Peer Language Use and Criminal Decision-Making:

An Experimental Study Testing Framing Effects of Peer Messages

by

Natanela Dain

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Criminal decision-making tends to occur in social contexts. There is evidence that the decision to commit a crime is often preceded by verbal communication, however, relatively little is known about the mechanisms through which conversations affect offending decisions. In this study, we applied rational choice theory, prospect theory, and need to belong theory to investigate the role of peer language use on offending decisions. We tested the hypothesis that peer messages framed as social gains and social losses would increase the likelihood and perceived worth of engaging in criminal activity. Moreover, based on prospect theory's loss aversion principle, we hypothesized that this increase would be greater for peer messages framed as social losses. We recruited 313 North American young adults (ages 18-24) to participate in an online randomized experiment. We found that peer verbal prompts framed as social gains and social losses increased the likelihood of stealing. Although this increase was not larger for social loss framed messages, our results showed that social loss aversion, or the fear of losing belonging, significantly predicted all offending outcomes. Moreover, the effects of social loss framing on likelihood and perceived worth of stealing were significantly mediated by fear of losing acceptance. This study substantiates that peer language use plays a significant role in offending decisions and provides support for the social loss aversion principle. Implications and directions for future research are discussed.

Acknowledgements

Dedication

To Mom and Dad, thank you for everything:

Frog and Toad went out to fly a kite.

They went to a large meadow where the wind was strong.

"Our kite will fly up and up," said Frog. "It will fly all the way up to the top of the sky."

"Toad," said Frog, "I will hold the ball of string. You hold the kite and run."

-Arnold Lobel

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Chapter 1
Introduction

Delinquency and crime tend to occur in social contexts (Hoeben & Thomas, 2019). The link between peer influence and involvement in deviant behavior is one of the most well-established and strongest associations in criminology (Warr, 2002). Peers impact involvement in crime in part by altering decision-making processes and shaping the decision-maker's risk and reward assessment (Chein et al., 2011; Defoe et al., 2015). For instance, McGloin and Thomas (2016) found that college students perceived greater social rewards and excitement/thrill in committing a crime and reported more willingness to commit a crime as size of peer group increased. Similarly, Gallupe and colleagues (2016; 2019) demonstrated that behavioral modeling of crime and peer verbal prompts to commit crime significantly increase likelihood of individual offending.

A recent literature review of peer influence on criminal decision-making cites growing interest in the situational influence of peers as conversational partners on offender decision-making processes (Hoeben & Thomas, 2019). There is evidence that verbal communication and conversation impact offender decision-making (Alarid et al., 2009; Barnum & Pogarsky, 2022; Costello & Hope, 2016; Hochstetler, 2006); however, little is known about the mechanisms through which conversation affects an offender's decision to commit crime. This study draws on classical criminology, behavioral economics, and social psychology theories to investigate the role of peer communication and peer language use on the decision to commit crime. Using hypothetical survey vignettes, this experiment tests framing effects of peer messages on criminal-decision making processes and provides insight

on how individuals process social cues and weigh social risks and rewards when making offending decisions.

The study reveals that peer messages framed as both social gains (potential for inclusion) and social losses (potential for exclusion), compared to a control condition, significantly increased the likelihood of stealing. Moreover, the fear of losing social acceptance drove offending decisions; individuals with a higher aversion to exclusion and losing acceptance were more likely to engage in serious offences and to perceive these offences as worthwhile. The fear of losing belonging in the peer group also increased the effect of social loss framed peer messages, which in turn, increased the willingness and perceived worth of committing theft. Overall, this experiment demonstrates that peer message framing and social loss aversion significantly affect offender decision-making.

This thesis is organized into several chapters. In Chapter 2, I provide an overview of peer influence on criminal offending, primarily focusing on the active influence of peers as conversational partners. Then, I will review theories of criminal choice, including rational choice and expected utility theory. In this review, I will outline the key principles of rational choice paradigms, but I will also highlight the limitations of such models in explaining criminal choice. In light of these limitations, I will point to a recent trend in criminology, wherein scholars are shifting away from traditional theories of criminal choice towards alternative behavioral economics models. I will link the principles of behavioral economics theories to the fundamental need to belong theory, then present my hypotheses. In Chapter 3, I will present my methodology and analytic approach. Chapter 4 will describe the results of

the experiment. In the final chapter, I discuss the main findings of my study, their

implications, and directions for future research.

Chapter 2

Literature Review

Situational Influences of Peers on Decision Making

Criminological literature on peer influences and offending decisions has largely presented two alternative views of criminal choice (Hoeben & Thomas, 2019). The socialization perspective, including theories of social learning, emphasize long term, normative peer influences and the internalization of values and beliefs (Akers, 1998; Sutherland, 1947). Socialization theories maintain that over time, interactions with peers lead to the transference of norms. Situational perspectives, on the other hand, highlight short-term, immediate peer influences (Asch, 1955; Birkbeck & Lafree, 1993; Osgood et al., 1996) and the ways in which peers can "make deviance more rewarding and easier to commit" (Hoeben & Thomas, 2019, p. 764).

Peers may situationally influence offending decisions through their mere presence. The presence of others tends to increase involvement in risky behavior and crime (Gardner & Steinberg, 2005; McGloin & Piquero, 2009). It is well-established that groups diffuse the sense of individual responsibility, reduce the perceived risk of detection, and lower the perceived informal costs of deviant behavior (Diener, 1977; Festinger et al., 1952; Warr, 2002). A recent study revealed that the number of co-offenders alters individuals' perceptions of risks and rewards associated with criminal offending (McGloin & Thomas, 2016). In larger groups, decision-makers report decreased perception of formal sanction

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risks, a lowered sense of responsibility for the criminal act, less anticipated disappointment by family, and greater anticipated rewards, including fun, excitement, and social inclusion.

