

Studying the imaginary Samaritan: An investigation of cognitive and social factors affecting
patterns of hypothetical helping behavior

by

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B.A., Drake University, 2018
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Abstract

Previous research (Balboa, 2023) has revealed that when directly comparing field data on helping strangers at varying costs to oneself to a hypothetical equivalent, patterns of results differ significantly. This finding contributed to a larger critique of social psychological research methods, which have relied largely on hypothetical surveys in recent history to approximate the choices participants would make in real life social situations (Baumeister et al., 2007). As a result, Study 1 of the current studies sought to expand on this research by investigating how different forms of hypothetical stimuli might influence realistic participant responding in a hypothetical helping paradigm. Study 2, in an effort to more directly manipulate participant responding to avoid the social desirability bias inherent in studies of prosocial behavior, attempted to use metacognitive monitoring strategies to influence honest responding. Finally, Study 3 drew from reciprocal altruism theories to manipulate participants' valuation of a hypothetical individual in need by lowering or raising the likelihood that they might interact with that person again in the future. Using measures of welfare tradeoff ratio, empathy, and oneness, all three studies additionally investigated the effects of baseline other valuation on the decision to help in a one-shot stranger helping paradigm. Results revealed that though metacognitive and valuation manipulations did not have an effect on helping likelihood across scenarios of different costs to the helper, perceived oneness does seem to influence whether people choose to help strangers. Additionally, patterns of responding across all studies are consistent with those found in the Balboa (2023) field study, especially when stimuli are presented in a first person video format. This finding further supports the role of cost/benefit analysis in the choice to help a stranger and provides a more realistic hypothetical study format for use in helping decision making research

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Approved by:

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Chapter 1 - Introduction

Historically, many social psychology field studies of helping behavior employed research assistants to solicit help from strangers in the real world. Such studies have investigated the effect of solicitor characteristics such as race (Gaertner & Dovidio, 1977; Dovidio & Gaertner, 1981), gender (Emswiller et al., 1971), pleasantness (Gross et al., 1975), and birthmarks (Piliavin, Piliavin, & Rodin, 1975). Other directly manipulated factors such as drunkenness or the choice to act in the presence of other helpers have also been historically investigated (Piliavin et al, 1969). More recently, a large proportion of psychological research has shifted to hypothetical situations, presented on paper or online survey formats, because they are easier and faster. This is true of research across psychology, including decision making and risk perception topics and domains (such as helping behavior) that implicitly entail decision making.

With many studies of social behavior now utilizing hypothetical survey formats rather than field studies, however, some argue that functional conclusions cannot be drawn as clearly from such research (Baumeister et al., 2007). Troublingly, only a handful of studies have attempted to map hypothetical judgments onto real life decision making (Buelow et al., 2024) or, in the case of the helping literature, directly compare hypothetical survey methods to matching field research on helping behavior. West and Brown (1975) directly compared hypothetical responses to a real life scenario in which participants were asked to help an injured peer. In the study, participants were approached by a female research assistant who varied in both injury severity and attractiveness. In the hypothetical version of the study, the attractiveness of the research assistant interacted with the severity of her injury, though no such interaction was found in the real life version of the study. Additionally, the study was underpowered, and the extent of this disparity is difficult to discern. Mathews & Canon (1975) directly compared the effects of

ambient noise in a lab to the effects of ambient noise (e.g., a lawnmower) in a naturalistic setting and found differences in the effects, though their stimuli were not consistent across experiments. More recent work on decision making (Bostyn et al., 2018) found that participants in a trolley-esque problem involving the choice to deliver shocks to one or five mice made the utilitarian choice in a hypothetical study, but not in a situation involving real mice. Additionally, hypothetical results revealed significant relationships between individual differences and the choice to provide a shock, when no such relationship existed in the real life counterpart study. Overall, it is evident that when making real life choices, especially those that involve helping (or, in the case of the mice, harming), there are clear disparities in what participants say they would do hypothetically and what they actually do in those situations.

A previous exploration of these disparities (Balboa, 2023) attempted to map some of the potential differences between hypothetical and real life decision making with a cognitive cost/benefit framework. That proposed framework predicted higher rates of both hypothetical and real world helping when costs to the benefactor were low and benefits to the recipient of help were high and lower rates when those costs and benefits were reversed. The behaviors in that study, which were gathered from McGuire (1994) consisted of the high cost/high benefit behavior of giving a dollar to someone in need, the high cost/low benefit behavior of allowing someone to borrow a phone, the low cost/low benefit behavior of returning a dropped pen, and the low cost/high benefit behavior of returning a dropped dollar. In that study, “high” cost and benefit behaviors were those rated as relatively more costly or beneficial than others in a pilot study, while “low” cost and benefit behaviors were determined in the same way. As such, in a hypothetical survey version of the study, participants showed some consistency with cost and benefit predictions in their intended behaviors, in that the highest cost behavior yielded smaller

probabilities of receiving help. That finding was somewhat consistent with hypotheses as well as other research involving the assessment of the costs and benefits of helping behaviors (e.g., Curry et al., 2022), but ultimately predicted higher helping overall than was observed in the field study. In the field study, participants deviated from both predicted patterns of helping based on the cost and benefit of each action as well as the results from the hypothetical study (See Figure 1.1). This evidence of cognizance of costs and benefits in a hypothetical scenario but not in its field counterpart provided some support for differing cognitive processes occurring in each scenario, which the current studies sought to investigate.

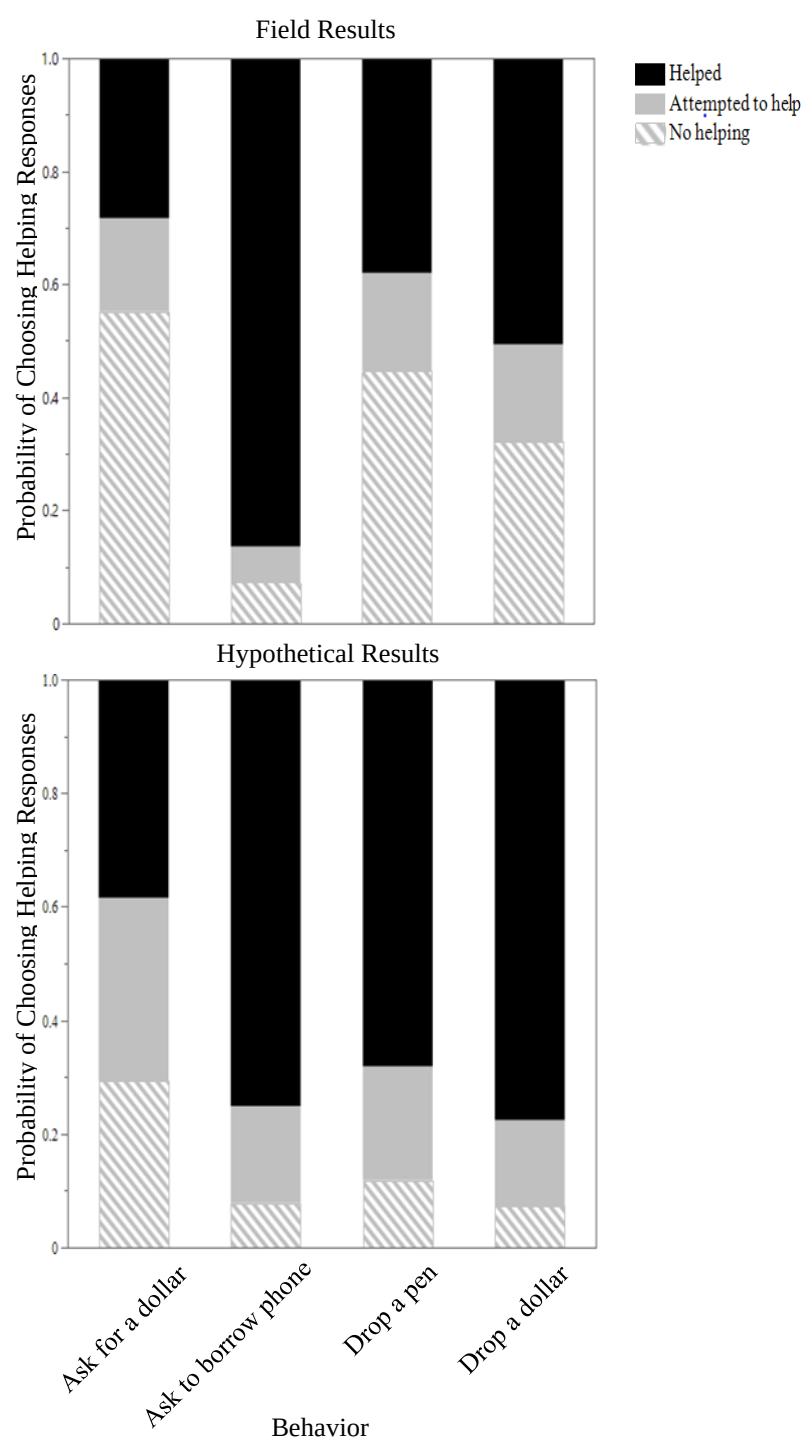


Figure 1.1. Results from field and hypothetical studies in Balboa (2023).

The current studies aimed to understand both the cognitive mechanisms behind helping behavior decisions and the factors that increase realistic responding in hypothetical research designs. At a fundamental level, the goal of psychology is to understand human *behavior*, and popular, time-efficient survey methods have been argued to not capture true behavior accurately enough (Baumeister et al., 2007). The bridge between the hypothetical and real life results are theories about which variables are key to the decision making and risk evaluation of the helping situation, and how those variables affect the decision making process when presented in different contexts. Thus, the current studies sought to first investigate the effects of context realism (Study 1), then metacognitive monitoring strategies (Study 2), and valuation of others (Study 3) on reported decisions to help in a hypothetical scenario (See Figure 1.2). The aim of these studies was to firstly determine whether there was a hypothetical stimulus type that produced more realistic responses, then to investigate several key cognitive factors that might affect the way in which participants make decisions in hypothetical helping contexts. “Realistic” in the current studies refers largely to the degree of similarity between

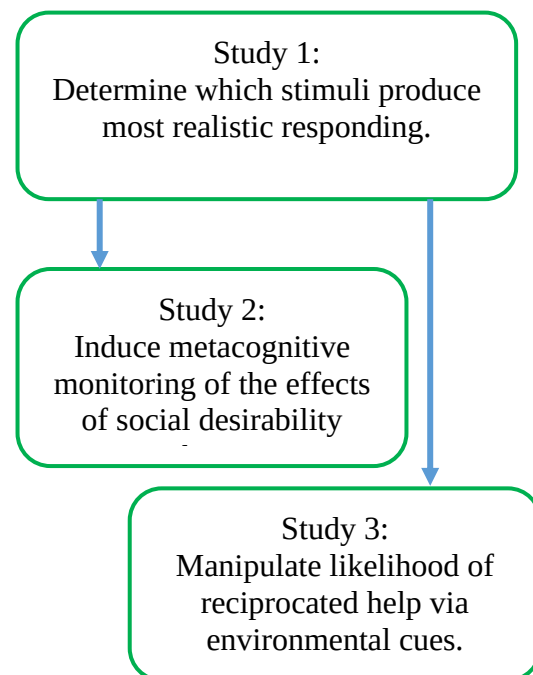


Figure 1.2. Structure of the current studies.

hypothetical survey results collected and the field study results from Balboa (2023), which assumes that field study participants were behaving naturalistically. By testing a series of different stimuli, metacognitive strategies, and measures of valuation, the proposed studies

sought to illuminate best practices for collecting hypothetical helping decision data that is representative of what participants would actually do in a real life scenario.

Chapter 2 - Realism in Hypothetical Stimuli

One factor hypothesized to affect responding in hypothetical scenarios is the realism of the situations and stimuli presented to participants. As such, the first of the three current studies focused on the role of stimulus realism on patterns of responding to helping scenarios. In the Balboa (2023) hypothetical study, the helping scenario was presented as a photo of a research assistant accompanied by a vignette explaining the observed scenario and offering a series of potential response options. The ecological validity of such hypothetical survey methods is something that has been a subject of debate in both social and cognitive psychology, however, with the realism of virtual social situations coming under particular fire. Evidence is mixed in terms of whether picture or video stimuli are better able to accurately approximate real life situations. Bateson and Hui (1992) found that when comparing responses to photo, video, and naturalistic stimuli, participants showed no significant differences in responding. It was acknowledged in that study, however, that their presented task was a cognitive problem, and they did not manipulate other factors in the situations presented such as time, attention, or environmental features, which could have contributed to the lack of observed differences. Another more recent study has posited that immersive video stimuli, in which participants are exposed to wide angle scenes or else utilize a virtual reality headset, are the only suitable proxy for field scenarios (Rossetti & Hurtubia, 2020). This view has been supported by findings that 3D and immersive stimuli provoke stronger and more realistic reactions than 2D or static versions. Stimuli filmed and presented in 3D have been found to specifically provoke stronger emotional reactions that more closely approximate real life situations (Serino & Repetto, 2018; Compton, 2019). The visual realism of stimuli is only a piece of the experience of realism or

“presence” however, and thus is not the only potential factor to explore in hypothetical stimulus design.

Though visual realism is thought to be a strong determinant of participants feeling like they are actually present within a hypothetical study context, other factors such as narrative realism and naturalistic social settings have been found to contribute to higher perceived presence (Weber et al., 2021). Naturalistic stimuli are those that incorporate dynamic stimuli that are representative of daily experiences, including scripted clips from movies or television shows or recorded behavior in the form of reality programming or scripted interactions. It has been found that when stimuli contain elements of naturalism such as commonly occurring social interactions, they regularly evoke realistic patterns of emotional responding and are therefore hypothesized to put participants into mental spaces more closely resembling real life situations (Sokusare et al., 2019). These more naturalistic stimuli have also been found to activate brain regions associated with real life social cognition and increase perspective-taking reported by participants (Jääskeläinen et al., 2021).

Alternatively, one general review of ecological validity of stimuli suggests that the nature of a given task dictates the extent to which stimuli need to be realistic, and recommends utilizing a range of realistic, contrived, and naturalistic scenarios to obtain behavioral data (Risko et al., 2012). From this perspective, ecological validity is determined not only by stimulus realism, but by how well an experiment adequately represents the context of interest (Holleman et al., 2020). Proponents of this perspective point out that while psychological researchers have access to hyper realistic stimuli in the form of tools like virtual reality headsets, the use of this technology often creates a physical context that makes it abundantly clear to participants that they are participating in a lab study (Kihlstrom, 2021). Hyper realistic stimuli have also been suggested to

reduce generalizability of experimental results, as the increased representativeness applies only to the specific setting of the experiment (Kvavilashvili & Ellis, 2004). Thus, it becomes the job of researchers attempting to model real life situations to provide the maximum possible stimulus realism without increasing artificiality to the point that it hinders the participant experience and study results more than it enhances them.

An important first step in the current investigation was therefore a systematic investigation of the effects of stimulus type on response patterns to determine if the type of stimulus presented truly produces different hypothetical responses. Due to practical constraints limiting the use of methods like virtual reality and the overarching goal of improving commonly used hypothetical survey techniques, Study 1 utilized two forms of video compared against static images depicting helping scenarios. The static images provided a control and replication of Balboa (2023), while the two video conditions were tested in line with previously discussed research on the efficacy of dynamic stimuli in hypothetical paradigms. First person and third person videos were used respectively to add to previous research that has found that for complex cognitive tasks, first person modeling leads to higher performance (Fiorella et al., 2017). In Study 1 and subsequent experiments, the performance goal was patterns of helping likelihood that most closely approximated the findings from the Balboa (2023) field study. The stimuli found to best approximate the field study results were then selected for use in Studies 2 and 3.

Chapter 3 - Metacognitive Monitoring of Social Desirability

Metacognition, or metacognitive processes, refers largely to knowledge and top-down processing of cognitive activity (Strle, 2012). Historically, metacognitive awareness has been evoked and utilized to assess criterion learning in memory tasks, wherein participants reflect on their learning to enhance performance. Measures of metacognitive processes, including judgments of learning, feeling of learning, and confidence judgments, have then been used to evaluate the effectiveness of metacognitive awareness on experimental task performance (Koriat, 2015). Some studies, however, have utilized metacognition to encourage participants to shift from automatic Type 1 processing to more deliberative Type 2 processing to make more informed decisions (Thompson et al., 2011). Prompting participants to think about their thought process when making decisions engages the process of metacognitive “monitoring”, which has been found to elicit more effortful processing of information. This monitoring in turn has been associated with higher rates of correct (often defined as more utilitarian or normative) responding in criterion-based tasks (Flavell, 1979; Batha & Carroll, 2007; Pyc et al., 2014). When applied in the realm of decision making, metacognitive monitoring has largely applied to rational decision making, with other decisions styles and outcomes being largely ignored (Basu & Dixit, 2022). Thus, there appears to be an opportunity to expand the use of metacognitive monitoring strategies to alter decision making in a social situation for which there is no objectively correct response.

Previous studies aimed at improving decision making have employed differing metacognitive monitoring strategies to produce more objectively correct responding. Common strategies have included re-thinking about answers before submitting a final one (Thompson & Johnson, 2014), evaluating how much they thought they had learned (Pyc et al, 2014), and

utilizing decision accuracy feedback to inform subsequent decisions (Haddara & Rahney, 2022). Other strategies such as creating pre-task checklists designed to evaluate and practice decision-making strategies have been found to improve decision accuracy and confidence (Chew, et al., 2016; Rosi et al., 2019). Little work has tried to use metacognitive reflection to encourage people to make a decision that is more *realistic*, however, such as utilizing metacognitive monitoring cues as a way to encourage participants to answer survey questions in a way that more closely approximates what decisions they would make in real life helping situations.

In social psychology, metacognition has found applications in persuasion via altering secondary cognitions and combatting biased intuitive action. Some approaches have involved manipulating stimuli to induce more or less cognitive effort. Participants have been found to perform differently based on both the nature of an informative stimulus (e.g., persuasive vs expository) and the format in which it is delivered (e.g., detailed vs simple narratives) (Dinsmore et al., 2015; Shulman & Bullock, 2019). Other approaches have employed a method similar to the dual process manipulation in Thompson et al. (2011), wherein participants are encouraged to think more about and build confidence in their thoughts to make them less susceptible to bias (Petty et al., 2007; Petty & Briñol, 2008). Still another application has tried to use mindfulness practice in order to orient participants with their decision making process, which has been found to alter initial affective and even selfish responding. Mindfulness based training, even without any explicit instructions to think about others or engage in social interaction, has been suggested to increase prosocial responding generally, though the robustness of this effect is as of yet unclear (Yeung & Summerfield, 2012; Norman, 2017). Finally, some work has been done to uncover and account for response bias (e.g., Orne, 1962) but metacognition has not been used

previously to induce sensitivity to and subsequent mitigation of response biases such as social desirability.

Social desirability bias is of particular concern in studies addressing prosocial decisions and behaviors, where acting prosocially is almost always the desirable response. As has been historically noted, even the act of engaging in a research study is enough to put participants in a mindset uniquely different from their everyday state (Orne, 1962; Cicourel, 1982; Kihlstrom, 2021). As evidenced by the overall higher rates of helping decisions across all cost/benefit conditions in Balboa (2023) relative to actual observed helping rates, hypothetical studies on helping decisions appear to put participants into a mindset different from what they would experience in real life. Though it is unclear whether social desirability bias was responsible for the observed differences in Balboa (2023), using social desirability as the target of metacognitive monitoring provides a way to examine whether it is acting on hypothetical helping decisions. Previous research examining its role in survey research have recommended strategies such as creating items where all options are equally desirable (Nederhof, 1985), under-emphasizing social desirability of options (King & Bruner, 2000; Fisher & Katz, 2000), asking participants to take the perspective of another individual (Norwood & Lusk, 2011), and stressing the importance of honesty in responses (Gordon, 1987) to manipulate socially desirable responding with varying degrees of success. More recently, the use of honesty priming via an honesty-related word task prior to the target experimental task has been suggested as a way to reduce socially desirable responding (Vinski & Watter, 2012), but this method has not replicated (Pashler et al., 2013).

Metacognitive monitoring strategies provide a way to more directly test the potential effects of social desirability on survey responding by making participants explicitly aware of its effect. The current study additionally utilized novel exploratory metacognitive prompting

methods to try and make participants aware of social desirability bias—rather than accuracy—before responding to helping items. Cueing participants to reflect on the effects of social desirability rather than assessing the accuracy of their responding provides a new potential way to use metacognitive strategies to investigate strategies for mitigating that bias.

