to decision makers that adding zero to the choice set is unlikely to harm the business and only has an upside for their labor.

Labor Welfare. The research question examined is particularly relevant for businesses whose labor rely on tips as a major source of income: food service establishments, ride share apps, taxis, delivery apps, etc. Such businesses need to balance the interests of their employees with those of their customers, while keeping their own profitability in mind. Using a 0% opt-out option will increase tips, but come at the cost of the customer's wallet, unless consumers educate

themselves on the manner in which the manner in which response alternatives are presented to them affect their judgments.

Pay-What-You-Want Pricing. Our results have implications for the PWYW pricing strategy, as that is also affected by social norms (Azar 2004, 2007; Mengel 2008). Counterintuitively, presenting consumers with explicitly non-generous options, increases their tipping. Future research could examine if it also does so in other PWYW domains. Future research is also needed to determine what the optimal number of options businesses should use, and how they can benefit from having more opt-out options.

Limitations and Areas for Future Research

We hope future research will demonstrate the generalizability of the 0% effect, and its boundary conditions in other contexts of voluntary payments (such as donations requests in check out POS systems) using large scale field experiments. Further, there are multiple antecedents of tipping (e.g., Azar 2007; Lynn 2009) and future research could examine whether the factors that have been shown in a traditional tipping domain translate to an electronic POS system, and interact with the manner in which tip choices are constructed.

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