Active Situational Influences: Peers as Conversational Partners

Peers may also actively influence offender decision-making processes through explicit suggestions to engage in criminal behavior (Hoeben & Thomas, 2019; Gasser & Seiter, 2014, Kellermann & Cole, 1994). The decision to commit a crime is often preceded by verbal communication and coordination with peers (Alarid et al., 2009; Hochstetler, 2006). Laboratory experiments reveal that modeling of criminal offending and verbal prompts from peers increases the likelihood of individual offending (Gallupe et al., 2016; 2019). Scholars posit several mechanisms through which peer communication may influence the criminal decision-making processes.

During conversations, decision-makers continuously update their perceptions of risks/rewards based on information imparted by their peers (Kreager et al., 2016; Matthews & Agnew, 2008; Stafford & Warr, 1993). Interpersonal communication may add information that the decision-maker had not yet considered. For example, peers may share stories of committing crimes and not being sanctioned for their offenses. In light of this new information, the decision-maker updates their perception of the likelihood of being arrested and sanctioned for committing a similar crime (Matthews & Agnew, 2008; Pogarsky et al., 2004). Once the decision-maker perceives a lower probability of arrest and sanction, the crime is perceived as less risky and individual likelihood of offending increases.

Conversational partners, therefore, may alter the criminal decision-maker's perceptions of costs and benefits associated with criminal behavior (Hoeben & Thomas, 2019).

Moreover, during criminal decision-making processes, not all risks and benefits are equally salient (Paternoster & Bushway, 2009). During conversations, peer language can influence the relative salience of certain costs and rewards, and consequently affect willingness to engage in criminal behavior (Hoeben & Thomas, 2019). Verbal prompting that highlights, for example, the costs of committing a crime (such as arrests and fines) may decrease likelihood of offending as potential sanctions become more salient in the decision-maker's mind. On the other hand, verbal prompting that draws attention to the benefits of committing a crime, such as monetary gains or social status, may increase likelihood of offending as potential rewards become more salient (Kreager et al., 2016; Matsueda et al., 2006).

In an experimental study of peer language use and criminal offending, Barnum and Pogarsky (2022) found evidence that decision-makers adjust perceived sanction risks and social costs based on the content of peer verbal prompts. In an online survey, participants read three hypothetical criminal offending vignettes. The first vignette outlined a drunk driving scenario. The second described a potential physical altercation with an angry stranger, while the third presented the participants with an opportunity to commit insurance fraud with their friend. For each vignette, participants were randomly assigned to read peer verbal prompts that emphasized either high sanction risk or low sanction risk associated with the crime, or verbal prompts that emphasized high social costs and low social costs of the

offence. After reading each scenario, participants rated the perceived certainty of sanction and the perceived social costs. Respondents reported greater perceived risk of formal sanctions when peer messages described a high likelihood of being caught and greater perceived social costs when verbal prompts drew attention to the immorality of offending and negative judgment from peers.

Barnum and Pogarsky's (2022) study provides empirical evidence that the content, wording, and language of peer messages affect risk assessment. However, the authors did not include measures of potential rewards associated with offending, including thrill, excitement, and social inclusion. Furthermore, they did not measure the decision-makers' perceived worth of the criminal opportunity or their willingness to offend. Scholars speculate then, that the content of peer verbal prompts influences risk and reward perception and subsequently, alters the perceived worth of the criminal opportunity and willingness to commit the crime, but this has not yet been empirically tested (Hoeben & Thomas, 2019).

Theories of Criminal Choice

Rational Choice and Prospect Theory

Much of the criminological literature on offender-decision making is based on rational choice theory (Loughran et al., 2016). Rational choice theory assumes that humans are rational decision-makers that engage in cost/benefit analysis during decision-making processes (Becker, 1968). Becker developed rational choice theory by expanding on expected utility theory, which postulates that individuals make decisions that maximize expected utility (von Neumann & Morgenstern, 1944). Becker (1968) theorized that decision-makers calculate the

expected utility of committing a criminal offence by weighing the probability of conviction, punishment, and potential gains of the offence, including monetary gains and psychic benefits. If the benefits outweigh the costs, the individual will decide to commit the crime. However, if the costs outweigh the benefits, the individual will not offend.

While Becker's work was seminal and informed many criminal justice policies, empirical studies reveal that people rarely make decisions as outlined by expected utility theory (Camerer & Loewenstein, 2004; Rabin & Thaler, 2001). Rational choice theory provides a linear equation of choice. According to this paradigm, probabilities ranging from 0 to 1 can be plugged in to an equation that predicts the decision-making outcome. However, increasingly, evidence suggests that decision-making under risk is not linear (Kruis et al. 2020). Decision-makers tend to overweigh small probabilities and underweight large probabilities. Moreover, they tend to disregard or ignore extremely small probabilities while exaggerating the likelihood of very high, but not certain probabilities (Kahneman & Tversky, 1979). Relatedly, when an outcome is highly probable but not guaranteed, decision-makers mistakenly treat it as certain (Tversky & Kahneman, 1986). This contradicts expected utility's linear model of choice and reveals that decision-making under risk is subject to cognitive biases and situational factors, including ambiguity.

Additionally, while rational choice models postulate that decision-makers weigh absolute costs and benefits, studies demonstrate that instead, decision-makers use a relative reference point and weigh gains and losses deviating from that reference point (Kruis et al., 2020). Often the decision-makers' references points are based on their current assets, their

expectations, and their lived experiences (Thomas & Loughran, 2014). To exemplify this, Piquero et al. (2011, p.351) write "an offender who has previously "generated a certain amount of [weekly] income from drug selling" may become more willing to accept risks in a subsequent week if his or her generated income decreases, because he or she will view it as a loss rather than "simply as a nongain in (i.e. zero) utility" (as cited in Pickett et al., 2020). In other words, rather than using a linear equation and calculating the probability of gaining a particular monetary sum, the decision-maker will also take into account situational factors, including previous earnings. The expected utility equation does not account for relative gains and losses, and therefore, offers a less thorough representation of the offending decision-making process.