Relatively few studies utilize metacognition as a goal-setting method to induce metacognitive monitoring without a quantitative performance goal, but goal-setting has also been found to be a successful method of inducing metacognitive monitoring throughout a task in order to increase performance (Son & Schwartz, 2002). Further, implementation intentions, which differ from goal-setting in that they ask participants not only what their final task outcome will be but how they achieve it, has been found to aid in target performance (Gallo et al., 2009). These findings have significant implications for hypothetical social decision making paradigms, in which participants are asked to respond honestly, but nonetheless might fall into socially desirable response patterns. Utilizing metacognitive monitoring strategies to draw attention to those socially desirable impulses and commit to combatting them could thus be a novel and effective way to avoid biased responding in hypothetical research paradigms. The focus of Study 2 was thus to adapt a metacognitive prompt task, initially designed to increase correct responding, to instead decrease the potential effect of socially desirable responding by asking participants to reflect on the goal of not answering in a biased way. The effects of different metacognitive prompts were examined directly, and the probability estimates were additionally be compared to the field study from Balboa (2023).

Chapter 4 - Likelihood of Reciprocation

Also of interest in each study were the potential effects of welfare valuation and empathic concern on patterns of helping decisions. Within the altruistic decision making literature there are theoretical debates as to the motive behind acting to help another at a cost to oneself. One theoretical position suggests that altruistic decisions are driven by experienced empathy toward another person. According to this perspective, for altruistic action to occur, the desire to help must be evoked by empathic merging with the individual in need of assistance (Batson, 1991). By this account, for altruistic helping to occur, sufficient empathy must be evoked in the helper to match the magnitude of the help to be offered. Any personal gain, such as reputation benefits or reciprocated help in the future, is then a potential benefit but not a requirement for acting. Support has been offered for this hypothesis in the form of brain imaging studies that have shown an association with empathy-related activation and the hypothetical decision to offer costly help to another in need (Hein et al., 2010). It is not yet clear, however, if empathy serves as the sole motivator for costly helping, or if there are other potential factors at play. In fact, a prevailing rival theory of helping posits that self-other merging, which involves seeing oneself in the person in need of help and which does not necessarily evoke empathy, is what is needed to motivate costly helping (Neuberg et al., 1997). By this account, perspective-taking is the main motivator of helping above the experience of empathy. Previous research has supported the role of self-other merging (hereafter referred to as “oneness”) along with empathy in helping intentions, especially when a target individual is in one’s ingroup (Stürmer et al., 2006). This perspective has been repeatedly contested by proponents of the empathy-altruism hypothesis, however, which offers evidence of empathy causally mediating the effect of oneness on helping, thus reducing the impact of oneness on costly helping decisions (Batson et al., 1997). Thus, the

effects of empathy and oneness on decisions to help others, as well as their potential interaction, are currently unclear. The current studies provided an altruistic paradigm that is ideal for investigating whether altruistic action is predicted by empathy, self-other merging, or a combination of the two.

An alternative theoretical framework based on the concept of reciprocal altruism suggests that costly helping can be predicted to occur when one expects the beneficiary to be able to reciprocate that help in the future (Trivers, 1971). According to reciprocal altruism theory, it is advantageous for us to develop a sensitivity toward people with whom we might have future interactions, as they have the potential to become regular cooperative partners. To determine whether someone might be a regular and beneficial cooperative partner, we must have a cognitive system that recognizes cues associated with mutually beneficial cooperative relationships (Tooby & Cosmides, 1996). Cues to future cooperation can include willingness to help, ability to help, and likelihood of repeated future interactions, among others (Cosmides & Tooby, 1992; Delton et al., 2011). When summed and weighted, these cues of reciprocation potential, as well as the potential costs and benefits to both parties, comprise an evaluation of how much an individual values another individual relative to themselves, called a welfare tradeoff ratio (henceforth WTR) (Delton & Robertson, 2016; Sznycer et al., 2019). Using this internal calculation, we make the decision to act at a cost to ourselves based on an assessment of how much we are valued by the person we are preparing to help and how much we value them. If we determine that a given person is someone who values our welfare to a similar extent that we value theirs, and if we know (or assume) that they are willing and able to reciprocate aid in the future, we're more likely to offer our own aid (Delton & Robertson, 2016).

Welfare tradeoff ratio calculation has been utilized largely in repeated measures paradigms, in which another individual's valuation of the participant can be gleaned from the actions that they take in subsequent tasks (e.g., Smith et al., 2017). In one-shot designs, however, participants still often choose to provide costly help despite selfishness being the most beneficial choice. Some accounts suggest that our general tendency to offer assistance to strangers could be an evolutionary adaptation that was historically advantageous in smaller, tight-knit communities (Simpson & Beckes, 2010). Others suggest that it is beneficial to provide help to others, especially those we know we will see again, because it might raise our reputation with other members of the group and lead to later prosocial behavior being directed back toward us (Nowak & Sigmund, 2005, Delton et al., 2011, Delton et al., 2023, Sznycer et al., 2019). Thus, while helping strangers poses a risk of potentially expending time or resources for someone who might not reciprocate, the potential indirect benefits could outweigh those risks. The risks are then further depleted by a general sensitivity to cues of reciprocation and WTR calculation, which allow us to more efficiently hedge our bets when offering help at a cost to ourselves, even with limited information about the other individual. The one-shot design of the current studies thus provides an opportunity to examine how baseline WTR toward a potential cooperative partner—and in Study 3, manipulated WTR—affects helping decisions that are not informed by a history of cooperation with another individual.

An unexplored direction in Balboa (2023) was the extent to which perceived valuation might be playing a role in helping decisions that differ in cost to the helper and benefit to the recipient in one-shot interactions. Previous research has examined the interaction of WTR and costly helping (Smith et al., 2017) as well as WTR and expected benefit (Forster et al., 2017). In the Smith et al. (2017) study, participants played Cyberball with research assistants who could

exclude them or make the more costly decision to include them, which was found to be related to higher WTR and higher levels of subsequent cooperation. Forster et al. (2017) had participants report how they would feel upon receiving different forms of aid from different relations and found that a participant's baseline WTR toward the other individual somewhat moderated the relationship between the benefit of the aid and gratitude felt toward that person. In both of the above studies, however, there were either multiple interactions with the target individual, or that individual was a known relation to the participant (with the exception of one stranger condition in Forster et al.). Further, while both studies utilized WTR and costs and benefits respectively, neither had conditions representing different combinations of costs and benefits, providing a way for the current study design to add to the existing WTR literature.

In Balboa (2023), an attempt was made to investigate cues to WTR with an ingroup/outgroup manipulation wherein research assistants wore either the T-shirts of the university at which the experiment was taking place or their rival university. The T-shirt manipulation was designed to serve as a cue of both ingroup/outgroup affiliation and likelihood of encountering that individual again, which was predicted to alter perceived social closeness to the target individual and thus willingness to provide costly help (Rachlin & Locey, 2011). Per the WTR literature, implied likelihood of seeing the target individual again should also indicate whether that individual could reciprocate help in the future, which might in theory alter a perceived WTR. That ingroup/outgroup manipulation was not strong enough to produce an effect, however, due potentially to context (a university student union in which there might have been a general norm of reciprocity) and strength of the ingroup/outgroup cue (T-shirts from schools under 100 miles apart, which might not have truly cued likelihood or unlikelihood of encountering someone again). The aim of Study 3 was thus to introduce a manipulation of

welfare valuation based on more explicit environmental cues of likelihood of future reciprocation with a stranger. This detail is of note in that most of the WTR research to date has used specific existing relationship pairs (e.g., money allocation between oneself and a named friend) where a given WTR has been formed based on previous interactions. The current study, however, will continue to utilize the one-shot interaction paradigm used in Studies 1 and 2 to provide further information on how individuals initially value the strangers that often characterize helping study settings. Measuring a participant's welfare tradeoff ratio toward the hypothetical other in such studies provides a way to represent the cognitive processes involved in making the decision to help someone at a cost to oneself.

While Studies 1 and 2 included a measure of WTR, empathy, and oneness to assess the general effects of those factors on the decision to help, Study 3 aimed to actively manipulate the extent to which participants valued and empathized with the hypothetical individual in the helping scenarios. To that end, manipulations of the location of each helping scenario were utilized in order to lower or raise valuation of the hypothetical individual in need of help based on likelihood of encountering them again. Theoretically, interacting in more transient locations should decrease the likelihood of future interactions and therefore the possibility of receiving reciprocated help, thus lowering the incentive to provide help to a stranger in that location. Likewise, a location where an individual could expect to regularly be and interact with the same individuals should raise the likelihood of future reciprocation and thus incentivize helping. These manipulated locations were then compared to stimuli set in the same neutral location as the Balboa (2023) studies to provide a control and determine whether participants have a baseline WTR that affects helping decisions regardless of likelihood of future encounters. Thus, whereas Studies 1 and 2 provided information on the baseline extent to which participants value the

hypothetical other in the helping tasks, Study 3 sought to determine whether that baseline valuation of a stranger could be altered in a hypothetical helping task and whether that alteration might influence responding.

Chapter 5 - Research Objectives

The current studies, when taken together, aimed to investigate which forms of hypothetical survey stimuli produced patterns of results that mirror previously collected field study data, as well as test whether novel manipulations of other valuation and metacognitive reflection can alter hypothetical survey responding. Study 1 served as an evaluation of the effects of different stimuli on indications of behavioral intentions and determinant of the stimuli that would be used in the subsequent studies. Study 2 attempted to manipulate participant responding that might be affected by social desirability bias using metacognitive reflection training prior to completing the helping task. Finally, Study 3 attempted to manipulate participants' valuation of the hypothetical other in the helping task to determine whether baseline WTR could be affected by study context and whether this effect might alter patterns of responding.

Goals of the Present Studies

- Provide a comparison of hypothetical stimuli types to determine which one(s) produce results that most closely resemble the field study results obtained in Balboa (2023).
- Evaluate the effects of metacognitive intervention strategies on response patterns in a prosocial task.
- Evaluate the role of baseline WTR estimates on the decision to help another person in a one-shot paradigm.
- Determine whether manipulations of stimulus setting interact with WTR to influence the likelihood of helping others.

Chapter 6 - Present Studies

Study 1: Hypothetical Stimuli Comparison

Participants

Power analysis revealed that to detect an effect size of 0.25 at 80% power with an alpha error rate of 20%, 107 participants would be necessary for each stimulus condition regression model (Faul et al., 2009). The effect size of 0.25 was determined prior to Balboa (2023) by estimating effect sizes from Pilliavin, Pilliavin, & Rodin (1975) and West and Brown (1975), who both elicited help from strangers in naturalistic settings. Based on recreations of the respective data, both studies were estimated to have achieved moderate effect sizes (0.25).

Participants were recruited from Amazon Mechanical Turk using CloudResearch and monetarily compensated for survey completion (Litman et al., 2017). Data collection, using the Qualtrics survey platform, was conducted in three stages that concluded when a minimum of 110 participants who had successfully completed English competency and attention checks had been exposed to each stimulus condition. In total, 519 responses were collected, and after eliminating participants who had failed the English competency check, attention checks, or completed less than 50% of the survey, 330 participants remained. When separated by stimulus condition, the static image sample had 110 participants (Average age = 46, 48% women, 52% men), as did the third person video sample (Average age = 43, 44% women, 55% men, <1% undisclosed) and the first person video sample (Average age = 42, 56% women, 43% men, <1% undisclosed).

Measures and Procedure

Helping Conditions

In Balboa (2023), four behaviors were selected from 25 behaviors originally gathered from McGuire (1994). In the McGuire (1994) study, participants rated the costs associated with

different helping behaviors. In a pilot study for Balboa (2023), participants rated the costs to the helper and benefits to the recipient of help. Behaviors were selected based on pilot rated costs to the helper (C_{self}) and benefit to the recipient (B_{other}). Four combinations of costs and benefits (high C_{self} /low B_{other} , low C_{self} /low B_{other} , high C_{self} /high B_{other} , and low C_{self} /high B_{other}) were selected for use in the study. Of note, ratings of “high” and “low” cost or benefit were not necessarily statistically higher or lower than all other behaviors but rather were compared to sample mean cost and benefit ratings. High and low cost behaviors were defined as those behaviors that had an average rating above or below the overall average cost rating respectively and were feasible to enact in a campus setting (i.e., behaviors such as jumping a car or giving a ride to a stranger, which would require the acquisition of a vehicle and potential risk to research assistants, were excluded). Returning a wallet or money was rated as low C_{self} and high B_{other} , picking up a dropped paper or other item was rated as low C_{self} and low B_{other} , asking for money to pay for lunch was rated as high C_{self} and high B_{other} , and asking to borrow someone’s phone was rated as high C_{self} and low B_{other} . Due to practical constraints, returning a wallet or money was amended to picking up and returning a dropped dollar, and asking for money to pay for lunch was amended to asking for a dollar to buy a snack. Table 6.1 provides a summary of each behavior and its associated cost and benefit designation.

Table 6.1. Behaviors utilized in Balboa (2023) and associated costs to self and benefit to other.

Behavior	Cost to Self	Benefit to Other
Picking up a dollar	Low	High
Picking up a dropped item (pen)	Low	Low
Asking for a dollar	High	High
Asking to borrow a phone	High	Low

Balboa (2023) used a coded response system based on the one used in a similar field study by Hauser et al. (2014), wherein participants could rate their probable response in that situation. In the current design, three response options were available to participants: they would not help (recorded as a 0), they would attempt to help in some way (recorded as a 1), or they would definitively help the target individual (recorded as a 2). For each response option, participants were given an example of the type of behavior that would correspond to that option. All four helping scenarios and their associated response option examples can be seen in Table 6.2.

Table 6.2. Response options for helping scenarios in Balboa (2023).

Scenario	Example given in no help option	Example given in attempt to help option	Example given in definitively help option
Picking up a dollar	Not bring them the dollar, not tell them they dropped the dollar, take the dollar for yourself	Tell the person they dropped the dollar but not pick it up and bring it to them	Pick up the dollar and return it
Picking up a dropped item (pen)	Not bring them the pen, not tell them they dropped the pen, take the pen for yourself	Tell the person they dropped the pen but not pick it up and bring it to them	Pick up the pen and return it
Asking for a dollar	Not give them any money	Offer to use an app such as Venmo	Give them a dollar, give them more than one dollar, buy them food
Asking to borrow a phone	Not allow them to use your phone	Have the desire to allow them to use your phone, but you don't carry it with you	Allow them to use your phone

Stimuli Type

Three different types of stimuli were used to determine whether more dynamic or immersive stimuli produce more realistic patterns of decisions. In the hypothetical decision condition of Balboa (2023), participants were presented with a vignette of one of the above scenarios along with a photo of a research assistant in a student union building and asked the extent to which they would help that individual, similar to methodology utilized in West and Brown (1975). The photo stimulus condition of Study 1 utilized the same methodology with the same actor featured in every condition (See Figure 6.1).

If this person dropped a pen in front of you in a public place and did not realize they dropped it, would you help them?



- ☐ I would help this person (e.g., pick up the pen and return it)
- ☐ I would try to help this person (e.g., tell the person they dropped the pen but not pick it up and bring it to them)
- ☐ I would not help this person (e.g., not bring them the pen, not tell them they dropped the pen)

Figure 6.1. An example question from the static condition of Study 1. Participants were presented with an image of the actor with an accompanying vignette describing the situation in which she would be needing help.

For the two video conditions, the stimuli differed between participants, but the response design remained the same. In the third person video condition, participants watched a video of the target individual engaging in one of the field behaviors from Balboa (2023) with an actor as if watching the scene in a movie or television show. In the first person video condition, participants saw the target individual approach and address the camera directly for active helping conditions or pass in front of the camera for the passive helping conditions (See Figure 6.2).



Figure 6.2. (Top) A still frame of the third person video condition where the target individual asks another actor to borrow their phone. (Bottom) A still frame of the first person video condition which the target individual approaches the camera to ask to borrow their phone.

Following the presentation of the video, participants were presented with the same three helping response options. For all stimuli in Study 1, the helping behaviors were enacted in a public building away from other individuals. In order to replicate the methods used in Balboa (2023), each participant saw only one of the four helping conditions and provided only one helping response. The similarity in methods allowed for a subsequent direct comparison of the results found in the 2023 field study.

Valuation Measures

Some theories of helping behavior suggest that empathy is the main driving force behind helping others at a cost to oneself, and it does so through the process of empathy merging, in which taking the perspective of another increases one's empathy and therefore willingness to help another person at a cost to themselves (Batson et al., 1997; Batson et al., 2007). An alternative explanation posits that altruistic behavior arises as a result of self-other merging, in which an individual experiences a sense of "oneness" with another individual (Neuberg et al., 1997). Aron et al. (1992) developed the Inclusion of Other in the Self (IOS) scale, which is a single-item measure utilized to measure perceived closeness to another individual that has been found to have strong correlations with other measures of social and emotional intimacy. To account for the potential difference between oneness and felt empathy suggested by Neuberg et al., the Perth Empathy Scale (PES) (Brett et al., 2023) was also administered as a general measure of how empathetic an individual tends to be.

Previous research has also found a strong connection between cooperative decisions and WTRs. The extent to which someone values someone else's welfare relative to their own, meaning they would trade their own wellbeing for the benefit of someone else, can be measured using an adapted discounting task that allows participants to make decisions to either keep a

specified amount of money for themselves or give a different specified amount to another individual (Delton, 2010). Scoring of this task provides a measure of an individual's WTR toward another person, either real or hypothetical. The WTR task used in the present studies was a 10-item version where the amount of money given to the other person was held constant while the amount kept by the participant varied (Sznycer et al., 2019). WTR scores were calculated via averaging the value at which participants began keeping money for themselves (referred to as a "switch point") and the value directly preceding it, then dividing by the value received by the other person. Studies utilizing varying versions of this task have found strong relationships between WTR and emotions related to cooperation, such as gratitude (Forster et al., 2017; Smith et al., 2017). Further research has investigated the relationships between social value, gratitude, magnitude of benefits, and WTR (Forster et al., 2022), but has yet to establish a formal model of how these factors influence each other. The WTR task was thus administered following the helping task with participants being asked to imagine the individual from the previous task as their cooperative partner. Administering the WTR task after the helping task was to ensure that the WTR task did not predispose participants to value the assistant in the helping task. The IOS scale was also administered after the helping task, with the order of presentations of the IOS and WTR randomized, as they both pertain specifically to the other individual in the helping scenario. The PES scale was always administered last, as it is a general dispositional scale.

Summary of Hypotheses

Stimuli Type

Previous research has found that presenting participants with different points of view can alter the information they receive about a situation (Storms, 1973) and that the more immersive video stimuli is, the closer the results are to real life scenarios (Rossetti & Hurturbia, 2020).

Study 1 thus sought to investigate the effect of perspective as well as static versus dynamic stimuli on helping responses. Following previous research, **Hypothesis 1.1** predicted that both first and third person videos would produce more realistic decisions relative to the photo condition and **Hypothesis 1.2** further predicted that first person video would produce more realistic decisions relative to third person videos.

Valuation

Competing theoretical hypotheses predict differential predictive power of each valuation measure. **Hypothesis 1.3**, which favors WTR as the driver of altruistic action, predicted that WTR would be the strongest predictor of helping likelihood, with higher WTR predicting a larger relative probability of helping. **Hypothesis 1.4**, which favors the empathy-altruism theory, predicted that both empathy and oneness felt with the hypothetical individual should be the strongest predictors of helping likelihood, such that a combination of high empathy and high perceived oneness would predict a larger relative probability of helping. **Hypothesis 1.5**, in support of the Neuberg et al. position, predicted that only oneness felt with the target individual should be the strongest predictor of helping likelihood, such that only higher perceived oneness would predict a larger relative probability of helping.

Results

In order to model the different patterns of results generated by different helping solicitation behaviors, stimuli type, and valuation measures, three ordinal logistic regressions including main effects of behaviors, WTR, empathy, oneness, and the interaction between empathy and oneness were run to predict the likelihood of a participant choosing to definitively help relative to attempting to help or not attempting at all. To better visualize and interpret the patterns of responses between stimuli type, a separate regression was run for each one and

comparisons across stimuli occurred through exploratory multilevel modeling. Across all of the current studies, ordinal logistic regression was used due to its ability to allow participant responses to be modeled along a latent construct that ranges from 0 (no help) to 2 (definitive help) per the response scale used in the study and determines the relative likelihood of each of the three outcomes occurring for each helping scenario.

Static Image

In order to investigate the effects of different solicitation behaviors as well as perceived WTR, empathy, and oneness toward the target individual, an ordinal logistic regression model was run using the four-level variable of behavior as well as WTR, empathy, oneness, and the interaction of empathy and oneness to predict likelihood of helping. Prior to interpretation of results, a Brant test of parallel lines was run and indicated that the assumption of parallel lines was upheld, which suggests that the relationship between the predictors and outcome are constant across levels of the outcome and therefore an ordinal regression is statistically appropriate. (Brant, 1990).

Overall model effects (Table 6.3) revealed an effect of behavior type ($L-R X^2 = 14.45, p = .002$), but no effects of WTR, empathy, or oneness felt toward the target individual on the likelihood of helping (See Table 6.4 for model estimates). Post-hoc comparisons indicated that in the condition that involved picking up a dropped dollar, participants estimated being significantly more likely to provide help than in the condition that involved giving a dollar for someone to use a vending machine ($z = -2.77, p = .028$) (See Table 6.5 for all comparisons, Figure 6.3 for differences in helping probability by behavior).

Table 6.3. Overall model effects for the ordinal logistic regression predicting helping likelihood for the static image condition.

	Df	L-R X^2	Prob > X^2
Behavior	3	14.45	.002
WTR	1	3.80	.051
Empathy	1	0.58	.447
Oneness	1	3.15	.076
Empathy*Oneness	1	0.01	.912

Table 6.4. Regression estimates for the ordinal logistic regression predicting helping likelihood for the static image condition.

	Estimate	SE	X^2	<i>p</i>
Intercept (0)	-3.06	0.47	43.23	< .001
Intercept (1)	-1.12	0.33	11.73	.001
Ask for a dollar	1.19	0.42	8.11	.004
Ask to borrow phone	0.63	0.43	2.21	.137
Drop a dollar	-1.87	0.80	5.49	.019
WTR	-1.00	0.55	3.04	.081
Empathy	-0.01	0.02	0.59	.442
Oneness	-0.37	0.21	3.03	.082
Empathy*Oneness	0.00	0.01	0.01	.911

Table 6.5. Tukey’s post-hoc comparisons for the ordinal logistic regression predicting helping likelihood for the static image condition.

Comparison	Estimate	<i>SE</i>	<i>z</i>	<i>p</i>
Drop a pen – Ask for a dollar	1.14	0.61	1.89	.247
Drop a pen – Ask to borrow phone	0.58	0.63	0.93	.788
Drop a pen – Drop a dollar	-1.92	1.14	-1.69	.332
Ask for a dollar – Ask to borrow phone	-0.55	0.55	-1.02	.747
Ask for a dollar – Drop a dollar	-3.05	1.10	-2.77	.028
Ask to borrow phone – Drop a dollar	-2.50	1.11	-2.26	.107

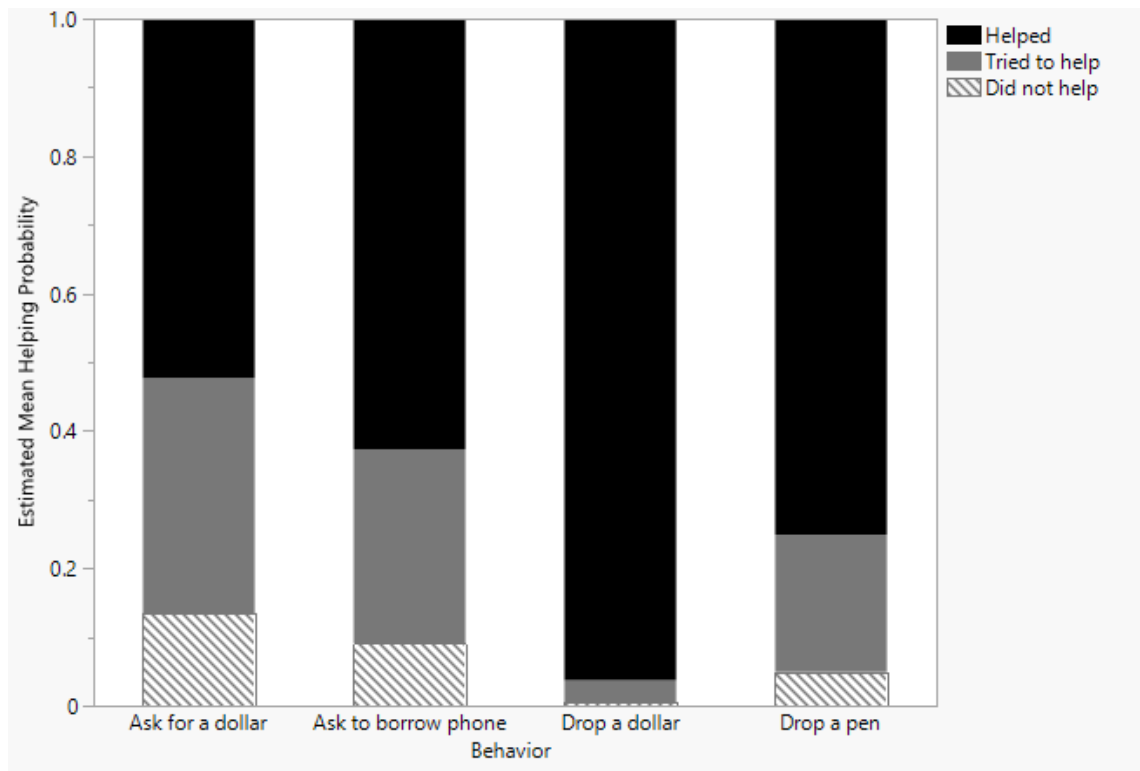


Figure 6.3. Estimated mean helping probability for each of the four help soliciting behaviors in the static image condition. Bar size corresponds with the relative probability of each response with larger bars representing a larger relative probability of choosing that response.

Third Person Video

For the third person video condition, the same ordinal logistic regression was run using four levels of helping solicitation behavior, WTR, empathy, oneness, and the interaction of oneness and empathy as predictors of helping likelihood. Once again, a Brant test of the assumption of parallel lines was run and it was found that the assumption held.

Overall model effects (Table 6.6) again revealed an effect of behavior type (L-R $X^2 = 14.45$, $p = .002$) (See Table 6.7 for model estimates). Contrary to the static image condition, there were four significant differences within the behavior types. Compared to returning a dropped dollar, participants had a significantly lower estimated probability of returning a dropped pen ($z = 2.05$, $p = .031$), giving a dollar for the vending machine ($z = -3.59$, $p < .001$), and lending their phone ($z = -2.60$, $p = .003$). Additionally, participants had a significantly higher estimated probability of returning a dropped pen than giving a dollar for the vending machine ($z = -1.53$, $p = .050$) (See Table 6.8 for all comparisons, Figure 6.4 for differences in helping probability by behavior). In another departure from the static image condition, there was also a main effect of perceived oneness, with higher levels of oneness predicting a higher likelihood of helping (See Figure 6.5 for main effect of oneness).

Table 6.6. Overall model effects for the ordinal logistic regression predicting helping likelihood for the third person video condition.

	Df	L-R X^2	Prob > X^2
Behavior	3	26.99	<.001
WTR	1	0.25	.614
Empathy	1	0.36	.548
Oneness	1	12.54	.001
Empathy*Oneness	1	0.64	.422

Table 6.7. Regression estimates for the ordinal logistic regression predicting helping likelihood for the third person video condition.

	Estimate	<i>SE</i>	X^2	<i>p</i>
Intercept (0)	-1.94	0.31	38.38	<. .001
Intercept (1)	-0.42	0.25	2.77	.096
Ask for a dollar	1.53	0.39	15.18	<. .001
Ask to borrow phone	0.54	0.35	2.43	.119
Drop a dollar	-2.06	0.52	15.87	<. .001
WTR	-0.24	0.46	0.27	.600
Empathy	-0.01	0.01	0.39	.531
Oneness	-0.06	0.20	9.98	.002
Empathy*Oneness	-0.01	0.01	0.66	.417

Table 6.8. Tukey's post-hoc comparisons for the ordinal logistic regression predicting helping likelihood for the third person video condition.

Comparison	Estimate	<i>SE</i>	<i>z</i>	<i>p</i>
Drop a pen – Ask for a dollar	-1.53	0.60	-2.58	.050
Drop a pen – Ask to borrow phone	-0.55	0.54	-1.02	.741
Drop a pen – Drop a dollar	2.05	0.75	2.75	.031
Ask for a dollar – Ask to borrow phone	-0.99	0.55	-1.79	.280
Ask for a dollar – Drop a dollar	-3.59	0.81	-4.41	<. .001
Ask to borrow phone – Drop a dollar	-2.60	0.74	-3.50	.003

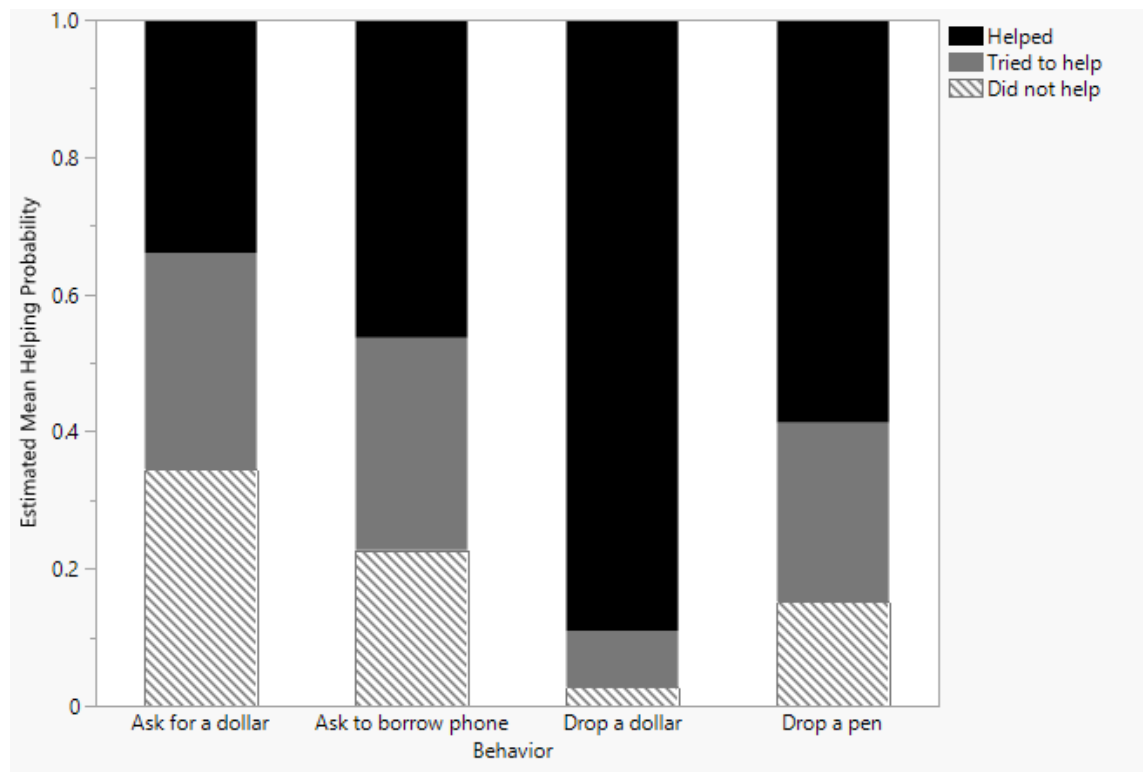


Figure 6.4. Estimated mean helping probability for each of the four help soliciting behaviors in the third person video condition. Bar size corresponds with the relative probability of each response with larger bars representing a larger relative probability of choosing that response.

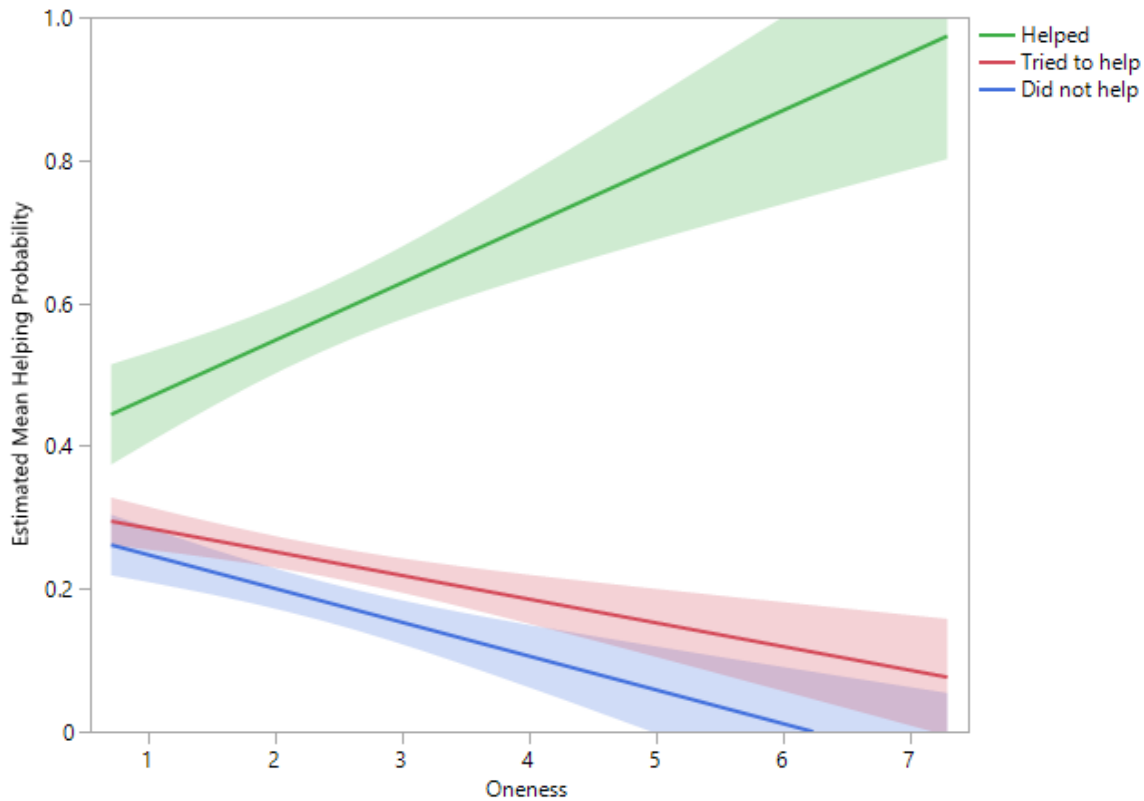


Figure 6.5. Estimated mean helping probability by level of perceived oneness with the target individual in the third person video condition. Each line represents the change in probability as oneness increases for each response type. As oneness increases, the likelihood of choosing to help increases, while the likelihood of both trying to help and not helping decreases.

First Person Video

For the first person video condition, the same ordinal logistic regression was run with helping solicitation behavior, WTR, empathy, oneness, and the interaction of empathy and oneness predicting helping likelihood. Once again, the Brant test of parallel lines indicated that the assumption had been met.

Overall model results were similar to those for the third person video condition, with a main effect of behavior type (L-R $X^2 = 9.92$, $p = .019$) and oneness (L-R $X^2 = 5.18$, $p = .023$). (See Table 6.9 for model statistics, Table 6.10 for model estimates, Figure 6.6 for main effect of behavior type, and Figure 6.7 for main effect of oneness). For the first person video condition,

however, there was only one significant difference between behaviors, with significantly lower estimates of helping probability for giving a dollar for the vending machine than returning a dropped dollar ($z = -2.01$, $p = .020$) (See Table 6.11 for all comparisons).

Table 6.9. Overall model effects for the ordinal logistic regression predicting helping likelihood for the first person video condition.

	Df	L-R X^2	Prob > X^2
Behavior	3	9.92	.019
WTR	1	0.18	.670
Empathy	1	0.60	.439
Oneness	1	5.18	.023
Empathy*Oneness	1	0.01	.928

Table 6.10. Regression estimates for the ordinal logistic regression predicting helping likelihood for the first person video condition.

	Estimate	SE	X^2	p
Intercept (0)	-2.50	0.37	44.51	<.001
Intercept (1)	-0.95	0.27	12.56	<.001
Ask for a dollar	0.94	0.37	6.56	.010
Ask to borrow phone	0.25	0.36	0.49	.482
Drop a dollar	-1.07	0.46	5.41	.020
WTR	-0.20	0.49	0.17	.683
Empathy	-0.01	0.02	0.60	.440
Oneness	-0.47	0.21	4.81	.028
Empathy*Oneness	-0.00	0.01	0.01	.928

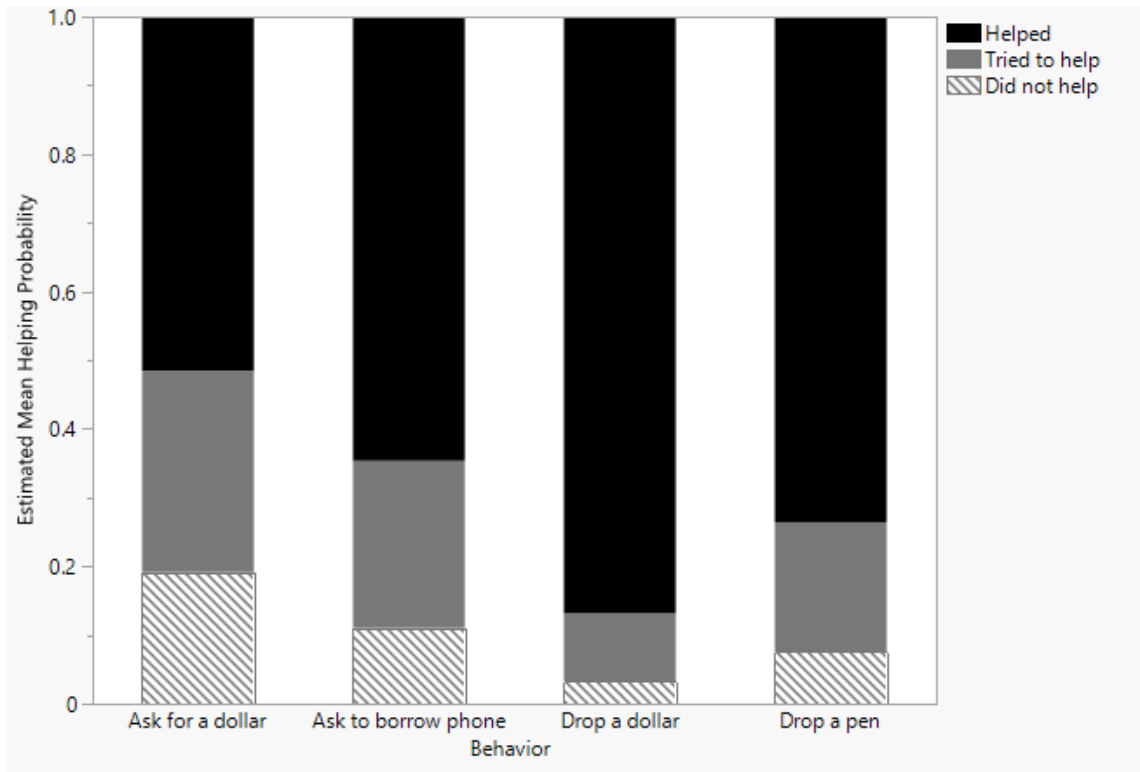


Figure 6.6. Estimated mean helping probability for each of the four help soliciting behaviors in the first person video condition. Bar size corresponds with the relative probability of each response with larger bars representing a larger relative probability of choosing that response.