The lack of empirical support for expected utility models has resulted in a recent shift towards behavioral economic theories to understand criminal decision-making processes (Hoeben & Thomas, 2019; Pickett et al., 2020). Prospect theory "is perhaps the most prominent behavioral economic alternative to expected utility theory" (Pickett et al., 2020, p. 1144). While prospect theory was initially developed by Kahneman and Tversky (1979) as a descriptive model for decision-making under risk relating to simple monetary outcomes and stated probability prospects, it has since been applied to more complex decision-making contexts, including insurance, finance, policy, and political choices (see Barberis, 2013 for a review). A key principle of prospect theory is that decision-making occurs in two stages. The first stage, termed the editing phase, entails a preliminary analysis of the available prospects. It functions to organize, restructure, and simplify the decision-makers' options. In

this stage, the decision maker constructs "a representation of the acts, contingencies, and outcomes that are relevant to the decision" (Tversky and Kahneman, 1992, p. 299). In the second evaluative phase, the decision-maker uses the edited prospects to weigh probabilities and choose the option of highest value. Unlike rational choice theory, however, prospect theory outlines that decision-making is non-linear and subject to cognitive biases (Kahneman & Tversky, 1979). Kahneman and Tversky's (1979) model posits that the two-step decision-making process is sensitive to framing effects, whereby the formulation or wording of the decision problem in phase one can dramatically alter the decision-making outcomes at phase two. According to prospect theory, alternative phrasing of an identical issue can significantly impact the individuals' constructive processes, and subsequently, their attitudes and behaviors.

In a landmark study, Tversky and Kahneman (1981) presented participants with a hypothetical vignette that described a disease outbreak predicted to kill 600 people. In one condition, participants were asked to choose between 2 disease control programs. If one program is adopted, 200 lives will be saved; if the second program is adopted, there is a 1/3 probability that 600 people will be saved and a 2/3 probability that no people will be saved. In another condition, participants were asked to choose between a program where 400 people will die, or a program where there is a 1/3 probability that no one will die and a 2/3 probability that 600 people will die. Results showed that when the decision was framed as a gain (lives saved), people became more risk-averse - they tended to choose the more certain option. Conversely, when the same decision was framed as a loss (people dying), people

became more risk-seeking, and were more willing to adopt a program with less certain outcomes. Although statistically, the outcomes were identical, simply changing the direction/framing of the problem led to a reversal in risk preference. The researchers replicated this finding across several studies. Tversky and Kahneman (1981) concluded that in risky decision-making contexts, decision-makers are more sensitive to expected losses compared to expected gains and are more willing to engage in risky behavior to avoid potential losses. They termed this phenomenon the loss aversion principle.

While prospect theory has gained traction and empirical support in various fields, it has been understudied in criminology (Thomas & Loughran, 2014). In an exploratory study of prospect theory, loss aversion, and criminal decision-making, Pickett and colleagues (2020) investigated the effects of framing criminal decisions in terms of financial gains/losses. Across several experiments, the researchers tested the hypothesis that framing crimes in terms of potential financial losses (missing out on earning money), compared to potential financial gains (opportunity to earn money) would increase attractiveness of criminal opportunity and willingness to commit crime. This study was the first to experimentally manipulate framing and test prospect theory in a criminal decision-making context. Pickett et al.'s (2020) findings did not support Kahneman and Tversky's loss aversion principle – framing criminal choices as financial losses did not increase the attractiveness of criminal opportunity or willingness to offend. However, the study was limited in its scope; the experimenters did not account for non-financial cost/benefit analysis that occurs during criminal decision-making. The study did not consider peer-related

influences or measure social incentives for committing crimes, including acceptance, inclusion, and sense of belonging (Pickett et al., 2020). The study also did not measure or account for social losses associated with not engaging in crime, such as rejection, ostracism, and exclusion (Hoeben & Thomas, 2019).

Need to Belong Theory: Seeking Social Gains and Avoiding Social Losses

Humans have a fundamental need to belong (Baumeister & Leary, 1995). The need to belong is the universal human motivation to form and maintain positive, significant interpersonal relationships. When love and belonging needs are thwarted, individuals experience feelings of rejection, loneliness, low self-esteem, weakness, and inferiority (Gonsalkorale & Williams, 2007; Maslow, 1970). Humans seek out social rewards such as inclusion, acceptance, attention, recognition, and status to fulfill their need to belong. According to need to belong theory, humans pursue these rewards until they have reached at least a "minimum level of social contacts and relatedness" (Baumeister & Leary, 1995, p. 500). On the other hand, humans are averse to social costs such as rejection, ostracism, and ridicule. These experiences threaten to thwart the need to belong and are associated with a myriad of negative outcomes (Baumeister & Leary, 1995; Hoeben & Thomas, 2019; Maslow, 1970). In their studies of belongingness needs, Baumeister and Leary (1995, p. 502) find that humans are "at least as reluctant to break social bonds as they are eager to form them in the first place."

The fundamental need for belonging drives human behavior (Baumeister & Leary, 1995; Maslow, 1970). It is no surprise then, that during criminal decision-making processes,

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social incentives and peer-related references carry significant weight (Katz, 1998; Nagin & Paternoster, 1993; Pickett et al., 2020). Hechter's (1987) rational choice perspective posits that individuals are willing to comply with group norms to accrue various social benefits such as status, popularity and time spent with friends. He argues that an individual who is dependent on a group for benefits may be willing to pay "taxes" to maintain membership in that group, and to avoid social isolation. Studies show that adolescents are more willing to engage in deviant behavior, such as alcohol use, when they derive social benefits from the behavior (Gallupe & Bouchard, 2015; Kreager et al., 2016). Relatedly, as social group size increases, individuals report greater fun, excitement, and inclusion associated with committing crimes (McGloin & Thomas, 2016). Committing crimes then, provides an opportunity for social gains, including "doing things together" (Weerman, 2003, p. 404), a sense of inclusion and the potential to increase popularity.

While social gains play an important role in criminal decision-making processes, the fear of social losses, including exclusion, ridicule, and loss of status, also drives offending decisions. Warr (2002) notes that the "mere risk of ridicule may be sufficient to provoke participation in behavior that is undeniably dangerous, illegal and morally reprehensible" (p. 46). In fact, functional magnetic resonance imaging scans reveal that social rejection activates regions of the brain related to peer susceptibility and risk-taking behaviors (Peake et al., 2013; Sebastian et al., 2011). Following experiences of rejection and ostracism people are more willing to engage in aggressive, radical, extreme, and even illegal behavior (Knapton et al., 2014; Twenge et al., 2001). For instance, participants who are ostracized and socially

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excluded report more willingness to support a fictional terrorist organization, compared to participants who are included and accepted (Pfundmair, 2019). Similarly, Short and Strodtbeck (1974) demonstrated that youths report fear of losing position and acceptance in a gang as a reason for participating in deviant acts. Criminological scholars theorize then, that threats of social loss (i.e., potential loss of status and acceptance) may increase likelihood of individual offending (Hoeben & Thomas, 2019; Pickett et al., 2020). This is consistent with prospect theory's notion of loss aversion, wherein framing a decision as a loss, compared to a gain, increases risk-seeking behavior.

Thomas and Nguyen (2020) conducted the first empirical test of social framing effects on offender decision-making. Using hypothetical vignettes, they tested the hypothesis that offending decisions framed as status losses, compared to status gains, would be associated with greater willingness to engage in various forms of delinquency. The authors recruited 1,200 college students from several universities in the United States and randomly assigned participants to status gain or status loss conditions, and to deviant and non-deviant conditions. All participants were presented with the opportunity to engage in a physical fight, to drive drunk, and to use marijuana with their friend group. In the deviant status gain condition, participants read that if they committed the offence, their friends would gain respect for them. In the deviant status loss condition, participants read that if they did not commit the offence, their friends would lose respect for them. Participants in the non-deviant status gain condition read that if they just walked away, their friends would gain respect for them, while those in the non-deviant status loss condition were told that if they walked away,

their friends would lose respect for them. In the deviant condition, for all three offence types, framing the criminal opportunity as a status loss, compared to a status gain, predicted greater willingness to offend. Similarly, in the non-deviant condition, for all three offence types, respondents reported less willingness to engage in crime when the social consequences were framed as status losses. The authors conclude that "the threat of losing social status can be a stronger motivator of deviant and non-deviant behavior than the prospects of gaining social status" (Thomas & Nguyen, 2020, p.18).

While Thomas and Nguyen's (2020) study is the first to explicitly measure loss aversion and social framing effects, their data is limited to college students and may not generalize to non-college populations. College students vary from more criminally-prone populations in their criminal decision-making processes (Bouffard & Exum, 2013; Topalli, 2005). For this reason, Thomas and Nguyen (2020) urge researchers to replicate their study with a non-college sample that is more representative of the general population. Further, Thomas and Nguyen's (2020) experiments gauge willingness to engage in fighting, drunk driving, and substance use. However, willingness to commit crimes varies significantly by criminal offence (Thomas, 2018). It may be the case that social framing effects differ for more severe criminal offences (Thomas & Nguyen, 2020), but this possibility has not yet been empirically tested.

Synthesizing the Literature

The decision to commit crimes often occurs in social contexts and involves verbal communication with peers. Research demonstrates that the language used by peers during

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such conversations plays an important role in the criminal decision-making process (Barnum & Pogarsky, 2022; Hoeben & Thomas, 2019). Applying behavioral economics' prospect theory and social psychology's fundamental need to belong theory to criminal choice, criminological scholars theorize that decision-makers may be more willing to take criminal risks and engage in criminal behavior when peers frame the decision to commit a crime as a social loss compared to a social gain (Hoeben & Thomas, 2019; Pickett et al., 2020). While there is emerging empirical support for social framing effects and increased willingness to offend (Thomas & Nguyen, 2020) to date, there has not been a study that investigates peer language use, framing effects, and willingness to engage in criminal offending.

Current Study

Building on Barnum and Pogarsky's (2022) study of peer language use and Thomas and Nguyen's (2020) study of status loss aversion, the current study investigates prospect theory in a peer deviance context and aims to disentangle the role of peer language use on criminal decision-making processes. This study examines if alternative phrasings of peer messages affect perceived worth of committing a crime and willingness to engage in serious criminal behavior. Using hypothetical survey vignettes, the study manipulates peer verbal prompts and frames the decision to commit serious crimes as either a social gain (potential for inclusion in a peer group), or a social loss (potential for exclusion from the peer group), then measures the decision-makers' perceived worth of engaging in criminal behavior and their willingness to offend. Based on Baumeister and Leary's (1995) fundamental need to belong theory and loss aversion principle in prospect theory, this study tests two hypotheses:

Hypothesis 1: Both social gain and social loss framing will increase willingness to offend and perceived worth of the criminal opportunity compared to the control condition.

Hypothesis 2: Peer messages framed as social losses will result in greater perceived worth of engaging in criminal activity and greater willingness to engage in criminal behavior than peer messages framed as social gains.

Chapter 3
Methodology

Research Design & Methods Overview

In order to test my hypotheses, I used a pre-registered (Dain & Gallupe, 2022), online randomized experiment. Data was collected in October 2022. Participants signed up to complete an online survey on prolific.co. Upon signing up, participants were randomly assigned to a social gain, social loss, or control condition using a randomization feature on the survey website. All participants provided informed consent, then participants in all three conditions read an identical vignette:

> *Imagine, it is a late weekend night; you are out with a new group of friends. You are walking home, chatting and laughing about the party you just attended with them. As you are walking, your friends point out an expensive looking car parked on the other side of the road. Your friends cross the road to take a closer look at the car. They notice that the door is unlocked and that there is a wallet lying on the passenger seat inside the vehicle. You can clearly see what looks like a handful of $100 bills sticking out. Your friend points at the wallet.*

The remainder of the vignette varied according to experimental condition. In the *social gain* condition, participants read that their new friend group promises to invite them to another gathering the following week if they take the wallet. If participants commit the crime, they *gain* the opportunity for social inclusion. In the *social loss* condition, participants read that

their new friend group threatens to not invite them to a gathering next week if they do not take the wallet. If participants fail to commit the crime, they *lose* the opportunity for social inclusion. In the *control* condition, participants did not read any peer verbal prompts. After they read the vignettes, all participants completed measures of their willingness to commit the criminal offence and the perceived worth of the criminal opportunity. Participants then also responded to questions assessing situational emotions and thwarted need to belong.