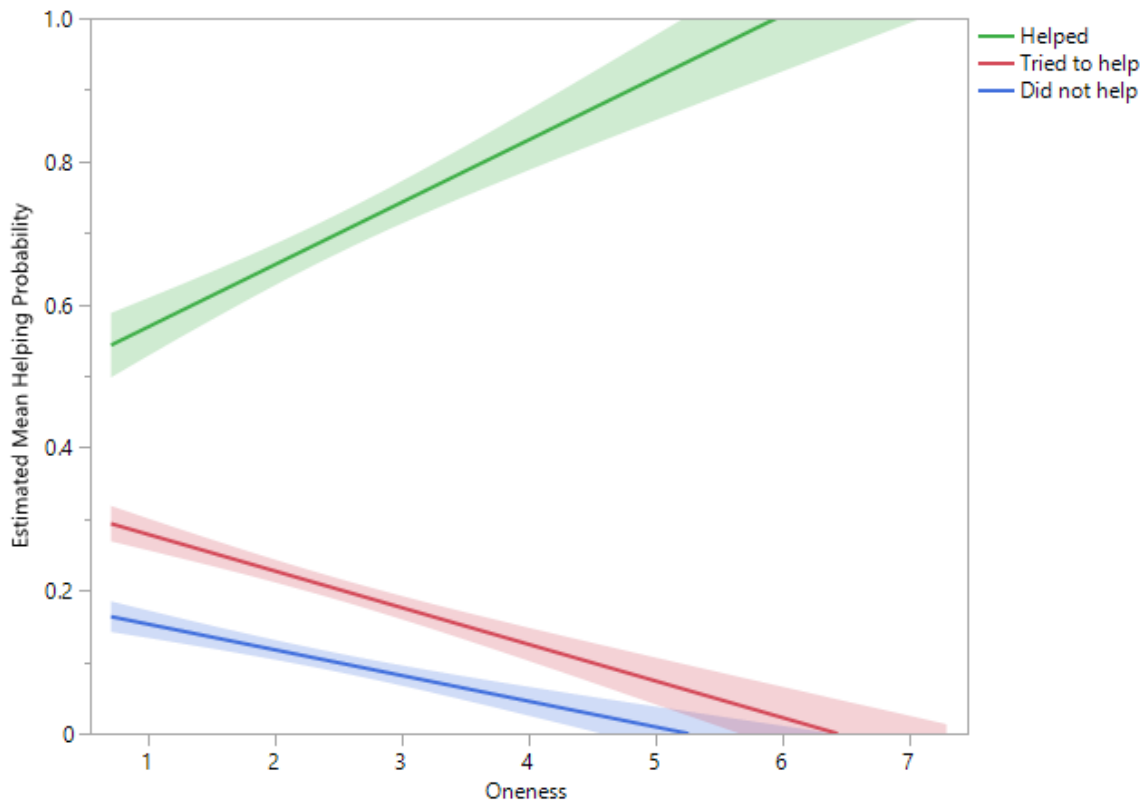


Figure 6.7. Estimated mean helping probability by level of perceived oneness with the target individual in the first person video condition. Each line represents the change in probability as oneness increases for each response type. As oneness increases, the likelihood of choosing to help increases, while the likelihood of both trying to help and not helping decreases.

Table 6.11. Tukey’s post-hoc comparisons for the ordinal logistic regression predicting helping likelihood for the first person video condition.

Comparison	Estimate	<i>SE</i>	<i>z</i>	<i>p</i>
Drop a pen – Ask for a dollar	-1.06	0.64	-1.66	.346
Drop a pen – Ask to borrow phone	-0.38	0.62	-0.61	.928
Drop a pen – Drop a dollar	0.94	0.73	1.29	.571
Ask for a dollar – Ask to borrow phone	-0.68	0.56	-1.21	.621
Ask for a dollar – Drop a dollar	-2.01	0.69	-2.89	.020
Ask to borrow phone – Drop a dollar	-1.32	0.69	-1.92	.218

Exploratory Analysis

In order to investigate Hypotheses 1.1 and 1.2 statistically, an exploratory multilevel ordinal logistic regression was run on the combined data from the Balboa (2023) field study and all three conditions from Study 1. Due to the nature of collecting different samples, the results of this analysis cannot be interpreted as definitive truth, but they provide a way to approximate the similarities between the models by investigating each study as a fixed effect. As such, the multilevel ordinal logistic regression utilized helping solicitation behavior, the study the data was collected from, and their interaction as predictors of helping behavior and allowed the intercepts to vary per participant to account for base variance differences between samples.

To determine differences between the models, a Tukey's post hoc test was performed on the interaction between behavior and study to determine which models, if any, had conditions that significantly differed from the Balboa (2023) field study in their prediction of helping probability. It was found that while all three models were relatively statistically similar, the estimated helping probability in the pen dropping condition in the static image study significantly differed from that of the field study ($z = 3.45, p = .046$). In the third person video study, the estimated helping probability in the asking to borrow a phone condition was significantly different from that in the field study ($z = -1.91, p = .046$) (See Table 6.12 below for model estimates and Table in A.1 in Appendix A for all post-hoc comparisons). There were no significant differences in estimated helping probability for any of the behavior types in the first person study relative to the field study (Figure 6.8), leading to the first person perspective stimuli being used in subsequent studies.

Table 6.12. Multilevel ordinal logistic regression estimates from a model using study (2023 field results, static image, third person video, and first person video), helping solicitation behavior, and their interaction as predictors and allowing intercepts to vary by participant. More specific post-hoc comparisons by study and behavior can be found in Table A.1 in Appendix A.

	Estimate	<i>SE</i>	<i>z</i>	<i>p</i>
Intercept (0)	-1.84	0.19	-9.32	<.001
Intercept (1)	-0.69	0.13	-5.25	<.001
Ask for a dollar	-1.05	0.18	-5.55	<.001
Ask to borrow phone	0.09	0.18	0.50	.616
Drop a dollar	1.13	0.27	4.19	<.001
First person	0.28	0.19	1.40	.160
Third person	0.66	0.25	2.64	.008
Field study	-0.19	0.19	-0.99	.321
Ask dollar*First person	0.21	0.30	0.71	.477
Ask phone*First person	-0.33	0.31	-1.07	.283
Dollar drop*First person	-0.17	0.41	-0.41	.679
Ask dollar*Third person	-0.07	0.33	-0.21	.829
Ask dollar*Third person	-0.84	0.34	-2.44	.014
Dollar drop*Third person	0.83	0.61	1.35	.175
Ask dollar*Field study	-0.02	0.30	-0.06	.946
Ask phone*Field study	-0.65	0.30	-2.16	.031
Dollar drop*Field study	0.54	0.43	1.23	.217

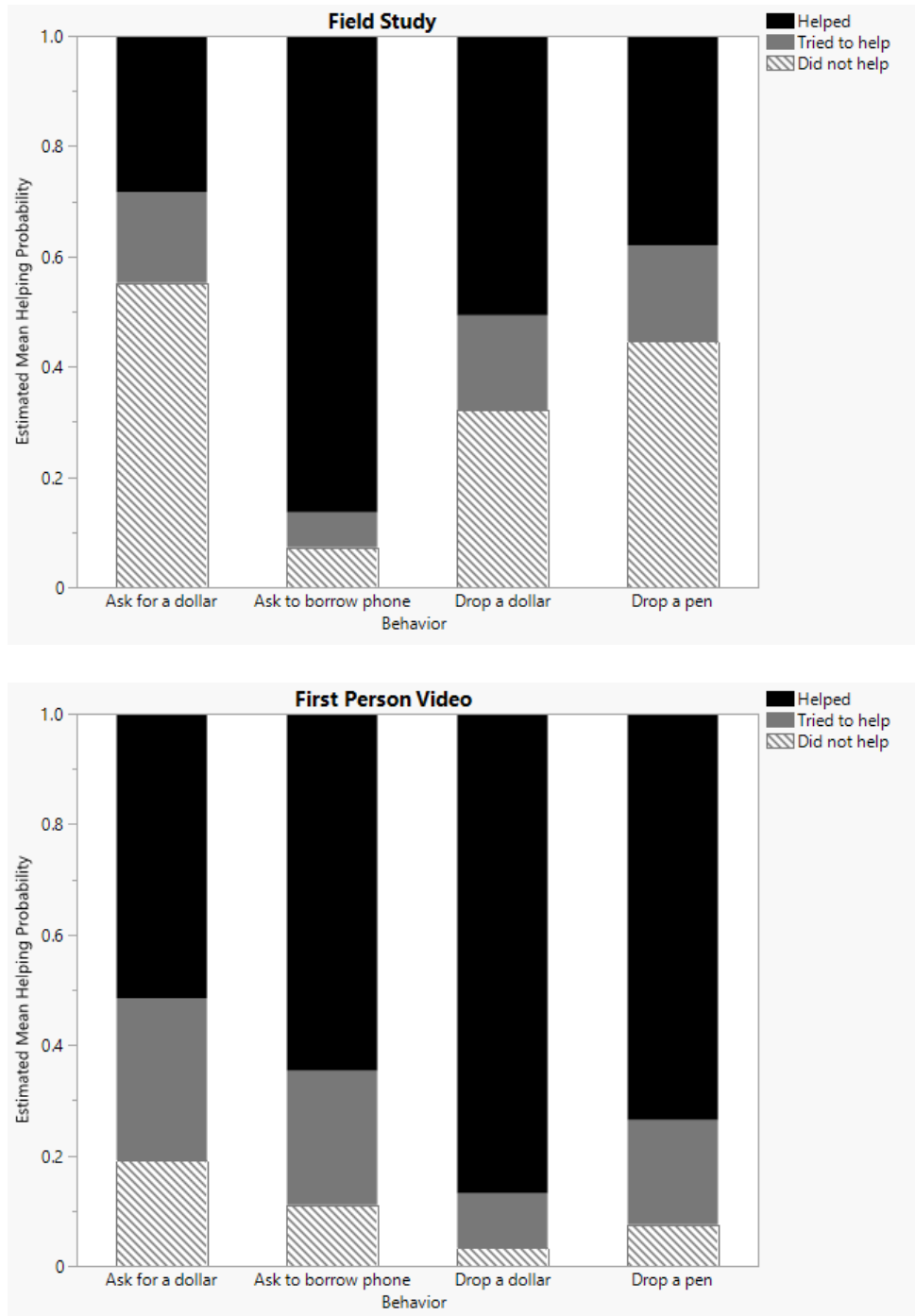


Figure 6.8. Estimated mean helping probability for each of the four help soliciting behaviors in the Balboa (2023) field study compared to the first person video condition from Study 1. Bar size corresponds with the relative probability of each response with larger bars representing a larger relative probability of choosing that response.

Discussion

The lack of significant differences in estimated helping probability across behaviors for the first person video study relative to the Balboa (2023) field study provides support for Hypothesis 1.2, which predicted that first person video would produce more realistic decisions relative to third person videos. Hypothesis 1.1, which predicted that both video conditions would produce results closer to the field study results than the static condition, was not as well supported given that both the third person video and static image conditions had significant deviations from the effects found in the field study. Though the exploratory analysis is limited due to lack of random assignment, the random effects structure of the multilevel model allowed for flexibility in accounting for variance due to systematically biased samples. As such, the model provides a rough approximation of differences between the studies that suggests that concurrent with previous research, first person video was the best of the three stimulus options to use moving forward.

Regarding valuation measures, support was found only for Hypothesis 1.5, which predicted that oneness felt with the hypothetical individual from the helping scenario would have the strongest ability to predict helping likelihood. Hypothesis 1.3, which predicted WTR as a driver of altruistic action, found no support in that no model had a significant effect of WTR on helping likelihood. Likewise, Hypothesis 1.4, which supported the combined empathy-altruism effect, was not supported by any of the models. The lack of effects of either WTR or empathy on helping likelihood suggest that these factors might not be at play in a one-shot helping interaction. A potential reason for the effect of oneness over both WTR and empathy could be partly due to the nature of the one question oneness assessment; the IOS scale asks participants to make a brief judgment of how close they feel to the hypothetical other in the moment.

Conversely, the WTR task asks participants to make repeated judgments related to their value of the hypothetical other outside of the helping context, while the PES scale provides a general measure of empathy. To continue investigating whether this result is consistent in this experimental paradigm, the same scales were utilized in subsequent studies and analyzed similarly to build on the results from the current study.

Study 2: Metacognitive Prompting Influence

Participants

Prior to analysis, power analysis revealed that to detect an effect size of 0.25 at 80% power with an alpha error rate of 20%, 139 participants would be necessary for a model utilizing the three level categorical variable of metacognitive prompt type and three valuation measures (Faul et al., 2009).

Participants were recruited from Amazon Mechanical Turk using CloudResearch and monetarily compensated for survey completion (Litman et al., 2017). Data collection, using the Qualtrics survey platform, was conducted in four stages that concluded when a minimum of 140 participants who had successfully completed English competency and attention checks were collected. In total, 270 responses were collected, and after eliminating participants who had failed the English competency check, attention checks, or completed less than 50% of the survey, 152 participants remained (Average age = 44, 51% women, 48% men, <1% non-binary).

Measures and Procedure

Helping Conditions

The same four helping scenarios from Balboa (2023) were used in Study 2. Participants saw one of the four helping solicitation scenarios, which were presented in the form of first

person video per Study 1 results, then were presented with the valuation measures immediately afterward.

Valuation Measures

As in Study 1, the WTR task, as well as the IOS and PES scales were administered after the helping task to investigate the effect of different conceptions of other valuation on helping decisions. The WTR and IOS scales were presented in random order immediately following the helping task, followed by the PES.

Metacognitive Monitoring

Study 2 aimed to utilize metacognitive monitoring as a strategy to increase realistic responding rather than normative responding. Previous research conducted by Batha and Carroll (2007) found that presenting participants with instructions on how to engage in metacognitive monitoring increased normative responding in a decision making task. The current study used two novel modified versions of their metacognitive monitoring task to compare different potential methods of influencing patterns of realistic responding.

Each participant encountered either general metacognitive monitoring instructions, social desirability metacognitive monitoring instructions, or no prompt prior to the helping scenario task. In the general metacognitive monitoring condition, participants saw a version of Batha and Carroll's prompt that instructed them how to be aware of their reasoning and utilize this awareness to make a decision. This prompt was modified in a way that reflects the relative simplicity of the helping scenario relative to the decision making problems utilized in Batha and Carroll (2007). The social desirability metacognitive monitoring prompt exposed participants to a more heavily modified version of Batha and Carroll's task, wherein participants were asked to keep the social desirability factors that might be influencing their decision in mind and use that

information to inform their choices in the subsequent scenario. Following a timed presentation of the metacognitive instructions, participants answered three comprehension questions relating to the three main points of the instructions respectively and could not move on to the helping task until they had provided correct answers for all of the questions. In the control condition, participants saw only the basic instructions for the helping scenario task utilized in Study 1 with no test for prompt comprehension. The prompts for both metacognitive monitoring conditions can be found in Table 6.13 along with the original Batha and Carroll task for comparison below.

Table 6.13. Metacognitive monitoring prompts for the general and social desirability conditions with Batha and Carroll (2007) conditions for comparison.

Batha and Carroll (2007)	General Monitoring Condition	Social Desirability Condition
Translation	Translation	Translation
• Read the problem/question. • Ask yourself if you understand the problem – re-read until you do. • Identify and paraphrase the main information in the question/problem.	• Read the scenario. • Ask yourself if you understand the scenario. • Identify and paraphrase the main idea of the scenario.	• Read the scenario. • Ask yourself if you understand the scenario. • Identify and paraphrase the main idea of the scenario.
Integration	Integration	Integration
• Ask yourself what information you need to make a decision. • Ask yourself if you have all the information necessary to make a decision. • Ask yourself if you know how to integrate and organize the information.	• Ask yourself what information you need to make a decision. • Ask yourself if you have all the information necessary to make a decision. • Ask yourself if you know how to integrate and organize the information.	• Ask yourself what social values and norms would influence you to do in the scenario. • Ask yourself how those social norms and values might affect how you choose to respond to the scenario. • Ask yourself if you know how to decide what you would do independent of social norms and values.

Solution Execution	Solution Execution	Solution Execution
•Revise your computation to check for errors or missed information. •Ask yourself if you have made the right decision.	•Revise your decision based on errors or missed information. •Ask yourself if you have made the right decision.	•Revise your decision based on what you know of the influence of social norms and values. •Ask yourself if you have made the right decision.

Summary of Hypotheses

Following the previous findings regarding metacognitive monitoring and task performance, **Hypothesis 2.1** predicted that both metacognitive monitoring conditions would be stronger predictors of the relative likelihood of different helping behaviors than the control condition. Given the mixed results of honesty priming studies (see Pashler et al., 2013 and Vinski & Walter, 2012), the more exploratory **Hypothesis 2.2** predicted that the social desirability condition would be the strongest predictor of helping likelihood, such that the social desirability condition would predict a pattern of helping more consistent with the Balboa (2023) field study.

Results

Prior to analysis, comparisons of models of differing complexities were performed to determine an appropriate structure for analyzing the variables of interest. AIC comparison revealed that a model utilizing helping solicitation behavior type, location of video, their interaction, and the main effects of WTR, empathy, and oneness best fit the data. The AIC value for this model (274.87) was only slightly higher than that of a model including only all main effects (273.99) and lower than that of a more complex model including all two-way interactions (276.77). As such, analyses continued with the selected model, for which the Brant test of parallel lines was run and the assumption was held.

The overall model found main effects of helping solicitation behavior type (L-R $X^2 = 17.11$, $p = .001$) and oneness (L-R $X^2 = 10.40$, $p = .001$), but no effects of metacognitive prompt, WTR, or empathy (See Table 6.14 for model statistics, Table 6.15 for model estimates). As in the video conditions of Study 1, as perceived oneness with the target individual increased, the likelihood of helping increased (See Figure 6.9). Post-hoc analyses of behavior type found that giving someone a dollar for the vending machine had a lower expected probability of helping than both returning a dollar ($z = -3.33$, $p = .005$) and returning a pen ($z = -3.10$, $p = .010$) (See Figure 6.10 for differences in helping likelihood between behaviors, Table 6.16 for all post-hoc comparisons).

Table 6.14. Overall model effects for the ordinal logistic regression predicting helping likelihood utilizing helping solicitation behaviors, metacognitive prompt, WTR, oneness, empathy, and the interaction of behavior and prompt as predictors.

	Df	L-R X^2	Prob > X^2
Behavior	3	17.11	.001
Prompt	2	2.73	.255
Behavior*Prompt	6	11.12	.085
WTR	1	0.11	.737
Oneness	1	10.40	.001
Empathy	1	0.79	.373

Table 6.15. Regression estimates for the ordinal logistic regression predicting helping likelihood utilizing helping solicitation behaviors, metacognitive prompt, WTR, oneness, empathy, and the interaction of behavior and prompt as predictors.

	Estimate	SE	X^2	<i>p</i>
Intercept (0)	-0.30	0.87	0.10	.751
Intercept (1)	1.50	0.99	2.80	.094
Behavior (Ask for a dollar)	1.07	0.30	12.91	<.001
Behavior (Ask to borrow phone)	0.37	0.30	1.59	.208
Behavior (Drop a dollar)	-0.84	0.38	4.82	.028
Prompt (Metacognition)	0.19	0.25	0.57	.449
Prompt (Social desirability)	0.27	0.26	1.05	.307
Ask dollar*Metacognition	-0.94	0.41	5.28	.022
Ask dollar*Socia desirability	0.39	0.41	0.91	.341
Ask phone*Metacognition	-0.09	0.40	0.05	.826
Ask phone*Socia desirability	-0.04	0.42	0.01	.918
Dollar drop*Metacognition	-0.06	0.50	0.02	.902
Dollar drop*Socia desirability	0.66	0.48	1.88	.171
WTR	-0.12	0.32	0.12	.734
Oneness	-0.05	0.16	9.45	.002
Empathy	-0.01	0.01	0.80	.371

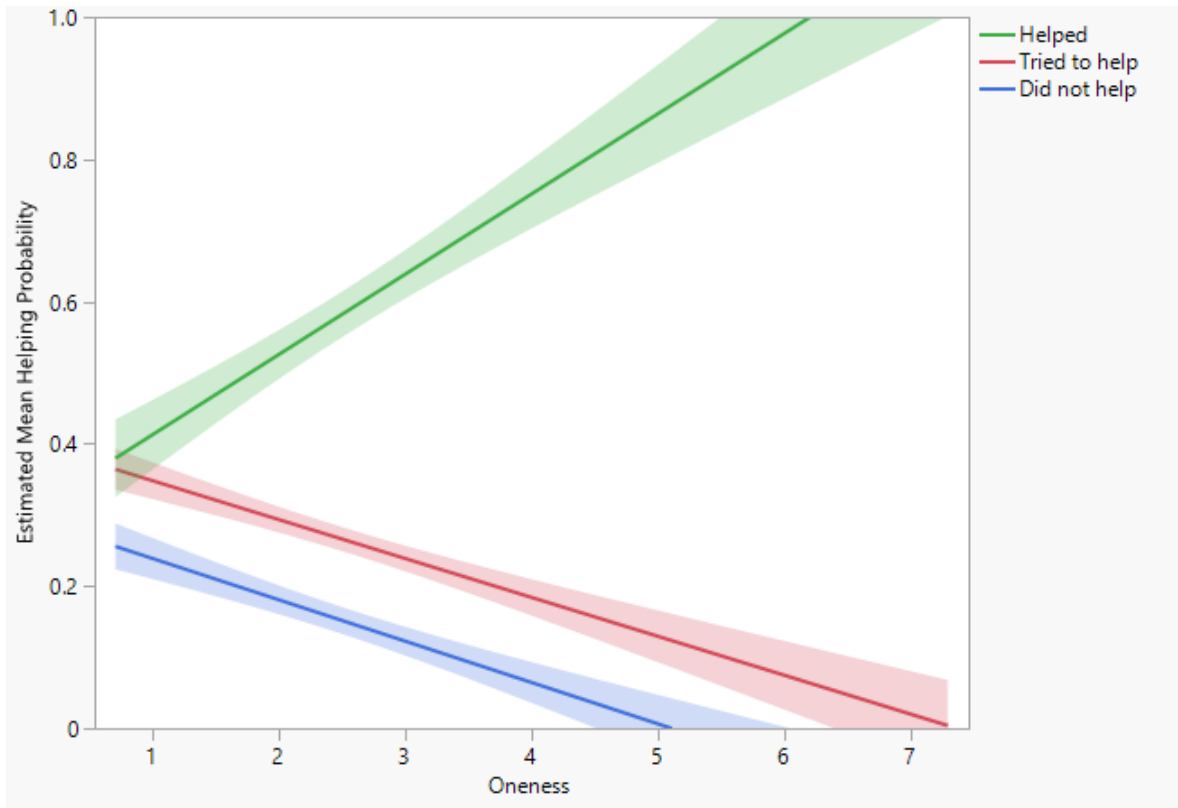


Figure 6.9. Estimated mean helping probability by level of perceived oneness with the target individual in Study 2. Each line represents the change in probability as oneness increases for each response type. As oneness increases, the likelihood of choosing to help increases, while the likelihood of both trying to help and not helping decreases.

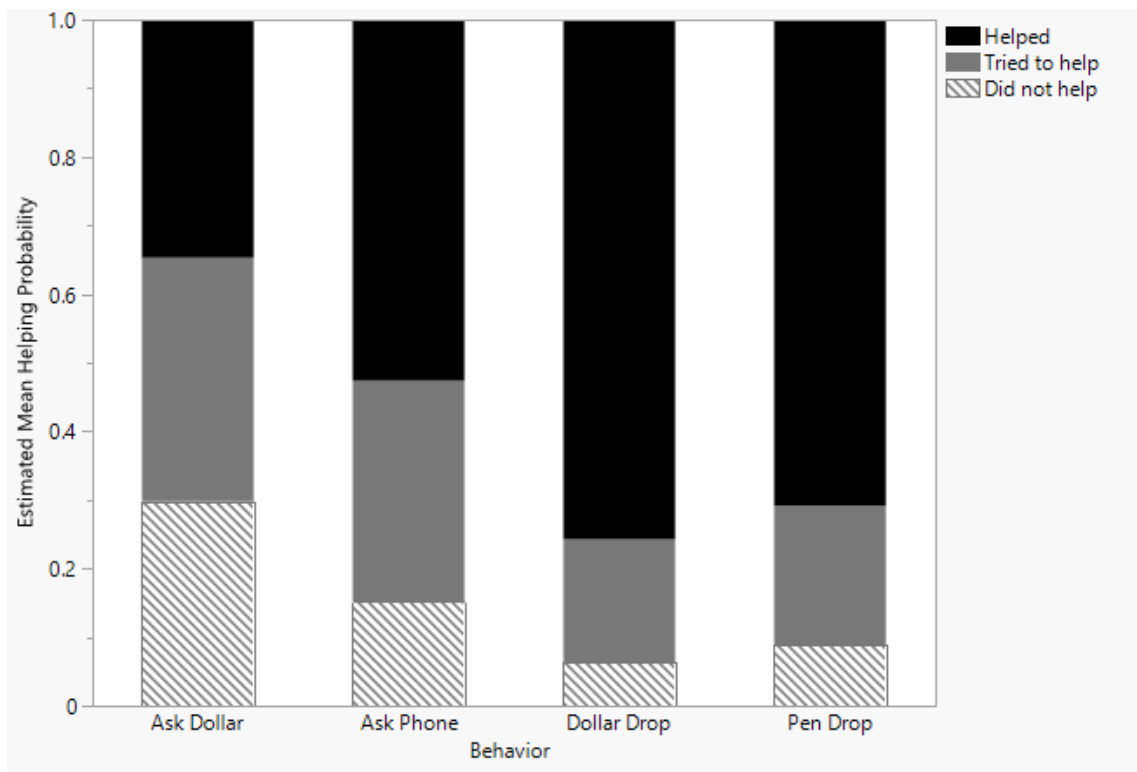


Figure 6.10. Estimated mean helping probability for each of the four help soliciting behaviors in Study 2. Bar size corresponds with the relative probability of each response with larger bars representing a larger relative probability of choosing that response.

Table 6.16. Tukey's post-hoc comparisons for the ordinal logistic regression predicting helping likelihood for Study 2.

Comparison	Estimate	<i>SE</i>	<i>z</i>	<i>p</i>
Ask Dollar - Ask Phone	-0.70	0.46	-1.51	.429
Ask Dollar - Dollar Drop	-1.91	0.57	-3.33	.005
Ask Dollar - Pen Drop	-1.67	0.54	-3.10	.010
Ask Phone - Dollar Drop	-1.21	0.56	-2.17	.132
Ask Phone - Pen Drop	-0.98	0.52	-1.87	.240
Dollar Drop - Pen Drop	0.24	0.62	0.38	.981

Discussion

Given the lack of effects of any of the metacognitive monitoring conditions, neither Hypothesis 2.1 nor 2.2 were supported. Though the manipulation was successful in the Batha and Carroll (2007) paradigm, it does not seem that the task transferred into a social desirability context. Once again, however, it seems that perceived oneness with the target individual does significantly predict the likelihood participants indicating that they would help across behavior conditions. Also as in previous studies, the main effect of type of helping behavior remains significant, with the highest cost helping behavior consistently garnering the lowest likelihood of receiving help, consistent with previous results from Balboa (2023). Thus, while the intended manipulation appeared to be ineffective, Study 2 continued to contribute to growing evidence of the importance of cost/benefit analysis in making the decision to help. Though not the main focus of the current studies, this result seems to be the most consistent cognitive process occurring during helping decisions across studies.

Study 3: Other Valuation Manipulation

Participants

Power analysis conducted prior to the main analysis revealed that to detect an effect size of 0.25 at 80% power with an alpha error rate of 20%, 139 participants would be necessary for a model utilizing the three level categorical valuation manipulation and three measures of other valuation (Faul et al., 2009).

Participants were recruited from Amazon Mechanical Turk using CloudResearch and monetarily compensated for survey completion (Litman et al., 2017). Data collection, using the Qualtrics survey platform, was conducted in three stages that concluded when a minimum of 140

participants who had successfully completed English competency and attention checks were collected. In total, 227 responses were collected, and after eliminating participants who had failed the English competency check, attention checks, or completed less than 50% of the survey, 145 participants remained (Average age = 47, 51% women, 48% men, <1% non-binary).

Measures and Procedure

Helping Conditions

The same four helping scenarios from Balboa (2023) were used in Study 3. Participants saw one of the four helping solicitation scenarios, which were presented in the form of first person video per Study 1 results, then were presented with the valuation measures immediately afterward.

Valuation Manipulation

In the Balboa (2023) studies, an attempt was made to cue ingroup or outgroup affiliation, which was predicted to cue likelihood of reciprocation of help, via university T-shirts. The field study portion occurred in a university student union, and research assistants wore either a home university shirt to cue ingroup affiliation or a rival university shirt to cue outgroup affiliation. In the hypothetical version of the study, participants were told that the scene took place in the student union and saw photos of research assistants wearing one of university T-shirts. Although T-shirts have been used many times in helping research to manipulate variables (e.g., Charles-Sire, et al. 2016; Hendren & Blank, 2009; Wilson & Dovidio, 1985), the theoretical basis for this manipulation came from the WTR literature, which suggests that a cue that someone will likely not be encountered again can lead to reduced valuation as a cooperative partner (Delton & Robertson, 2016). This manipulation in Balboa (2023) did not have a significant effect, which

could be due to several reasons, but one strong possibility is that university affiliation was simply not strong enough of a cue of potentially seeing someone again.

Study 3 used environmental cues to either likelihood or unlikelihood of encountering someone again and subsequently receiving reciprocated help from them. Whereas Balboa (2023) tried to cue likelihood of reciprocation through implied university affiliation, Study 3 used stimuli in which the environmental setting served as the cue to whether help would have a higher or lower chance of being reciprocated. These settings were then compared to a control setting, which was the same first person video set in a neutral location utilized in Study 1 and originally taken from Balboa (2023).

In the low chance of reciprocation condition, which was presented to participants via first person video, the individual in need of help was filmed in a regional airport in front of a baggage carousel. The target individual in the video was pushing a suitcase and either approached the camera from the side, drawing attention from the baggage carousel, or passed in front of the camera as in Studies 1 and 2. Manipulating the setting was theorized to provide the cue of transience that was predicted to cause low valuation of the other individual. Given the explicit implication of travel, this condition represented a stronger manipulation of participants' predictions of seeing another individual again than the T-shirt manipulation from Balboa (2023). In the high chance of reciprocation condition, first person video was recorded in a classroom, where the target individual was seated in front of the camera and either turned around to ask for help or else dropped an item directly in front of the participant on the way out of the classroom (See Figure 6.11 for example stimuli in both the high and low chance of reciprocation video conditions). Finally, as in Studies 1 and 2, the WTR and IOS scales were presented in random order immediately following the helping task, followed by the PES.



Figure 6.11. (Top) A still frame of the airport video where the target individual drops a dollar in front of the camera. (Bottom) A still frame of the classroom video where the target individual drops a dollar in front of the camera.

Summary of Hypotheses

Given predictions of factors that influence the helping of others from the welfare tradeoff literature, **Hypothesis 3.1** predicted that cueing low likelihood of reciprocation would predict a smaller relative probability of helping across behavioral conditions than both the neutral and high reciprocation conditions. **Hypothesis 3.2** predicted that cueing high likelihood of reciprocation would predict a larger relative probability of helping across behavioral conditions relative to both the neutral and low reciprocation conditions.

Results

As in Studies 1 and 2, an ordinal logistic regression was run, with helping solicitation behavior type, location of video, WTR, empathy, and oneness as predictors. AIC comparisons between models of varying complexity revealed that a model including the interaction between behavior and location was a worse fit for the data (248.27) than one with only main effects entered (237.70). The third model tested, which included only the interaction of the video location and WTR, also increased AIC values (241.48), as did a model including all two-way interactions between valuation measures (247.47). Given the theoretical relevance and relatively smaller increase in AIC, the model with the main effects of behavior, empathy, and oneness and the interaction between WTR and video location was chosen for analysis.

The overall model again revealed an effect of helping solicitation behavior type (L-R $X^2 = 32.89$, $p < .001$) as well as oneness (L-R $X^2 = 8.29$, $p = .004$) (See Table 6.17 for model statistics, Table 6.18 for all model estimates). As in previous studies, higher perceived oneness with the target individual predicted a higher likelihood of helping, but the other valuation measures had no effect (See Figure 6.12 for effect of oneness). Post-hoc analyses also revealed that consistent with previous studies, giving a dollar for the vending machine had a significantly

lower estimated probability of helping than returning a dropped dollar ($z = -4.40, p < .001$), returning a dropped pen ($z = -4.59, p < .001$) and lending a phone ($z = -3.50, p = .003$) (See Figure 6.13 for mean differences in helping probability by behavior, Table 6.19 for all post-hoc comparisons).

Table 6.17. Overall model effects for the ordinal logistic regression predicting helping likelihood utilizing helping solicitation behaviors, video location, WTR, oneness, empathy, and the interaction of location and WTR as predictors.

	Df	L-R X^2	Prob > X^2
Behavior	3	32.89	<.001
Location	2	1.98	.372
WTR	1	0.25	.619
Location*WTR	2	0.22	.897
Oneness	1	8.29	.004
Empathy	1	0.28	.510

Table 6.18. Regression estimates for the ordinal logistic regression predicting helping likelihood utilizing helping solicitation behaviors, video location, WTR, oneness, empathy, and the interaction of location and WTR as predictors.

	Estimate	SE	X^2	p
Intercept (0)	=1.51	0.89	2.86	.091
Intercept (1)	-0.08	0.88	0.01	.931
Behavior (Ask for a dollar)	1.73	0.31	30.31	<.001
Behavior (Ask to borrow phone)	-0.08	0.33	0.06	.780
Behavior (Drop a dollar)	-0.79	0.37	4.58	.032
Location (Airport)	-0.28	0.27	1.07	.301
Location (Classroom)	0.35	0.26	1.80	.179
WTR	0.18	0.37	0.24	.624
WTR*Airport	0.01	0.50	0.00	.980
WTR*Classroom	0.19	0.47	0.17	.683
Oneness	-0.48	0.18	7.35	.007
Empathy	0.01	0.01	0.27	.604

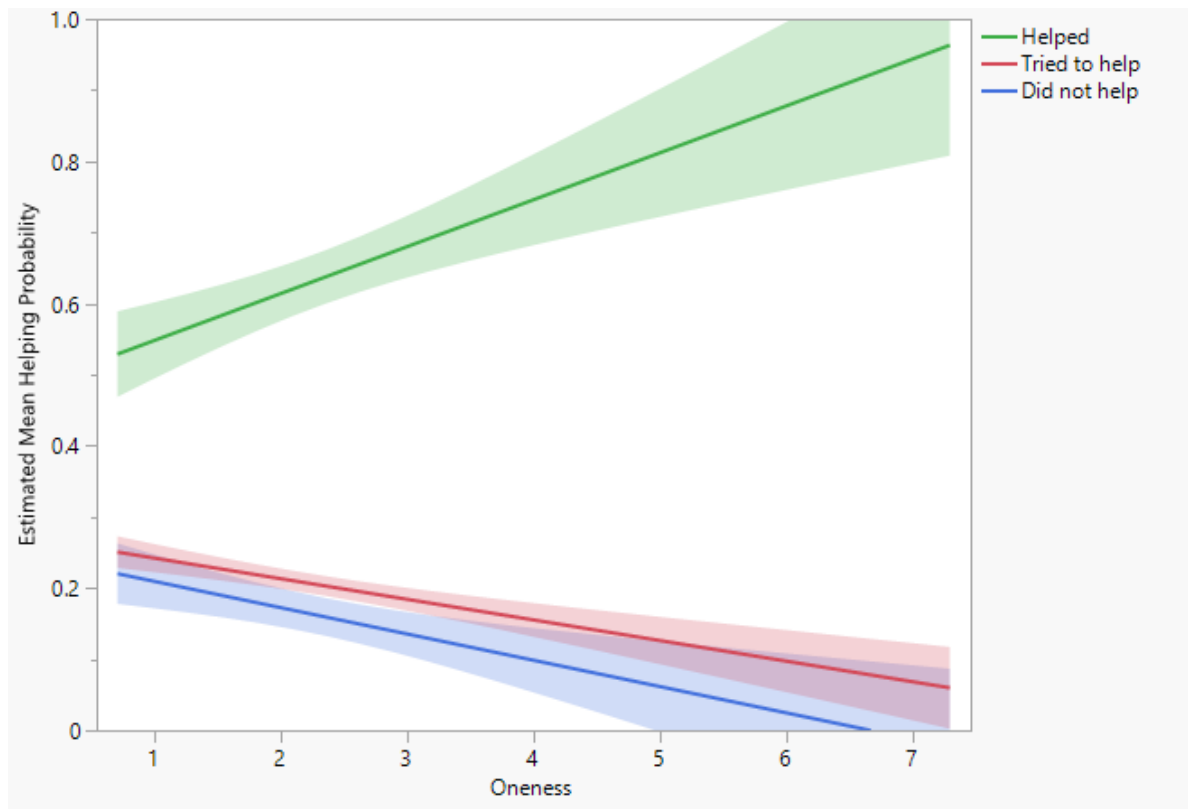


Figure 6.12. Estimated mean helping probability by level of perceived oneness with the target individual in Study 3. Each line represents the change in probability as oneness increases for each response type. As oneness increases, the likelihood of choosing to help increases, while the likelihood of both trying to help and not helping decreases.

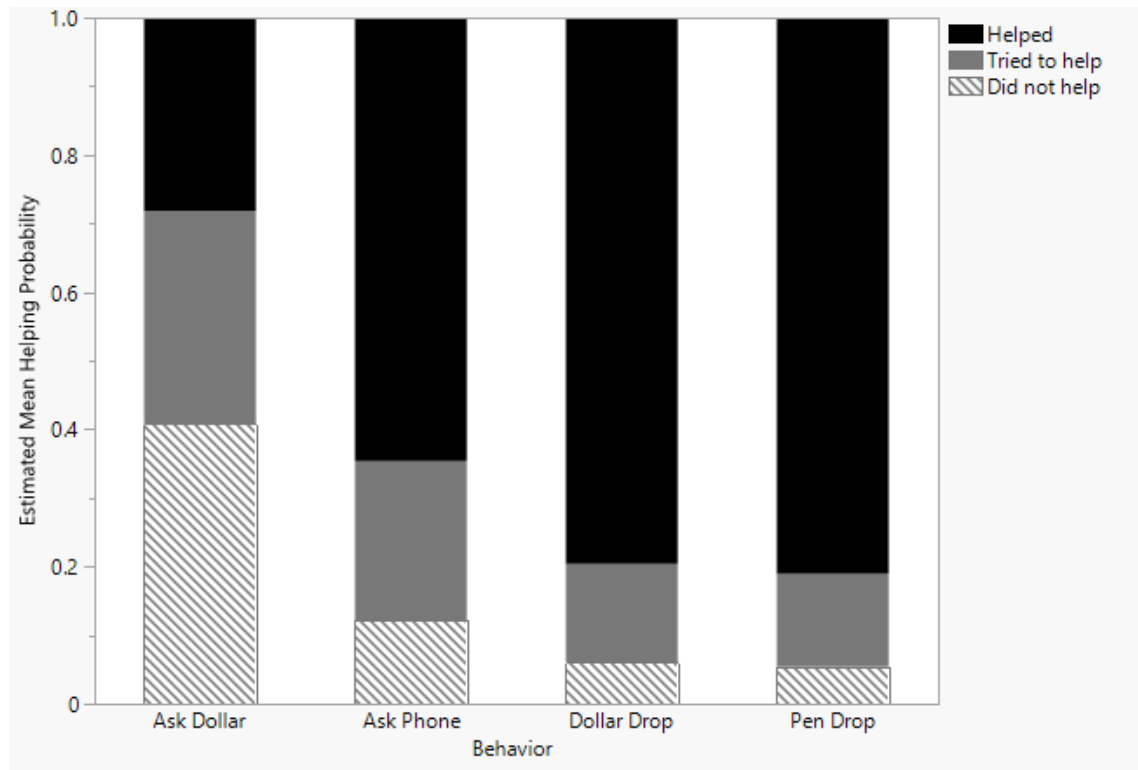


Figure 6.13. Estimated mean helping probability for each of the four help soliciting behaviors in Study 3. Bar size corresponds with the relative probability of each response with larger bars representing a larger relative probability of choosing that response.

Table 6.19. Tukey's post-hoc comparisons for the ordinal logistic regression predicting helping likelihood for Study 3.

Comparison	Estimate	SE	z	p
Ask for a dollar – Ask for a phone	-1.82	0.52	-3.50	.003
Ask for a dollar – Drop a dollar	-2.52	0.56	-4.40	<.001
Ask for a dollar – Drop a pen	-2.59	0.57	-4.59	<.001
Ask for a phone – Drop a dollar	-0.71	0.57	-1.24	.599
Ask for a phone – Drop a pen	-0.77	0.57	-1.37	.521
Drop a dollar – Drop a pen	-0.07	0.61	-0.11	1.00

Discussion

As in Study 2, the manipulation of interest did not induce a significant effect, which did not support Hypotheses 3.1 and 3.2, which predicted effects of video location on the likelihood of helping. Not only did the location of the scenario not affect helping decisions, but there was no overall effect of WTR, nor the interaction of location and WTR, which were most strongly theoretically linked. Also similar to Study 2, the main effects of oneness and helping solicitation behaviors were repeated, indicating that those two factors remain important in the decision to help regardless of instruction or location of the scenario and supporting the Neuberg et al. (1997) hypothesis. Consistent with the hypotheses and findings of Balboa (2023), participants were again significantly less likely to indicate they would give a dollar to someone who needed it for the vending machine, which represented the highest personal cost.