Next, all participants were randomly assigned to a social loss, social gain, or control condition again. Then, they read a second hypothetical scenario, adapted from Thomas and Nguyen (2020):

> *You and a group of your new friends have dinner reservations at a new*
> *restaurant across town. You decide to meet at one of your friend's houses*
> *for some pre-dinner drinks. You volunteer to be the designated driver but*
> *have a couple of drinks at your friend's just to be social. After some time,*
> *you realize it's time to leave. Your friends start asking you to drive them.*
> *There are no cabs or Ubers immediately available and if you wait for one,*
> *you miss your reservation. You feel mostly okay to drive but know that you*
> *are over the legal limit, and if you get pulled over you would get charged*
> *with intoxicated driving.*

The remainder of this vignette varied according to experimental condition. Like the first vignette, in the *social gain* condition, participants read that their friend group promises to invite them to another gathering the following week if they drive. In the *social loss* condition,

participants read that their friend group threatens to not invite them to a gathering next week if they did not drive. In the *control* condition, participants did not read any peer verbal prompts. Participants completed measures of their willingness to drive drunk and the perceived worth of driving drunk, followed by measures of situational emotions and thwarted need to belong. Lastly, participants responded to measures of impulsivity and resistance to peer influence, sociodemographic measures, and reported their honesty throughout the study.

Pretesting

I conducted a pilot study to ensure that the survey flow was operating as expected and to iron out any issues with wording and question formatting. For this pilot study, I recruited 10 respondents between the ages of 18-24 that were living in Canada or the United States. Participants were recruited on prolific.co. Prolific.co is a site similar to Mechanical Turk (MTurk), that connects researchers to participants (though unlike MTurk, it is primarily used for academic research). Once the study was published on prolific.co, eligible participants were able to view the study description through their Prolific account. They could then choose to participate or not. If they chose to participate, they clicked on the study link within Prolific which then opened up the Qualtrics survey. The survey was available on prolific.co until 10 valid responses were collected.

For the pilot study, participants could provide written feedback and suggestions. Comments from participants highlighted some issues with question formatting. Due to formatting limitations on the survey website, participants could not clear/ de-select their responses for

some questions. Based on participants' feedback, the questions were reformatted, submitted to, and approved by the University Research Ethics Board.

Sampling Procedure

Young adults between the ages of 18-24 have the highest rates of criminal offending compared to any other age group (Allen, 2016). I recruited 315 participants in this age range to complete the online study. Based on Thomas and Nguyen (2020), we expected an effect size of approximately d=0.57. To detect a significant effect at an alpha of .05 and power of .8, 105 participants per group (n=315 total) were required. To recruit participants, the survey was posted on Prolific.co and was made available to anyone registered on the survey website that was between the ages of 18-24 and living in North America. While initially we were going to limit the sample to respondents living in Canada, we decided to include US residents to ensure a sufficient sample size. Prolific.co primarily has respondents that are located in the UK and America, with fewer participants residing in Canada. Since Canada and America have similar legal definitions of property crimes and impaired driving, we opted to include Americans in our sample. The survey was available on prolific.co until 315 valid responses were collected.

Despite evidence that criminal-decision making processes differ between college students and the general population (Bouffard & Exum, 2013; Topalli, 2005) most studies of criminal decision-making and peer deviance tend to recruit samples of undergraduate students (McGloin & Thomas, 2016; Paternoster et al., 2017; Thomas et al., 2018; Thomas & Nguyen, 2020). The current experiment employed online convenience sampling to increase

the diversity of the sample, particularly in terms of education level and location, beyond what is normally seen in undergraduate samples. Online convenience sampling is also cost and time effective, and thus rendered the thesis project more feasible given financial and time constraints.

Variables

Sociodemographic Variables

Some studies suggest that online convenience samples such as Amazon's Mechanical Turk (MTurk) are not representative of the general population (Walter et al., 2019). MTurk respondents "tend to have lower average incomes, higher average education levels, lower average ages, and much smaller percentages of most non-White groups, especially Blacks" (Levay et al., 2016, p.3) while also holding more liberal political views than the general population (Berinsky et al., 2012; Krupnikov & Levine, 2014; Mullinix et al., 2015). Following the lead of Levay et al. (2016), McGloin and Thomas (2016) and Thomas and Nguyen (2020) we controlled for the effects of age, gender, level of education, ethnicity, and political ideological leaning.

Age

Participants were asked to indicate their age between 18-24.

Gender

Participants were asked to select the gender identity option(s) with which they identify. Response options included: female, male, non-binary/ third gender, prefer not to say, and

another. If participants responded "another" they were asked to specify their answer in a textbox. Responses were coded such that 1 = female, 2 = male, and 3 = non-binary/other.

Education

Education was measured by asking participants to indicate the highest level of school they had completed or degree they had received. Participants could select: 1) less than high school degree, 2) high school degree or equivalent (e.g., GED), 3) some college but no degree, 4) associate degree, 5) bachelor degree, 6) graduate degree.

Ethnicity

Ethnicity was measured by asking "What is your race/ethnicity? Check all that apply." Response options included: 1) Black, 2) Chinese, 3) Filipino, 4) Japanese, 5) Korean, 6) Native, Aboriginal (e.g., North American Indian, First Nations, Métis, Inuk), 7) Pacific Islander, 8) South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.), 9) Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.), 10) West Indian (e.g., Iranian, Afghan, etc.), 11) White, 12) Other (please specify). Due to low numbers of responses in several categories, the responses were recoded to create a dichotomous variable, where 1 = white, and 2 = all other race/ethnicity categories. Using a dichotomous variable ensured that there were enough responses in each category to conduct meaningful statistical analyses.