Chapter 7 - Exploratory Study Comparison

In order to roughly estimate differences between all of the current studies, along with the Balboa (2023) field results and original hypothetical study, a multilevel ordinal logistic regression similar to that used in Study 1 was run using helping solicitation behavior, study, and their interaction as fixed effects and allowing intercepts to vary by participant to account for between sample variance. To investigate differences in helping response patterns across studies, Tukey's post-hoc analyses were performed on the interaction between behavior and study and the levels of behavior at which the previous and current hypothetical study results differed from the field study results were compared (See Table 7.1 for all model estimates).

The post-hoc analyses found that there were no significant differences in helping response for any of the behavior conditions between the field study and the first person video stimuli from Study 1. For the original hypothetical study, which repeated the field study paradigm in a hypothetical scenario, there was a significant difference in behavior such that hypothetical participants estimated they would be more likely to return a dropped pen than they did in the field study ($z = -3.65, p = .035$). Likewise, participants rated themselves more likely to return a dropped pen across the Study 2 metacognition conditions ($z = -1.71, p = .047$) and across the Study 3 location conditions ($z = -2.33, p = .003$) (See Figure 7.1 for visualization of helping patterns, and Table A.2 in Appendix A for all post-hoc comparisons). Though, like the analysis from Study 1, the results of this analysis violated the assumptions of random sampling and equal distributions of participants, these preliminary results demonstrate that the first person video stimuli produced patterns of helping behavior most statistically similar to those observed in the field study.

Table 7.1. Multilevel ordinal logistic regression estimates from a model using study (2023 field results, 2023 hypothetical results, Study 1 first person results, Study 2 results, and Study 3 results), helping solicitation behavior, and their interaction as predictors and allowing intercepts to vary by participant. More specific post-hoc comparisons by study and behavior can be found in Table A.2 in Appendix A.

	Estimate	SE	z	p
Intercept (0)	-1.79	0.16	-11.36	<.001
Intercept (1)	-0.55	0.10	-5.75	<.001
Ask dollar	-1.17	0.16	-7.49	<.001
Ask phone	0.39	0.14	2.71	.007
Dollar drop	0.60	0.16	3.84	<.001
First person	0.44	0.20	2.21	.027
Field study	-0.64	0.16	-4.00	<.001
2023 Hypothetical	0.17	0.14	1.13	.256
Metacognition	-0.11	0.16	-0.69	.493
Ask dollar*First person	0.30	0.31	0.97	.330
Ask phone*First person	-0.64	0.32	-2.01	.044
Dollar drop*First person	0.39	0.38	1.02	.306
Ask dollar*Field study	-0.05	0.24	-0.21	.833
Ask phone*Field study	1.58	0.31	5.07	<.001
Dollar drop*Field study	-0.67	0.26	-2.60	.009
Ask dollar*2023 Hypothetical	0.01	0.23	0.03	.975
Ask phone*2023 Hypothetical	0.07	0.26	0.27	.788
Dollar drop*2023 Hypothetical	-0.00	0.26	-0.01	.992
Ask dollar*Metacognition	0.17	0.26	0.66	.512
Ask phone*Metacognition	-0.60	0.26	-2.28	.022
Dollar drop*Metacognition	0.12	0.29	0.40	.687

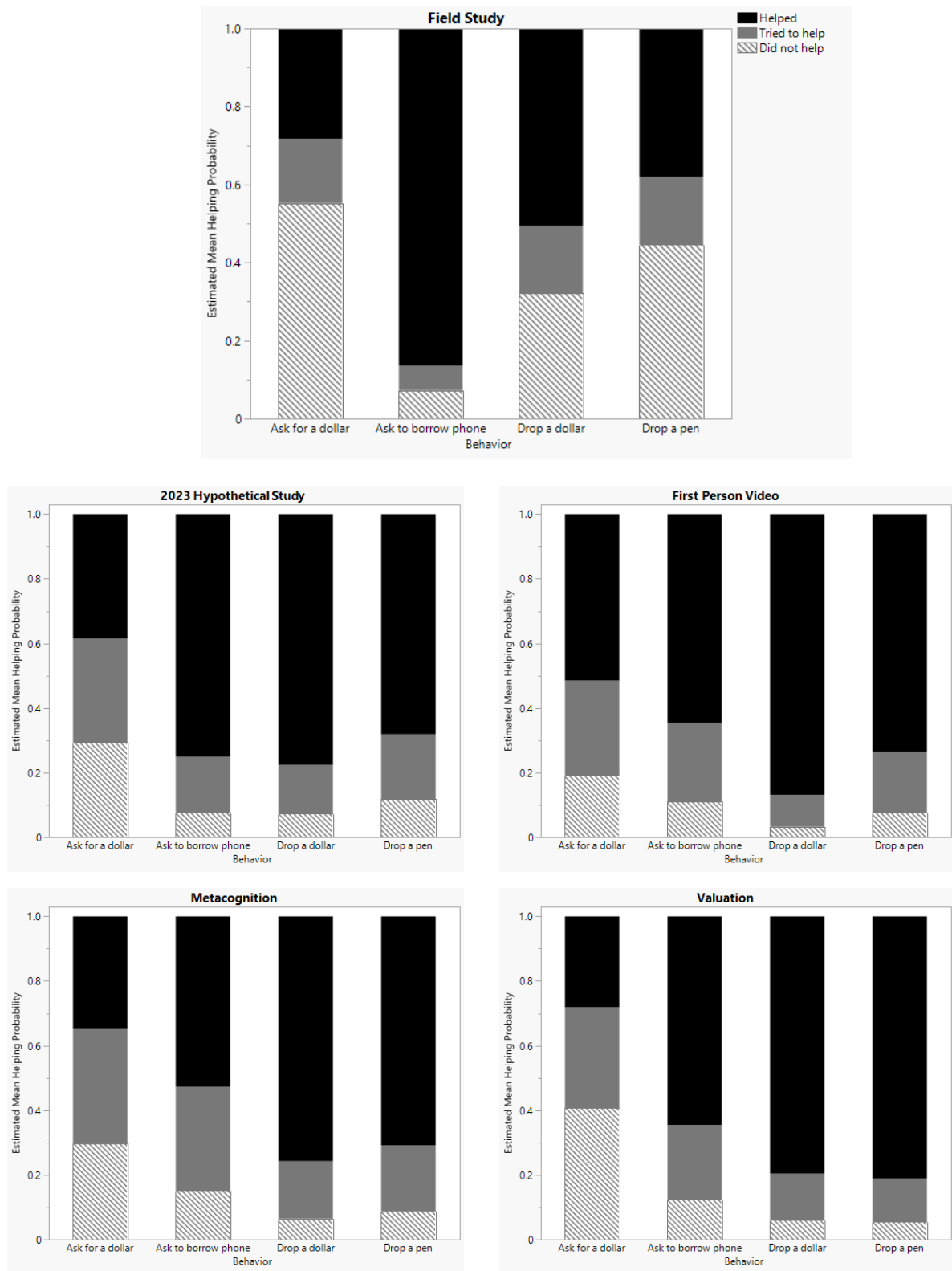


Figure 7.1. Comparison of relative likelihood of helping by behavior for all studies compared in the Exploratory Analysis.

Chapter 8 - General Discussion

The current studies, taken together, aimed to first identify a form of virtual stimuli that could produce patterns of results consistent with previous field study findings, then investigate whether manipulations of metacognitive reflection and other valuation could alter hypothetical responses in a helping paradigm. In Study 1, which tested static images, third person videos, and first person videos as hypothetical social scenario stimuli, it was found that first person videos produced patterns of estimated helping likelihood that most closely resembled those actually collected in a field study. This comparison and conclusion was made by running an exploratory multilevel ordinal logistic regression model that was able to determine that the first person video results were statistically similar to those obtained in the field. Using the first person video stimuli, Study 2 attempted to manipulate metacognitive reflection on socially desirable responding to determine whether it could be used to encourage participants to respond realistically to prosocial behavioral survey items. It was found that neither a standard metacognitive reflection task nor a task specifically tailored to promote reflection on socially desirable responding affected participant helping decisions. Perceived oneness with the target individual did predict estimations of helping likelihood, however, as did the cost and benefit of respective helping behaviors. Finally, Study 3 attempted to manipulate participants' valuation of a hypothetical other's welfare by increasing or reducing the chance that the hypothetical other might be interacted with again. There was again no effect of the main manipulation, such that participants did not respond differently based on inferred likelihood of running into the other person again, but effects of oneness and cost and benefit of the helping act were once again found.

Implications

Stimulus Use in Hypothetical Decision Making Contexts

One of the key takeaways of the current studies is that first person video stimuli do seem to more closely approximate actual observed behavior in the context of the one-shot helping paradigm. This finding is consistent with previous research that has posited firstly that video stimuli create a more realistic experience than static stimuli (Serino & Repetto, 2018; Compton, 2019) and secondly that first person video contributes to better engagement with video subjects and tasks (Fiorella et al., 2017). Though others have suggested that 3D or immersive video is truly the only proxy for field scenarios (Rosetti & Hurturbia, 2020), the ability of first person video to approximate field results is promising as a more cost and time effective way to deliver realistic stimuli to online participants. First person videos, while still more time consuming to film, edit, and utilize in surveys than static images, are still a more accessible way to increase realism without having to purchase and program virtual reality or immersive video setups. Though this series of studies utilized a specific one-shot stranger helping paradigm, it is possible that first person video stimuli might also produce more realistic responding for other social scenarios involving one-shot stranger interactions where participants are asked to estimate what choice they would make in that scenario.

Metacognitive Monitoring with Uncertain Outcomes

The lack of effects of the metacognitive monitoring prompts from Study 2 suggest that use of monitoring strategies might not be effective in a one-shot task in which there is no objectively correct response. First, in a one-shot decision, it is possible that the cognitive systems theorized to be impacted by metacognitive monitoring strategies are not even activated, as engaging in these strategies is usually associated with deliberative processing (Thompson et al.,

2011). In the one-item task used in the current studies, it is likely that more intuitive reasoning is being utilized, thus reducing the potential effect of metacognitive monitoring. It has also been suggested that metacognition applies best to discrete decisions, whereas any social decision is part of a larger ongoing process incorporating multiple sources of input and occurring beyond the point of the decision (Yeung & Summerfield, 2012). Thus, though metacognitive training might aid in decision making in discrete outcome paradigms, social decision making might represent too continuous of a decision process to be affected by targeted interventions like those used in Batha & Carroll (2007). In regard to the role of social desirability in hypothetical estimations of helping likelihood, the lack of effect of the social desirability condition could be more related to the overall failure of the metacognitive monitoring than a lack of social influence. An investigation utilizing social desirability manipulations or measures outside of the metacognitive context might reveal different ways in which pressures to respond prosocially might affect hypothetical responding in future studies of helping behavior.

The Role of Oneness in the Decision to Help

Regarding calculations of other valuation when making the choice to help, it is unclear whether WTR or general empathy are factored into one-shot helping decisions, but it does seem that feelings of oneness are associated with making the choice to help. This finding is in line with the predictions of Neuberg et al. (1997), which suggested that the experience of oneness with another individual is what motivates altruistic action. Given the order of presented tasks, however, it cannot be concluded whether feelings of oneness precipitate helping or if helping another person encourages a reactive feeling of oneness. Oneness effects were also found across helping behaviors, and future studies targeting this effect specifically might investigate whether oneness has a general effect on helping behavior or is situation specific.

In order to ensure that there would be no priming effects of the valuation measures on the helping task, both the WTR and IOS were always presented immediately following the task. This could have in turn had a priming effect for the IOS task, wherein participants who made the decision to help the target individual then reported higher perceptions of oneness with that person as a result of their own decision. Thus, while there appears to be an association between oneness and the choice to help, additional investigation would be needed to determine the direction of that relationship. Further, more work will need to be done to untangle the effects of empathy, oneness, and WTR in hypothetical helping situations. Post-hoc zero order correlations did reveal relationships between the valuation measures—though they did not demonstrate multicollinearity in analyses—that suggest some relation to each other. In both the third person point of view condition from Study 1 and in Study 3, there were small correlations of WTR and oneness ($r = .23-.29, p < .006$). Additionally, oneness and empathy showed similar levels of correlation in all three conditions from Study 1 ($r = .21-.35, p < .027$).

Though the WTR task itself was not found to be a significant predictor of helping choices, perceived oneness could also act as a proximate manifestation of high WTR. Cognitive calculation of WTR is theorized to take into account not only our valuation of a target individual, but also our perception of how they value us. This process implies inherent perspective-taking, which could be represented in the form of perceived oneness, though further research exploring the nuances between WTR and oneness alone would be needed to support this assumption. Post-hoc zero order correlations revealed that for the third person point of view condition from Study 1, as well as in Study 3, there

The Triumph of Costs and Benefits

Though incidental relative to the target manipulations in the current studies, the most robust finding across studies was the relative likelihoods of more and less costly helping behaviors. Regardless of manipulation, participants were consistently least likely to choose to help in the condition in which the target asked for a dollar for a vending machine, which was the most costly helping condition from Balboa (2023). Compared to the relative likelihood of low cost behaviors like returning dropped items, this finding continues to support the cost/benefit framework of helping decisions put forth by McGuire (1994) and supported by Balboa (2023). Thus, while the main manipulations of interest failed to find robust effects, the current studies continued to generate support for the role of cost/benefit analysis in the decision to help others, and can be further investigated in subsequent studies.

Limitations

One of the largest limitations of the current studies was the same as in Balboa (2023), which is that the behaviors utilized in the helping scenarios did not represent extremes in terms of helping cost and benefit, but rather represented departures from mean ratings of costs and benefits. The main reason for this limitation was that for the Balboa (2023) field study, truly high cost behaviors like jumping someone's car or giving them a ride could not be feasibly enacted by research assistants; thus, the hypothetical version of the survey was also constrained, as were the current studies in order to allow for direct comparison of results.

The necessity of using the same four behaviors from the previous studies also led to a repetition of another limitation from Balboa (2023), which is the potential confound of direct versus passive forms of helping. In two of the helping conditions (asking to borrow a phone and asking for a dollar) participants are asked directly to provide help to the target individual,

whereas in the other two conditions (picking up a dropped pen and picking up a dropped dollar) they are not. Thus, it is possible that the differences observed between helping behaviors, especially when they occur between a direct and passive behavior condition, could be due in part to the nature of the helping solicitation as well as cost/benefit analyses. Additionally, the passive conditions allow for another class of response: engaging in active selfishness. In conditions where the target individual dropped an item, participants in real life have the chance not only to help or not help but to actively harm that individual (albeit at a low cost to them) by taking the dropped item for themselves. Indeed, this result was found several times in the original Balboa (2023) field study, and represents a separate class of responses outside of the helping to not helping scale utilized in the studies. Therefore, future research might be needed to tease apart passive helping, active helping, and selfish response patterns.

Also present in Balboa (2023) was the lack of an effect of cues to likelihood of reciprocated help in the future. As in that study, it is possible that the manipulation of location to cue transience of interactions might not have been strong enough to alter participant perceptions of the social interaction context. One reason for this could have been the speed of the social interaction; video length ranged from 4-7 seconds, with participants viewing only the moment at which the helping scenario was actively occurring. It is thus possible that the viewing time simply did not give participants enough time to assess the location of the helping scenario, and allowed only for assessment of the main helping plot. The timing of the interaction and one question nature of the survey might have also contributed to the lack of metacognitive monitoring effects. Given that many metacognitive strategies are applied to complex and repeated cognitive tasks (e.g., Batha & Carroll (2007)'s original context), it is possible that a one-shot interaction with no feedback or re-testing is not a context in which metacognitive

strategy intervention would be effective. This finding does not mean that a metacognitive strategy intervention could not be applied to other social decision making contexts, but it is likely that for a one-shot stranger paradigm, this strategy is not particularly applicable.

Future Directions

One possible future direction from the current studies is to conduct a second field study replicating Balboa (2023) to obtain a more contemporary sample against which to compare the currently discussed hypothetical results. The current study data were collected three years after the conclusion of the field study, which raises questions as to whether cohort effects could be responsible for some of the observed differences between study results. Additionally, collecting a field sample outside of a university setting would help to more broadly generalize results and provide a better comparison group for the current data. Though it was assumed that field study subjects were behaving naturally, it is possible that they would have acted differently outside of a university setting. Obtaining a more general field sample would reveal whether this was the case and provide a better sample to compare online participants to.

Another avenue of interest is focusing explicitly on manipulating helping behavior based on whether helping requests are active or passive. As discussed in the limitations, the directness of requests for help could have been responsible for some of the observed differences in helping responses; therefore, conducting a helping study explicitly manipulating the directness of a request independent of helping costs and benefits could help distinguish where observed differences came from.

Other manipulations of interest to investigate the observed effects in the current studies could be to first lengthen the video stimuli and then potentially attempt to further strengthen cues to reciprocation per the evolutionary theory predictions. Given that the length of the helping

solicitation videos could have been partially responsible for the lack of effect of the video location, lengthening the videos with the same location manipulation could clarify whether that was in fact the case or if the manipulation was simply not strong enough. Depending on those results, an additional attempt could be made to cue likelihood or unlikelihood of receiving reciprocated help in an even clearer way. This could potentially include explicitly cueing whether the target individual will be interacted with again (e.g., they explicitly mention living nearby or else promise to return the favor) or providing other narrative clues to future interactions (e.g., indicating that the person in the video is someone the participant sees in town or work on a regular basis).

Conclusions

The primary goal of the current studies was to continue building on previous findings which suggest that hypothetical decision making contexts might not perfectly represent what participants would truly do when confronted with the same decision in real life. Thus, the first study aimed to provide a comparison of different feasibly developed hypothetical stimuli to determine which might produce patterns of hypothetical decision making that more closely approximate field study outcomes. The finding that first person video stimuli produced result patterns that did not significantly differ from field results, while third person videos and static images did, provides support for the prediction that not all survey methods are created equal, especially when trying to model real life social decision making in a hypothetical paradigm. Though the previously found mismatch between hypothetical and field results could be potentially alarming for researchers interested in capturing social decision making through hypothetical formats, the first person video results provide a feasible strategy for creating more

true to life hypothetical stimuli without necessarily needing to resort to time and resource costly immersive video or virtual reality formats.

When it comes to predicting how individuals might make decisions to help others at a cost to themselves, it is clear that more investigation is needed as to the exact factors being considered at the time of the decision. The two potential factors selected for the current studies represent only a fraction of the potential inputs being considered when making social decisions, and while attempts to manipulate them were unsuccessful, overall study results still added to existing findings on helping decisions. The replication of the Balboa (2023) findings on cost/benefit analysis as a driver of helping decisions provide additional support for a theoretical framework of helping and provide opportunities for future research manipulating costs and benefits of helping. Taken with the results of Study 1, which provides hypothetical stimuli that produce more realistic responding, the results of all three studies create a strong foundation for the continued study of cognitive processes involved in helping decisions via effective hypothetical survey methods.

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Appendix A - Exploratory Analysis Post-Hoc Results

Appendix Table A.1. All post-hoc comparisons for the Study 1 multilevel ordinal logistic regression model using study (2023 field results, static image, third person video, and first person video), helping solicitation behavior, and their interaction as predictors and allowing intercepts to vary by participant.

Comparison	Estimate	SE	z	p
Ask for a dollar First - Ask to borrow phone First	-0.59	0.56	-1.07	1.00
Ask for a dollar First - Drop a dollar First	-1.81	0.68	-2.65	.363
Ask for a dollar First - Drop a pen First	-0.94	0.60	-1.57	.973
Ask for a dollar First - Ask for a dollar Static	-0.10	0.53	-0.19	1.00
Ask for a dollar First - Ask to borrow phone Static	-0.48	0.54	-0.87	1.00
Ask for a dollar First - Drop a dollar Static	-3.20	1.11	-2.89	.219
Ask for a dollar First - Drop a pen Static	-1.12	0.62	-1.82	.912
Ask for a dollar First - Ask for a dollar Third	0.71	0.55	1.29	.996
Ask for a dollar First - Ask to borrow phone Third	0.20	0.52	0.38	1.00
Ask for a dollar First - Drop a dollar Third	-2.04	0.74	-2.75	.299
Ask for a dollar First - Drop a pen Third	-0.31	0.54	-0.58	1.00
Ask for a dollar First - Ask for a dollar Field	1.38	0.49	2.81	.261
Ask for a dollar First - Ask to borrow phone Field	-1.72	0.58	-2.96	.184
Ask for a dollar First - Drop a dollar Field	0.27	0.48	0.56	1.00
Ask for a dollar First - Drop a pen Field	0.87	0.49	1.78	.925
Ask to borrow phone First - Drop a dollar First	-1.21	0.67	-1.80	.917
Ask to borrow phone First - Drop a pen First	-0.35	0.60	-0.60	1.00
Ask to borrow phone First - Ask for a dollar Static	0.49	0.53	0.93	1.00
Ask to borrow phone First - Ask to borrow phone Static	0.12	0.55	0.22	1.00
Ask to borrow phone First - Drop a dollar Static	-2.61	1.10	-2.37	.571

Ask to borrow phone First - Drop a pen Static	-0.53	0.61	-0.86	1.00
Ask to borrow phone First - Ask for a dollar Third	1.31	0.57	2.31	.614
Ask to borrow phone First - Ask to borrow phone Third	0.79	0.53	1.50	.983
Ask to borrow phone First - Drop a dollar Third	-1.45	0.74	-1.97	.842
Ask to borrow phone First - Drop a pen Third	0.28	0.54	0.53	1.00
Ask to borrow phone First - Ask for a dollar Field	1.97	0.51	3.86	.011
Ask to borrow phone First - Ask to borrow phone Field	-1.12	0.57	-1.96	.846
Ask to borrow phone First - Drop a dollar Field	0.86	0.49	1.75	.933
Ask to borrow phone First - Drop a pen Field	1.46	0.50	2.91	.211
Drop a dollar First - Drop a pen First	0.86	0.70	1.22	.998
Drop a dollar First - Ask for a dollar Static	1.70	0.66	2.59	.407
Drop a dollar First - Ask to borrow phone Static	1.33	0.67	2.00	.828
Drop a dollar First - Drop a dollar Static	-1.40	1.16	-1.20	.998
Drop a dollar First - Drop a pen Static	0.68	0.72	0.95	1.00
Drop a dollar First - Ask for a dollar Third	2.52	0.70	3.62	.026
Drop a dollar First - Ask to borrow phone Third	2.01	0.66	3.03	.155
Drop a dollar First - Drop a dollar Third	-0.24	0.82	-0.29	1.00
Drop a dollar First - Drop a pen Third	1.50	0.66	2.25	.661
Drop a dollar First - Ask for a dollar Field	3.18	0.66	4.84	<.001
Drop a dollar First - Ask to borrow phone Field	0.09	0.68	0.13	1.00
Drop a dollar First - Drop a dollar Field	2.07	0.64	3.27	.081
Drop a dollar First - Drop a pen Field	2.67	0.65	4.13	.004
Drop a pen First - Ask for a dollar Static	0.85	0.58	1.46	.986
Drop a pen First - Ask to borrow phone Static	0.47	0.59	0.80	1.00
Drop a pen First - Drop a dollar Static	-2.26	1.12	-2.02	.817

Drop a pen First - Drop a pen Static	-0.18	0.65	-0.27	1.00
Drop a pen First - Ask for a dollar Third	1.66	0.62	2.70	.334
Drop a pen First - Ask to borrow phone Third	1.15	0.58	1.98	.837
Drop a pen First - Drop a dollar Third	-1.10	0.76	-1.44	.989
Drop a pen First - Drop a pen Third	0.64	0.59	1.09	.999
Drop a pen First - Ask for a dollar Field	2.32	0.57	4.07	.005
Drop a pen First - Ask to borrow phone Field	-0.77	0.61	-1.26	.997
Drop a pen First - Drop a dollar Field	1.21	0.55	2.22	.684
Drop a pen First - Drop a pen Field	1.81	0.56	3.24	.088
Ask for a dollar Static - Ask to borrow phone Static	-0.37	0.52	-0.72	1.00
Ask for a dollar Static - Drop a dollar Static	-3.10	1.09	-2.84	.248
Ask for a dollar Static - Drop a pen Static	-1.02	0.60	-1.72	.943
Ask for a dollar Static - Ask for a dollar Third	0.81	0.53	1.52	.980
Ask for a dollar Static - Ask to borrow phone Third	0.30	0.50	0.60	1.00
Ask for a dollar Static - Drop a dollar Third	-1.94	0.72	-2.69	.338
Ask for a dollar Static - Drop a pen Third	-0.21	0.52	-0.41	1.00
Ask for a dollar Static - Ask for a dollar Field	1.48	0.47	3.14	.117
Ask for a dollar Static - Ask to borrow phone Field	-1.61	0.55	-2.92	.205
Ask for a dollar Static - Drop a dollar Field	0.40	0.46	0.80	1.00
Ask for a dollar Static - Drop a pen Field	0.97	0.47	2.07	.783
Ask to borrow phone Static - Drop a dollar Static	-2.73	1.10	-2.49	.482
Ask to borrow phone Static - Drop a pen Static	-0.65	0.61	-1.07	1.00
Ask to borrow phone Static - Ask for a dollar Third	1.19	0.56	2.13	.744
Ask to borrow phone Static - Ask to borrow phone Third	0.67	0.52	1.30	.996
Ask to borrow phone Static - Drop a dollar Third	-1.57	0.73	-2.15	.733

Ask to borrow phone Static - Drop a pen Third	0.17	0.53	0.31	1.00
Ask to borrow phone Static - Ask for a dollar Field	1.85	0.50	3.69	.020
Ask to borrow phone Static - Ask to borrow phone Field	-1.24	0.56	-2.20	.698
Ask to borrow phone Static - Drop a dollar Field	0.74	0.48	1.54	.978
Ask to borrow phone Static - Drop a pen Field	1.34	0.49	2.72	.318
Drop a dollar Static - Drop a pen Static	2.08	1.13	1.84	.902
Drop a dollar Static - Ask for a dollar Third	3.92	1.12	3.50	.039
Drop a dollar Static - Ask to borrow phone Third	3.40	1.10	3.10	.128
Drop a dollar Static - Drop a dollar Third	1.16	1.20	0.97	1.00
Drop a dollar Static - Drop a pen Third	2.89	1.10	2.64	.371
Drop a dollar Static - Ask for a dollar Field	4.58	1.10	4.18	.003
Drop a dollar Static - Ask to borrow phone Field	1.49	1.12	1.35	.994
Drop a dollar Static - Drop a dollar Field	3.47	1.08	3.21	.095
Drop a dollar Static - Drop a pen Field	4.07	1.09	3.74	.017
Drop a pen Static - Ask for a dollar Third	1.84	0.63	2.91	.211
Drop a pen Static - Ask to borrow phone Third	1.32	0.60	2.22	.684
Drop a pen Static - Drop a dollar Third	-0.92	0.78	-1.18	.999
Drop a pen Static - Drop a pen Third	0.81	0.60	1.35	.994
Drop a pen Static - Ask for a dollar Field	2.50	0.59	4.26	.002
Drop a pen Static - Ask to borrow phone Field	-0.59	0.63	-0.94	1.00
Drop a pen Static - Drop a dollar Field	1.39	0.57	2.46	.502
Drop a pen Static - Drop a pen Field	1.99	0.58	3.45	.046
Ask for a dollar Third - Ask to borrow phone Third	-0.51	0.53	-0.98	1.00
Ask for a dollar Third - Drop a dollar Third	-2.76	0.76	-3.64	.024
Ask for a dollar Third - Drop a pen Third	-1.02	0.55	-1.86	.893

Ask for a dollar Third - Ask for a dollar Field	0.66	0.48	1.38	.993
Ask for a dollar Third - Ask to borrow phone Field	-2.42	0.59	-4.09	.004
Ask for a dollar Third - Drop a dollar Field	-0.45	0.49	-0.92	1.00
Ask for a dollar Third - Drop a pen Field	0.15	0.49	0.32	1.00
Ask to borrow phone Third - Drop a dollar Third	-2.24	0.72	-3.10	.132
Ask to borrow phone Third - Drop a pen Third	-0.51	0.51	-0.99	1.00
Ask to borrow phone Third - Ask for a dollar Field	1.18	0.46	2.58	.415
Ask to borrow phone Third - Ask to borrow phone Field	-1.91	0.55	-3.45	.046
Ask to borrow phone Third - Drop a dollar Field	0.07	0.45	0.15	1.00
Ask to borrow phone Third - Drop a pen Field	0.67	0.46	1.46	.987
Drop a dollar Third - Drop a pen Third	1.73	0.73	2.38	.562
Drop a dollar Third - Ask for a dollar Field	3.42	0.72	4.73	<.001
Drop a dollar Third - Ask to borrow phone Field	0.33	0.74	0.44	1.00
Drop a dollar Third - Drop a dollar Field	2.31	0.70	3.30	.074
Drop a dollar Third - Drop a pen Field	2.91	0.71	4.09	.004
Drop a pen Third - Ask for a dollar Field	1.69	0.50	3.43	.049
Drop a pen Third - Ask to borrow phone Field	-1.40	0.56	-2.51	.467
Drop a pen Third - Drop a dollar Field	0.58	0.48	1.21	.998
Drop a pen Third - Drop a pen Field	1.18	0.49	2.43	.527
Ask for a dollar Field - Ask to borrow phone Field	-3.09	0.55	-5.65	<.001
Ask for a dollar Field - Drop a dollar Field	-1.11	0.41	-2.73	.309
Ask for a dollar Field - Drop a pen Field	-0.51	0.40	-1.27	.997
Ask to borrow phone Field - Drop a dollar Field	1.98	0.52	3.80	.014
Ask to borrow phone Field - Drop a pen Field	2.58	0.54	4.82	<.001
Drop a dollar Field - Drop a pen Field	0.60	0.41	1.47	.986

Appendix Table A.2. All post-hoc comparisons for the final exploratory multilevel ordinal logistic regression using study (2023 field results, 2023 hypothetical results, Study 1 first person results, Study 2 results, and Study 3 results), helping solicitation behavior, and their interaction as predictors and allowing intercepts to vary by participant.

Comparison	Estimate	SE	z	p
Ask dollar First - Ask phone First	-0.62	0.57	-1.09	1.00
Ask dollar First - Dollar drop First	-1.86	0.69	-2.70	.427
Ask dollar First - Pen drop First	-0.99	0.61	-1.61	.989
Ask dollar First - Ask dollar Field	1.43	0.50	2.88	.301
Ask dollar First - Ask phone Field	-1.76	0.58	-3.01	.226
Ask dollar First - Dollar drop Field	0.28	0.49	0.57	1.00
Ask dollar First - Pen drop Field	0.90	0.50	1.80	.962
Ask dollar First - Ask dollar 2023 Hypothetical	0.57	0.48	1.18	1.00
Ask dollar First - Ask phone 2023 Hypothetical	-1.05	0.52	-2.03	.893
Ask dollar First - Dollar drop 2023 Hypothetical	-1.19	0.52	-2.29	.745
Ask dollar First - Pen drop 2023 Hypothetical	-0.70	0.50	-1.39	.998
Ask dollar First - Ask dollar Metacog	0.67	0.52	1.31	.999
Ask dollar First - Ask phone Metacog	-0.11	0.51	-0.22	1.00
Ask dollar First - Dollar drop Metacog	-1.04	0.56	-1.88	.945
Ask dollar First - Pen drop Metacog	-0.81	0.54	-1.51	.995
Ask dollar First - Ask dollar WTR	1.02	0.53	1.93	.927
Ask dollar First - Ask phone WTR	-0.55	0.53	-1.03	1.00
Ask dollar First - Dollar drop WTR	-1.35	0.58	-2.33	.716
Ask dollar First - Pen drop WTR	-1.43	0.60	-2.41	.656
Ask phone First - Dollar drop First	-1.24	0.68	-1.82	.960
Ask phone First - Pen drop First	-0.37	0.61	-0.61	1.00

Ask phone First - Ask dollar Field	2.05	0.51	4.01	.009
Ask phone First - Ask phone Field	-1.14	0.58	-1.97	.915
Ask phone First - Dollar drop Field	0.90	0.50	1.80	.964
Ask phone First - Pen drop Field	1.52	0.51	2.98	.240
Ask phone First - Ask dollar 2023 Hypothetical	1.18	0.49	2.42	.645
Ask phone First - Ask phone 2023 Hypothetical	-0.43	0.52	-0.84	1.00
Ask phone First - Dollar drop 2023 Hypothetical	-0.58	0.52	-1.11	1.00
Ask phone First - Pen drop 2023 Hypothetical	-0.08	0.50	-0.16	1.00
Ask phone First - Ask dollar Metacog	1.29	0.53	2.46	.613
Ask phone First - Ask phone Metacog	0.51	0.51	1.00	1.00
Ask phone First - Dollar drop Metacog	-0.42	0.55	-0.77	1.00
Ask phone First - Pen drop Metacog	-0.19	0.54	-0.36	1.00
Ask phone First - Ask dollar WTR	1.64	0.54	3.05	.206
Ask phone First - Ask phone WTR	0.07	0.53	0.13	1.00
Ask phone First - Dollar drop WTR	-0.73	0.57	-1.27	.999
Ask phone First - Pen drop WTR	-0.82	0.59	-1.38	.998
Dollar drop First - Pen drop First	0.87	0.71	1.22	1.00
Dollar drop First - Ask dollar Field	3.28	0.65	5.04	<.001
Dollar drop First - Ask phone Field	0.10	0.69	0.14	1.00
Dollar drop First - Dollar drop Field	2.13	0.64	3.35	.091
Dollar drop First - Pen drop Field	2.75	0.65	4.26	.003
Dollar drop First - Ask dollar 2023 Hypothetical	2.42	0.63	3.85	.017
Dollar drop First - Ask phone 2023 Hypothetical	0.80	0.64	1.25	1.00
Dollar drop First - Dollar drop 2023 Hypothetical	0.66	0.64	1.04	1.00
Dollar drop First - Pen drop 2023 Hypothetical	1.16	0.63	1.84	.954

Dollar drop First - Ask dollar Metacog	2.53	0.66	3.85	.018
Dollar drop First - Ask phone Metacog	1.74	0.64	2.73	.408
Dollar drop First - Dollar drop Metacog	0.81	0.67	1.22	1.00
Dollar drop First - Pen drop Metacog	1.05	0.66	1.60	.990
Dollar drop First - Ask dollar WTR	2.87	0.67	4.29	.003
Dollar drop First - Ask phone WTR	1.31	0.66	1.99	.907
Dollar drop First - Dollar drop WTR	0.51	0.69	0.74	1.00
Dollar drop First - Pen drop WTR	0.42	0.70	0.60	1.00
Pen drop First - Ask dollar Field	2.41	0.57	4.25	.003
Pen drop First - Ask phone Field	-0.77	0.62	-1.25	1.00
Pen drop First - Dollar drop Field	1.26	0.55	2.29	.744
Pen drop First - Pen drop Field	1.88	0.56	3.35	.092
Pen drop First - Ask dollar 2023 Hypothetical	1.55	0.54	2.85	.320
Pen drop First - Ask phone 2023 Hypothetical	-0.07	0.56	-0.12	1.00
Pen drop First - Dollar drop 2023 Hypothetical	-0.21	0.56	-0.37	1.00
Pen drop First - Pen drop 2023 Hypothetical	0.29	0.55	0.53	1.00
Pen drop First - Ask dollar Metacog	1.66	0.58	2.88	.304
Pen drop First - Ask phone Metacog	0.87	0.56	1.57	.992
Pen drop First - Dollar drop Metacog	-0.06	0.59	-0.09	1.00
Pen drop First - Pen drop Metacog	0.18	0.58	0.30	1.00
Pen drop First - Ask dollar WTR	2.00	0.59	3.40	.078
Pen drop First - Ask phone WTR	0.44	0.58	0.75	1.00
Pen drop First - Dollar drop WTR	-0.36	0.61	-0.59	1.00
Pen drop First - Pen drop WTR	-0.45	0.63	-0.71	1.00
Ask dollar Field - Ask phone Field	-3.19	0.54	-5.91	<.001

Ask dollar Field - Dollar drop Field	-1.15	0.41	-2.79	.360
Ask dollar Field - Pen drop Field	-0.53	0.41	-1.30	.999
Ask dollar Field - Ask dollar 2023 Hypothetical	-0.86	0.39	-2.20	.800
Ask dollar Field - Ask phone 2023 Hypothetical	-2.48	0.46	-5.37	<.001
Ask dollar Field - Dollar drop 2023 Hypothetical	-2.62	0.47	-5.56	<.001
Ask dollar Field - Pen drop 2023 Hypothetical	-2.12	0.44	-4.83	<.001
Ask dollar Field - Ask dollar Metacog	-0.75	0.43	-1.74	.974
Ask dollar Field - Ask phone Metacog	-1.54	0.43	-3.53	.052
Ask dollar Field - Dollar drop Metacog	-2.47	0.51	-4.88	<.001
Ask dollar Field - Pen drop Metacog	-2.24	0.48	-4.63	.001
Ask dollar Field - Ask dollar WTR	-0.41	0.44	-0.94	1.00
Ask dollar Field - Ask phone WTR	-1.98	0.48	-4.16	.005
Ask dollar Field - Dollar drop WTR	-2.78	0.54	-5.18	<.001
Ask dollar Field - Pen drop WTR	-2.86	0.55	-5.18	<.001
Ask phone Field - Dollar drop Field	2.04	0.52	3.89	.015
Ask phone Field - Pen drop Field	2.66	0.53	4.98	<.001
Ask phone Field - Ask dollar 2023 Hypothetical	2.32	0.51	4.53	.001
Ask phone Field - Ask phone 2023 Hypothetical	0.71	0.53	1.33	.999
Ask phone Field - Dollar drop 2023 Hypothetical	0.57	0.53	1.07	1.00
Ask phone Field - Pen drop 2023 Hypothetical	1.06	0.52	2.06	.879
Ask phone Field - Ask dollar Metacog	2.43	0.55	4.43	.002
Ask phone Field - Ask phone Metacog	1.65	0.53	3.12	.172
Ask phone Field - Dollar drop Metacog	0.72	0.56	1.27	.999
Ask phone Field - Pen drop Metacog	0.95	0.55	1.73	.975
Ask phone Field - Ask dollar WTR	2.78	0.56	4.95	<.001

Ask phone Field - Ask phone WTR	1.21	0.55	2.20	.800
Ask phone Field - Dollar drop WTR	0.41	0.58	0.70	1.00
Ask phone Field - Pen drop WTR	0.33	0.60	0.54	1.00
Dollar drop Field - Pen drop Field	0.62	0.42	1.49	.996
Dollar drop Field - Ask dollar 2023 Hypothetical	0.29	0.40	0.72	1.00
Dollar drop Field - Ask phone 2023 Hypothetical	-1.33	0.45	-2.97	.249
Dollar drop Field - Dollar drop 2023 Hypothetical	-1.47	0.45	-3.25	.122
Dollar drop Field - Pen drop 2023 Hypothetical	-0.98	0.43	-2.28	.748
Dollar drop Field - Ask dollar Metacog	0.50	0.44	0.90	1.00
Dollar drop Field - Ask phone Metacog	-0.39	0.43	-0.91	1.00
Dollar drop Field - Dollar drop Metacog	-1.32	0.49	-2.69	.434
Dollar drop Field - Pen drop Metacog	-1.09	0.47	-2.32	.722
Dollar drop Field - Ask dollar WTR	0.74	0.45	1.64	.986
Dollar drop Field - Ask phone WTR	-0.83	0.47	-1.78	.966
Dollar drop Field - Dollar drop WTR	-1.63	0.52	-3.14	.164
Dollar drop Field - Pen drop WTR	-1.71	0.54	-3.19	.142
Pen drop Field - Ask dollar 2023 Hypothetical	-0.33	0.40	-0.83	1.00
Pen drop Field - Ask phone 2023 Hypothetical	-1.95	0.46	-4.26	.003
Pen drop Field - Dollar drop 2023 Hypothetical	-2.09	0.47	-4.50	.001
Pen drop Field - Pen drop 2023 Hypothetical	-1.59	0.44	-3.65	.035
Pen drop Field - Ask dollar Metacog	-0.22	0.44	-0.51	1.00
Pen drop Field - Ask phone Metacog	-1.01	0.44	-2.32	.724
Pen drop Field - Dollar drop Metacog	-1.94	0.50	-3.87	.016
Pen drop Field - Pen drop Metacog	-1.71	0.48	-3.56	.047
Pen drop Field - Ask dollar WTR	0.12	0.45	0.27	1.00