Political Ideological Leaning

Political leaning was measured using an adapted seven-point scale on political views. Participants were asked to indicate where they place themselves on a scale of 1) extremely liberal, 2) liberal, 3) slightly liberal, 4) moderate; middle of the road, 5) slightly conservative,

6) conservative, 7) extremely conservative (American National Election Studies, 2021).

Table 1 provides descriptive statistics of all variables measured.

Table 1. Descriptive Statistics

	Mean/%	Median	SD	Min	Max
Controls					
Age	21.920	22	1.667	18	24
Gender					
Female	51.76%				
Male	43.13%				
Non-binary/Other	5.11%				
Education	3.607	3	1.251	1	6
Ethnicity (white = 1)					
White	58.76%				
Non-white/Other	41.21%				
Political leaning	2.712	2	1.521	1	7
Impulsivity	7.974	8	2.749	4	16
Resistance to peer influence	2.877	3	0.815	1	4
Taking Wallet Controls					
Situational anger	4.791	5	1.741	1	7
Situational fear	4.498	4.5	1.674	1	7
Need to belong	5.681	5	2.520	3	15
Driving Drunk Controls					
Situational anger	4.518	4.5	1.722	1	7
Situational fear	4.805	5	1.768	1	7
Need to belong	6.933	7	3.246	3	15
Experimental Conditions					
Taking Wallet					
Social gain group	33.55%				
Social loss group	33.87%				
Control group	32.59%				
Driving Drunk					
Social gain group	33.23%				
Social loss group	33.55%				

Control group	33.23%				
Dependent Variables					
Taking Wallet					
Willingness to take wallet	1.473	1	0.884	1	5
Worth of taking wallet	2.089	1	1.562	1	7
Driving Drunk					
Willingness to drive drunk	2.054	2	1.155	1	5
Worth of driving drunk	2.048	2	1.296	1	7

n=313

Control Variables

Studies show that individual differences in impulsivity and ability to resist peer influence affect criminal decision-making processes (Hoeben & Thomas, 2019; McGloin & Thomas, 2016). To ensure equivalence across conditions and to account for pre-existing individual differences, we measured these potentially confounding variables.

Impulsivity

Replicating McGloin and Thomas's (2016) methods, impulsivity was measured using the impulsivity subscale from Grasmick et al. (1993). Participants read four statements and rated the extent to which they agree with each statement (4 = strongly agree, 3 = somewhat agree, 2 = somewhat disagree, 1 = strongly disagree). The statements included: 1) I often act on the spur of the moment without stopping to think, 2) I don't devote much thought and effort to preparing for the future, 3) I often do whatever brings me pleasure here and now, even at the cost of some distant goal, 4) I'm more concerned with what happens to me in the short run than in the long run. Higher scores denote greater impulsivity. The scale had good internal reliability (Cronbach's alpha = 0.81).

Resistance to Peer Influence

Ability to resist peer influence was quantified using a shortened version of Steinberg and Monahan's (2007) resistance to peer influence scale. The shortened version of the scale was adapted from McGloin and Thomas (2016). Participants read two pairs of statements and selected the statement that they believed was the most accurate descriptor for them. Then, participants rated the verity of the statement that they selected as "really true" or "sort of true" for them. Ratings were converted to scores and scores were averaged, with higher scores indicating greater resistance to peer influence.

For the first statement pair, participants read: "For some people, it's pretty easy for their friends to get them to change their mind" and "for other people, it's pretty hard for their friends to get them to change their mind." Then, for the more applicable statement, participants rated the statement as really true or sort of true for them. If participants selected that it is easy for their friends to change their minds, this indicated less ability to resist peer influence. If they selected this statement was really true for them, they received a score of 1. If they selected this statement was sort of true for them, they received a score of 2. On the other hand, if participants selected that it is hard for their friends to change their mind, this indicated greater resistance to peer influence. If they rated this statement as sort of true, they received a score of 3. If they rated this statement as really true, this was converted to a score of 4.

For the second statement pair, participants read: "Some people think it's more important to be an individual than to fit in with the crowd" and "other people think it's more

important to fit in with the crowd than to stand out as an individual." If participants selected

that it is more important to be an individual, this signified greater resistance to peer

influence. If they rated this as really true, they would score a 4, and if they rated this as sort

of true, they would score a 3. If participants selected that it is more important to fit in with

the crowd, this indicated less resistance to peer influence. If the statement was sort of true for

them, they received a score of 2. If this statement was rated as really true for them, they

received a score of 1.

Situational Emotions

Research suggests that state emotions may play a significant role in criminal decision-making

processes (Bouffard et al., 2000; Clarke, 2014; van Gelder et al., 2016; Warr, 2016). Barnum

and Solomon (2019) found that situation-specific emotions, including anger and fear,

strongly related to intention to commit assault. Following Barnum and Solomon (2019)

participants were asked to "think about the scenario you just read. If you were actually in this

situation indicate how much you DISAGREE or AGREE with the following statements: 1)

This situation would make you angry, 2) This situation would frighten you, 3) This situation

would make you nervous, 4) This situation would make you irritated. Participants rated their

disagreement or agreement with each statement on a scale of 1 to 7 (1 = strongly disagree, 7

= strongly agree). The two anger variables (anger and irritation) were averaged to create a

situational anger scale. The two fear variables (frightened and nervous) were averaged to

create a situational fear scale. Both the anger scale (Cronbach's alpha = 0.87) and fear scale

(Cronbach's alpha= 0.77) had good internal reliability.

Data Quality Variables

Honesty

Participants completing this online survey were aware that they were responding to questions on willingness to commit crime, and due to the sensitive nature of the topic, may have hesitated to provide candid, honest responses. At the end of the survey, participants were asked "How honest were you in filling out this survey?" with responses ranging from 1 'I was honest all of the time' to 5 'I was not honest at all'. Participants who scored in the two least honest categories were excluded from the analysis (n=2).

Independent Variables

This study investigates the effects of peer language use on criminal decision-making. The independent variable in the experiment is *peer messages*. In accordance with prospect theory (Tversky & Kahneman, 1981), the experiment manipulated framing of peer messages as a social gain or a social loss. As outlined in Baumeister and Leary's (1995) need to belong theory, social gain was defined as inclusion and acceptance by a new friend group, while social loss referred to exclusion and rejection by a new friend group.