Pen drop Field - Ask phone WTR	-1.45	0.47	-3.06	.201
Pen drop Field - Dollar drop WTR	-2.25	0.53	-4.24	.004
Pen drop Field - Pen drop WTR	-2.33	0.55	-4.27	.003
Ask dollar 2023 Hypothetical - Ask phone 2023 Hypothetical	-1.62	0.44	-3.71	.029
Ask dollar 2023 Hypothetical - Dollar drop 2023 Hypothetical	-1.76	0.44	-3.98	.010
Ask dollar 2023 Hypothetical - Pen drop 2023 Hypothetical	-1.26	0.41	-3.05	.207
Ask dollar 2023 Hypothetical - Ask dollar Metacog	0.11	0.42	0.26	1.00
Ask dollar 2023 Hypothetical - Ask phone Metacog	-0.68	0.41	-1.63	.987
Ask dollar 2023 Hypothetical - Dollar drop Metacog	-1.61	0.48	-3.35	.091
Ask dollar 2023 Hypothetical - Pen drop Metacog	-1.37	0.46	-3.00	.230
Ask dollar 2023 Hypothetical - Ask dollar WTR	0.45	0.43	1.05	1.00
Ask dollar 2023 Hypothetical - Ask phone WTR	-1.12	0.45	-2.46	.613
Ask dollar 2023 Hypothetical - Dollar drop WTR	-1.91	0.51	-3.76	.024
Ask dollar 2023 Hypothetical - Pen drop WTR	-2.00	0.53	-3.77	.021
Ask phone 2023 Hypothetical - Dollar drop 2023 Hypothetical	-0.14	0.46	-0.30	1.00
Ask phone 2023 Hypothetical - Pen drop 2023 Hypothetical	0.36	0.45	0.80	1.00
Ask phone 2023 Hypothetical - Ask dollar Metacog	1.73	0.48	3.62	.038
Ask phone 2023 Hypothetical - Ask phone Metacog	0.94	0.46	2.06	.878
Ask phone 2023 Hypothetical - Dollar drop Metacog	0.01	0.50	0.02	1.00
Ask phone 2023 Hypothetical - Pen drop Metacog	0.24	0.49	0.50	1.00
Ask phone 2023 Hypothetical - Ask dollar WTR	2.07	0.49	4.23	.004
Ask phone 2023 Hypothetical - Ask phone WTR	0.50	0.48	1.04	1.00
Ask phone 2023 Hypothetical - Dollar drop WTR	-0.30	0.53	-0.56	1.00
Ask phone 2023 Hypothetical - Pen drop WTR	-0.38	0.54	-0.70	1.00

Dollar drop 2023 Hypothetical - Pen drop 2023 Hypothetical	0.50	0.45	1.12	1.00
Dollar drop 2023 Hypothetical - Ask dollar Metacog	1.87	0.48	3.87	.016
Dollar drop 2023 Hypothetical - Ask phone Metacog	1.08	0.46	2.36	.691
Dollar drop 2023 Hypothetical - Dollar drop Metacog	0.15	0.50	0.31	1.00
Dollar drop 2023 Hypothetical - Pen drop Metacog	0.38	0.48	0.80	1.00
Dollar drop 2023 Hypothetical - Ask dollar WTR	2.21	0.50	4.46	.001
Dollar drop 2023 Hypothetical - Ask phone WTR	0.64	0.48	1.33	.999
Dollar drop 2023 Hypothetical - Dollar drop WTR	-0.15	0.52	-0.29	1.00
Dollar drop 2023 Hypothetical - Pen drop WTR	-0.24	0.54	-0.44	1.00
Pen drop 2023 Hypothetical - Ask dollar Metacog	1.37	0.46	3.00	.229
Pen drop 2023 Hypothetical - Ask phone Metacog	0.58	0.44	1.33	.999
Pen drop 2023 Hypothetical - Dollar drop Metacog	-0.35	0.49	-0.71	1.00
Pen drop 2023 Hypothetical - Pen drop Metacog	-0.11	0.47	-0.24	1.00
Pen drop 2023 Hypothetical - Ask dollar WTR	1.71	0.47	3.65	.035
Pen drop 2023 Hypothetical - Ask phone WTR	0.15	0.47	0.31	1.00
Pen drop 2023 Hypothetical - Dollar drop WTR	-0.65	0.51	-1.28	.999
Pen drop 2023 Hypothetical - Pen drop WTR	-0.74	0.53	-1.39	.998
Ask dollar Metacog - Ask phone Metacog	-0.79	0.46	-1.72	.976
Ask dollar Metacog - Dollar drop Metacog	-1.72	0.52	-3.32	.100
Ask dollar Metacog - Pen drop Metacog	-1.48	0.50	-2.99	.238
Ask dollar Metacog - Ask dollar WTR	0.34	0.47	0.73	1.00
Ask dollar Metacog - Ask phone WTR	-1.22	0.50	-2.50	.591
Ask dollar Metacog - Dollar drop WTR	-2.02	0.54	-3.72	.028
Ask dollar Metacog - Pen drop WTR	-2.11	0.56	-3.76	.024
Ask phone Metacog - Dollar drop Metacog	-0.93	0.50	-1.87	.946

Ask phone Metacog - Pen drop Metacog	-0.70	0.48	-1.46	.996
Ask phone Metacog - Ask dollar WTR	1.13	0.47	2.41	.653
Ask phone Metacog - Ask phone WTR	-0.44	0.47	-0.92	1.00
Ask phone Metacog - Dollar drop WTR	-1.23	0.52	-2.37	.686
Ask phone Metacog - Pen drop WTR	-1.32	0.54	-2.45	.625
Dollar drop Metacog - Pen drop Metacog	0.23	0.52	0.45	1.00
Dollar drop Metacog - Ask dollar WTR	2.06	0.53	3.89	.015
Dollar drop Metacog - Ask phone WTR	0.49	0.52	0.95	1.00
Dollar drop Metacog - Dollar drop WTR	-0.31	0.56	-0.55	1.00
Dollar drop Metacog - Pen drop WTR	-0.39	0.57	-0.68	1.00
Pen drop Metacog - Ask dollar WTR	1.83	0.51	3.59	.044
Pen drop Metacog - Ask phone WTR	0.26	0.50	0.52	1.00
Pen drop Metacog - Dollar drop WTR	-0.54	0.54	-0.99	1.00
Pen drop Metacog - Pen drop WTR	-0.62	0.56	-1.11	1.00
Ask dollar WTR - Ask phone WTR	-1.57	0.50	-3.11	.176
Ask dollar WTR - Dollar drop WTR	-2.36	0.56	-4.25	.004
Ask dollar WTR - Pen drop WTR	-2.45	0.57	-4.27	.003
Ask phone WTR - Dollar drop WTR	-0.80	0.54	-1.47	.996
Ask phone WTR - Pen drop WTR	-0.88	0.56	-1.58	.991
Dollar drop WTR - Pen drop WTR	-0.09	0.59	-0.15	1.00

Appendix B - R Code

```
library(MASS)
library(nnet)
library(brant)
library(carData)
library(emmeans)
library(ggplot2)
library(sjPlot)
library(lme4)
library(psych)
library(car)
library(tidyr)
library(ordinal)
library(broom)
library(broom.mixed)
library(flextable)
library(systemfonts)
library(officer)

#####
#STUDY 1
#####

#individual analyses by stimulus

#static image

staticdata = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Study 1
(Static).csv")
View(staticdata)
str(staticdata)
summary(staticdata)

staticdata$Behavior = factor(staticdata$Behavior)
contrasts(staticdata$Behavior) = contr.sum(4)
contrasts(staticdata$Behavior)
staticdata$Outcome = factor(staticdata$Outcome, order = TRUE, levels = c("0", "1", "2"))
staticdata$WTR = as.numeric(staticdata$WTR)
staticdata$Empathy = as.numeric(staticdata$Empathy)
staticdata$IOSCircle = as.numeric(staticdata$IOSCircle)
staticdata$C.Empathy <- scale(staticdata$Empathy, center = TRUE, scale = FALSE)
staticdata$C.IOSCircle <- scale(staticdata$IOSCircle, center = TRUE, scale = FALSE)
str(staticdata)

#ordinal model
```

```

staticor <- polr(data=staticdata, Outcome ~ Behavior + C.Empathy + C.IOSCircle +
C.Empathy:C.IOSCircle + WTR)
summary(staticor)
vif(staticor)

#testing assumption of parallel lines
brant(staticor)
#says the assumption holds

#main effects summaries
Anova(staticor)
#printing tables
tab_model(staticor, show.stat=TRUE, show.p=FALSE, show.re=FALSE)

#multiple comparisons
emmeans_staticor <- emmeans(staticor, pairwise ~ Behavior, adjust = "tukey")
summary(emmeans_staticor)

#third person video
thirddata = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Study 1
(Third).csv")
View(thirddata)
str(thirddata)
summary(thirddata)

thirddata$Behavior = factor(thirddata$Behavior)
contrasts(thirddata$Behavior) = contr.sum(4)
contrasts(thirddata$Behavior)
thirddata$Outcome = factor(thirddata$Outcome, order = TRUE, levels = c("0", "1", "2"))
thirddata$WTR = as.numeric(thirddata$WTR)
thirddata$Empathy = as.numeric(thirddata$Empathy)
thirddata$IOSCircle = as.numeric(thirddata$IOSCircle)
thirddata$C.Empathy <- scale(thirddata$Empathy, center = TRUE, scale = FALSE)
thirddata$C.IOSCircle <- scale(thirddata$IOSCircle, center = TRUE, scale = FALSE)
str(thirddata)

#ordinal model

thirdor <- polr(data=thirddata, Outcome ~ Behavior + C.Empathy +C.IOSCircle
+C.Empathy:C.IOSCircle + WTR)
summary(thirdor)

#testing assumption of parallel lines
brant(thirdor)
#says the assumption holds

```

```

#main effects summaries
Anova(thirdor)
#printing tables
tab_model(thirdor, show.stat=TRUE, show.p=FALSE, show.re=FALSE)

#multiple comparisons
emmeans_thirdor <- emmeans(thirdor, pairwise ~ Behavior, adjust = "tukey")
summary(emmeans_thirdor)

#first person video
firstdata = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Study 1
(First).csv")
View(firstdata)
str(firstdata)
summary(firstdata)

firstdata$Behavior = factor(firstdata$Behavior)
contrasts(firstdata$Behavior) = contr.sum(4)
contrasts(firstdata$Behavior)
firstdata$Outcome = factor(firstdata$Outcome, order = TRUE, levels = c("0", "1", "2"))
firstdata$WTR = as.numeric(firstdata$WTR)
firstdata$Empathy = as.numeric(firstdata$Empathy)
firstdata$IOSCircle = as.numeric(firstdata$IOSCircle)
firstdata$C.Empathy <- scale(firstdata$Empathy, center = TRUE, scale = FALSE)
firstdata$C.IOSCircle <- scale(firstdata$IOSCircle, center = TRUE, scale = FALSE)
str(firstdata)

#ordinal model

firstor <- polr(data=firstdata, Outcome ~ Behavior + C.Empathy + C.IOSCircle +
C.Empathy:C.IOSCircle + WTR)
summary(firstor)

#testing assumption of parallel lines
brant(firstor)
#says the assumption holds

#main effects summaries
Anova(firstor)
#printing tables
tab_model(firstor, show.stat=TRUE, show.p=FALSE, show.re=FALSE)

#multiple comparisons
emmeans_firstor <- emmeans(firstor, pairwise ~ Behavior, adjust = "tukey")

```

```
summary(emmeans_firstor)
```

```
#exploratory model with all stimuli + 2023 data
compare = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Final Diss
Analyses and Graphs/Study 1 Comparison.csv")
View(compare)
str(compare)
summary(compare)
```

```
compare$Behavior = factor(compare$Behavior)
contrasts(compare$Behavior) = contr.sum(4)
contrasts(compare$Behavior)
compare$Study = factor(compare$Study)
contrasts(compare$Study) = contr.sum(4)
contrasts(compare$Study)
compare$P = as.character(compare$P)
compare$Outcome = factor(compare$Outcome, order = TRUE, levels = c("0", "1", "2"))
str(compare)
```

```
#exploratory multilevel ordinal regression
compareor <- clmm(Outcome ~ Behavior*Study + (1|P), data = compare, link = "logit")
summary(compareor)
Anova(compareor, type = "II")
drop1(compareor, test = "Chisq")
```

```
#multiple comparisons
emmeans_compareor <- emmeans(compareor, pairwise ~ Behavior*Study, adjust = "tukey")
summary(emmeans_compareor)
```

```
#printing post hoc table
compareor_results <- broom::tidy(emmeans_compareor$contrasts)
tab_df(compareor_results,
  title = "Post-hoc results for all stimulus types",
  digits = 3,
  show.rownames = FALSE)
```

```
#printing estimates table
compareorsummary <- broom.mixed::tidy(compareor, conf.int = TRUE)
comparetable <- flextable(compareorsummary) %>%
  theme_booktabs() %>%
  set_caption("CLMM Model Results") %>%
  colformat_double(j = c("estimate", "conf.low", "conf.high", "p.value"), digits = 3)
read_docx() %>%
  body_add_flextable(comparetable) %>%
```

```

print(target = "clmm_model_results.docx")

#####
#STUDY 2
#####
study2data = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Study 2
Analysis.csv")
View(study2data)
str(study2data)
summary(study2data)

study2data$Behavior = factor(study2data$Behavior)
contrasts(study2data$Behavior) = contr.sum(4)
contrasts(study2data$Behavior)
study2data$Outcome = factor(study2data$Outcome, order = TRUE, levels = c("0", "1", "2"))
study2data$Prompt = factor(study2data$Prompt, levels = c("Control", "Meta", "SD"))
#manually making the control condition the reference group for effect coding because R is being
difficult
contrasts(study2data$Prompt) <- matrix(c(-1, 1, 0,
-1, 0, 1),
nrow = 3,
dimnames = list(levels(study2data$Prompt), NULL))
contrasts(study2data$Prompt)
study2data$WTR = as.numeric(study2data$WTR)
study2data$Empathy = as.numeric(study2data$Empathy)
study2data$IOSCircle = as.numeric(study2data$IOSCircle)
study2data$C.Empathy <- scale(study2data$Empathy, center = TRUE, scale = FALSE)
study2data$C.IOSCircle <- scale(study2data$IOSCircle, center = TRUE, scale = FALSE)
str(study2data)

#testing interaction models
metacog1 <- polr(data=study2data, Outcome ~ Behavior + Prompt + Empathy + IOSCircle +
WTR)
metacog2 <- polr(data=study2data, Outcome ~ Behavior*Prompt + Empathy + IOSCircle +
WTR) #using this model
metacog3 <- polr(data=study2data, Outcome ~ Behavior*Prompt + C.Empathy + C.IOSCircle +
C.Empathy:C.IOSCircle + WTR) #added nothing to model fit, excluding
AIC(metacog1, metacog2, metacog3)
summary(metacog2)

#testing assumption of parallel lines
brant(metacog2)
#says the assumption holds

#main effects summaries
Anova(metacog2)

```

```

#printing tables
tab_model(metacog2, show.stat=TRUE, show.p=FALSE, show.re=FALSE)

#multiple comparisons
emmeans_metacog2behavior <- emmeans(metacog2, pairwise ~ Behavior, adjust = "tukey")
summary(emmeans_metacog2behavior)

emmeans_metacog2interaction <- emmeans(metacog2, pairwise ~ Behavior*Prompt, adjust =
"tukey")
summary(emmeans_metacog2interaction)

#printing post hoc tables
metacogbehavior_contrast <- broom::tidy(emmeans_metacog2behavior$contrasts)
tab_df(metacogbehavior_contrast,
       title = "Post-hoc results for study 2 behavior",
       digits = 3,
       show.rownames = FALSE)

metacoginteraction_contrast <- broom::tidy(emmeans_metacog2interaction$contrasts)
tab_df(metacoginteraction_contrast,
       title = "Post-hoc results for study 2 interaction",
       digits = 3,
       show.rownames = FALSE)

#####
#STUDY 3
#####

study3data = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Study 3
Analysis.csv")
View(study3data)
str(study3data)
summary(study3data)

study3data$Behavior = factor(study3data$Behavior)
contrasts(study3data$Behavior) = contr.sum(4)
contrasts(study3data$Behavior)
study3data$Outcome = factor(study3data$Outcome, order = TRUE, levels = c("0", "1", "2"))
study3data$Location = factor(study3data$Location, levels = c("Classroom", "Union",
"Airport"))
contrasts(study3data$Location) <- matrix(c(-1, 1, 0,
-1, 0, 1),
nrow = 3,
dimnames = list(levels(study3data$Prompt), NULL))
contrasts(study3data$Location)
study3data$WTR = as.numeric(study3data$WTR)

```

```

study3data$Empathy = as.numeric(study3data$Empathy)
study3data$IOSCircle = as.numeric(study3data$IOSCircle)
study3data$C.Empathy <- scale(study3data$Empathy, center = TRUE, scale = FALSE)
study3data$C.IOSCircle <- scale(study3data$IOSCircle, center = TRUE, scale = FALSE)
str(study3data)

#testing interaction models
wtr1 <- polr(data=study3data, Outcome ~ Behavior + Location + Empathy + IOSCircle + WTR)
wtr2 <- polr(data=study3data, Outcome ~ Behavior*Location + Empathy + IOSCircle + WTR)
wtr3 <- polr(data=study3data, Outcome ~ Behavior + Location*WTR + Empathy + IOSCircle)
#best AIC given complexity, use this one
wtr4 <- polr(data=study3data, Outcome ~ Behavior + Location*WTR +
C.Empathy:C.IOSCircle)
AIC(wtr1, wtr2, wtr3, wtr4)
summary(wtr3)

#testing assumption of parallel lines
brant(wtr3)
#says the assumption holds

#main effects summaries
Anova(wtr3)
#printing tables
tab_model(wtr3, show.stat=TRUE, show.p=FALSE, show.re=FALSE)

#multiple comparisons
emmeans_wtr3behavior <- emmeans(wtr3, pairwise ~ Behavior, adjust = "tukey")
summary(emmeans_wtr3behavior)

#####
#Exploratory multilevel model with all studies
#####
compareall = read.csv("C:/Users/nbalb/Documents/Documents/Dissertation Ideas/Final Diss
Analyses and Graphs/All Studies Comparison.csv")
View(compareall)
str(compareall)
summary(compareall)

compareall$Behavior = factor(compareall$Behavior)
contrasts(compareall$Behavior) = contr.sum(4)
contrasts(compareall$Behavior)
compareall$Study = factor(compareall$Study)
contrasts(compareall$Study) = contr.sum(5)
contrasts(compareall$Study)
compareall$P = as.character(compareall$P)
compareall$Outcome = factor(compareall$Outcome, order = TRUE, levels = c("0", "1", "2"))

```

```

str(compareall)

#exploratory multilevel ordinal regression
compareorall <- clmm(Outcome ~ Behavior*Study + (1|P), data = compareall, link = "logit")
summary(compareorall)

#multiple comparisons
emmeans_compareorall <- emmeans(compareorall, pairwise ~ Behavior*Study, adjust =
"tukey")
options(max.print = 10000)
summary(emmeans_compareorall)

#printing estimates table
compareorallsummary <- broom.mixed::tidy(compareorall, conf.int = TRUE)

compareoralltable <- flextable(compareorallsummary) %>%
  theme_booktabs() %>%
  set_caption("CLMM Model Results") %>%
  colformat_double(j = c("estimate", "conf.low", "conf.high", "p.value"), digits = 3)

read_docx() %>%
  body_add_flextable(compareoralltable) %>%
  print(target = "clmm_model_results.docx")

compareoralltable

#printing post hoc table
compareorall_results <- broom::tidy(emmeans_compareorall$contrasts)
tab_df(compareorall_results,
  title = "Post-hoc results for all studies",
  digits = 3,
  show.rownames = FALSE)

```