Scenario One – Taking Wallet

For the first hypothetical scenario, participants in the social gain condition read the following prompt: "Come on, grab the wallet! If you do, you can hang out with us next weekend when we go to another party." This prompt highlighted the opportunity for social inclusion. Participants in the social loss condition read: "Come on, grab the wallet! If you don't, you can't hang out with us next weekend when we go to another party." This prompt emphasized

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potential social exclusion or ostracism. In the control condition, participants did not receive

peer verbal prompts (i.e., measurement of the dependent variables proceeded immediately

after the scenario).

Scenario Two – Drunk Driving

In the second scenario, participants in the social gain condition read the following prompt:

"Come on! Drive us. Next weekend we're going out again, and if you drive us this time, you

can come with us." This peer message drew attention to the potential for social inclusion.

Participants in the social loss condition read: "Come on! Drive us. Next weekend we're

going out again, and if you don't drive us this time, you can't come with us." This framing

highlighted the potential loss of social inclusion. In the control condition, participants did not

receive peer verbal prompts (i.e., measurement of the dependent variables proceeded

immediately after the scenario).

Dependent Variables

The study aims to examine the effects of peer language on crime. Crime was conceptualized

as a property offense (opening a stranger's car and stealing a wallet) in one vignette, and

impaired driving (driving under the influence of alcohol) in a second vignette. The dependent

variables in this experiment were the decision-maker's *willingness to commit the offence* and

the *perceived worth of committing the crime*. According to rational choice theory and

prospect theory, decision-makers continuously update their assessments of risks and rewards

as they engage in criminal decision-making processes (Anwar & Loughran, 2011; Becker

1968; Tversky & Kahneman, 1981). To gauge the outcome of their criminal decision-making

processes, following Pickett et al., (2020) participants ranked *their willingness to offend* by rating the likelihood that they would commit the crime (1 = very unlikely, 5 = very likely). Then, participants provided measures of *perceived worth of the criminal opportunity*. Respondents ranked how "worth it" they perceive committing the offence to be (1 = not at all worth it, 7 = totally worth it, where 4 = maybe worth it). Participants provided these measures after reading each vignette, and therefore, rated the likelihood and perceived worth of stealing the wallet and the likelihood and perceived worth of driving drunk.

Mediating Variable: Thwarted Need to Belong

Research shows that when individuals' belongingness needs are thwarted, they are significantly more likely to engage in aggressive, risky, and radical behavior (Knapton et al., 2014; Pfundmair, 2019; Twenge et al., 2001). It may be the case that thwarted belongingness needs mediate the relationship between framing of peer messages and the dependent variables (willingness to offend and perceived worth of offending). To test this possibility, a 3-item need to belong scale was created. Participants responded to this scale after reading each vignette.

Need to Belong – Wallet Vignette

Respondents indicated how concerned they were with the following: a) damaging relationships with peers if they did not take the wallet; b) being unwelcome in social situations with their peers if they did not take the wallet (1 = not at all concerned, 2= a bit concerned, 3 = moderately concerned, 4 = quite concerned, 5 = very concerned). These two items were adapted from the well validated and widely used Interpersonal Needs

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Questionnaire (Van Orden et al., 2012), which measures thwarted need to belong and perceived burdensomeness. Based on Agnew & Brezina's (1997) relational problems scale, participants also rated how painful it would be if their peers stopped talking to them and spending time with them if they did not take the wallet (1 = not at all painful, 2 = a bit painful, 3 = moderately painful, 4 = quite painful, 5 = very painful). The three items were combined such that higher scores indicate greater thwarted need to belong. The scale had good internal reliability (Cronbach's alpha = 0.77).

Need to Belong – Drunk Driving Vignette

Thwarted need to belong was measured again after participants read the drunk driving scenario. Respondents indicated how concerned they would be with the following: a) damaging relationships with peers if they did not drive b) being unwelcome in social situations with their peers if they did not drive (1 = not at all concerned, 2= a bit concerned, 3 = moderately concerned, 4 = quite concerned, 5 = very concerned). They also rated how painful it would be if their peers stopped talking to them and spending time with them if they did not drive (1 = not at all painful, 2 = a bit painful, 3 = moderately painful, 4 = quite painful, 5 = very painful). These three items were combined in a way that is consistent with the wallet need to belong scale, such that higher scores indicate greater thwarted need to belong. The scale had good internal reliability (Cronbach's alpha = 0.89).

Data Analysis

The Sample

The survey resulted in 321 responses. Two participants were dropped because they reported an honesty score of less than two. Participants that did not consent to the study, or that timed out from the survey website and did not complete the first set of questions were also dropped. This left 314 participants in the sample.

Missing data analyses revealed that there was almost no missing data in the set. The variable with the greatest number of missing responses was need to belong in the drunk driving vignette at n=1 missing (0.32%). The rest of the variables had complete responses. Listwise deletion was used to remove the missing response. This left a final sample of n=313.

Bivariate Tests

Bivariate tests were conducted on Stata to investigate the relationship between framing of peer messages and willingness to offend, as well as perceived worth of the criminal opportunities. The dependent variables, willingness to offend and perceived worth of the offences, were continuous but not normally distributed. Logarithmic transformations were tested but did not substantially improve model fit. Therefore, non-parametric Kruskal-Wallis tests were used. Four bivariate tests were run. The first Kruskal-Wallis test tested the relationship between framing of peer messages and willingness to take the wallet. The second model tested the relationship between framing of peer messages and perceived worth of taking the wallet. Next, a Kruskal-Wallis was conducted to investigate the relationship between framing of peer messages and willingness to drive drunk. Lastly, a Kruskal-Wallis

was conducted to test the relationship between peer message framing and perceived worth of driving drunk.

Multivariate Models

Main Analyses: Bootstrapped Linear Regressions

Four linear regression models were conducted to test the hypotheses that both social loss and social gain framing would increase willingness to offend and the perceived worth of criminal opportunities, but that this increase would be greater for social loss framing. All four models controlled for situational emotions, impulsivity, resistance to peer influence, need to belong, age, gender, education, ethnicity and political ideological leaning. One linear regression model was conducted to test the effects of peer message framing on willingness to take the wallet while controlling for the variables outlined above. The second model tested the effects of peer message framing on perceived worth of taking the wallet, controlling for the aforementioned variables. The third model tested the effects of peer message framing on willingness to drive drunk, while controlling for the above variables. A fourth and final linear regression model tested the effects of peer message framing on the perceived worth of driving drunk, while controlling for the same variables listed above.

Since the dependent variables were non-normally distributed and transformations did not help normalize the distributions, we estimated bootstrapped linear regression models (1000 repetitions). Diagnostics indicated that there were no issues with multicollinearity, outliers, or influential cases for any of the models.

Supplementary Analyses: Ordered Logistic Regressions

The dependent variables, willingness to offend and perceived worth of the offences, were ordinal. To check the robustness of the main models, the bootstrapped linear regressions were rerun as ordinal logistic models. The ordinal logistic models for likelihood of taking the wallet and for the worth of driving drunk did not violate the proportional odds assumption. However, the models for worth of taking the wallet and likelihood of driving drunk did violate the proportional odds assumption. For this reason, the bootstrapped linear regression models are presented as the main findings.

Mediation Analyses

Studies show that thwarted need to belong is associated with greater willingness to engage in aggressive and illegal behavior (Knapton et al., 2014; Pfundmair, 2019; Twenge et al., 2001). To test the possibility that thwarted need to belong mediates the relationship between peer message framing and willingness to offend and perceived worth of criminal opportunities, estimates were produced using Zellner's seemingly unrelated regression. Significance of direct paths were assessed using standard p-values (.05 threshold, two-tailed). Indirect effects based on those models were calculated using bootstrapped (10,000 replications) bias-corrected 95% confidence intervals. Confidence intervals that did not include zero are interpreted as statistically significant.

Interaction Analyses

It may also be the case that social gain and social loss framing have more of an impact on individuals who have a greater need to belong. In other words, individuals who are more

concerned about being unwelcome in social situations, damaging relationships with their peers, and who would feel more pain if their peers stopped talking to them or spending time with them, may be more responsive to the experimental manipulation. To test this possibility, four bootstrapped linear regression models were conducted with an interaction term between need to belong and experimental condition. The first model investigated interaction effects between thwarted need to belong and experimental condition on the likelihood of taking the wallet. The second model tested interaction effects between thwarted need to belong and experimental condition on the perceived worth of taking the wallet. The third model examined interaction effects between thwarted need to belong and experimental condition on the likelihood of driving drunk. The fourth and final model tested interaction effects between thwarted need to belong and experimental condition on the perceived worth of driving drunk.

Chapter 4

Results

Bivariate Analyses

Table 2 shows the results of the four Kruskal-Wallis tests. There was no significant relationship between experimental condition and the likelihood of the taking wallet ($p>.05$). Respondents in the social loss and social gain conditions did not report more willingness to take the wallet compared to those in the control condition. Similarly, there was no significant relationship between framing of peer messages and the perceived worth of the taking the wallet ($p>.05$). Participants in the social loss and social gain conditions did not report greater perceived worth of the criminal opportunity compared to those in the control condition. There was no significant relationship between peer message framing and the likelihood of driving drunk ($p>.05$). Social loss and social gain framed peer messages were not associated with greater likelihood of driving drunk compared to no peer verbal prompts. Lastly, there was no significant relationship between the experimental conditions and the perceived worth of driving drunk ($p>.05$). Those in the social loss and social gain conditions did not report greater perceived worth of driving drunk than those in the control condition. We hypothesized that social gain and social loss framing would increase the likelihood and perceived worth of the criminal offences, and that this increase would be greater for social loss framing. These results did not lend support to our hypotheses.

Table 2. Bivariate results for peer message framing effects on criminal decision-making

	Likelihood of taking wallet Mean (median)	Perceived worth of taking wallet Mean (median)	Likelihood of driving drunk Mean (median)	Perceived worth of driving drunk Mean (median)
Social gain	1.476 (1)	1.876 (1)	2.221 (2)	2.135 (2)
Social loss	1.500 (1)	2.123 (1)	1.867 (2)	1.895 (2)
Control	1.441 (1)	2.275 (1.5)	2.077 (2)	2.154 (2)
p	.861	.267	.108	.503

*p<.05, ** p<.01

Multivariate Analyses

Model 1: Likelihood of Taking Wallet

Table 3 displays the results of the first multivariate bootstrapped linear regression model.

This model tested the relationship between peer message framing and the likelihood of taking

the wallet while controlling for situational emotions, thwarted need to belong, impulsivity,

resistance to peer influence, and sociodemographic variables. The model explained 28.14%

of the variance in likelihood of taking the wallet. When controlling for all other variables in

the model, social gain framed peer messages, compared to no verbal prompt from peers,

predicted significantly greater likelihood of committing the crime (*p*<.01). When

participants read social gain framed peer messages, this predicted a .419 unit increase in the

likelihood of taking the wallet. Social loss framing, compared to no peer prompts also

predicted significantly greater likelihood of taking the wallet (*p*<.05). Social loss framed

peer messages predicted a .278 unit increase in the likelihood of taking the wallet. These

results supported the first hypothesis that social gain and social loss framed messages

compared to the control condition would result in greater likelihood of taking the wallet.

However, the results did not support the second hypothesis, which predicted that the increase

in the likelihood of taking the wallet would be greater for social loss framed peer messages

compared to social gain framed messages.

Table 3. Likelihood of taking wallet model

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.419**	.116	.191	.647	.000
Social loss	.278*	.127	.029	.528	.029
Controls					
Need to belong	.130**	.024	.084	.177	.000
Situational fear	-.070*	.029	-.127	-.013	.016
Situational anger	-.171**	.033	-.237	-.106	.000
Impulsivity	.036*	.017	.004	.069	.029
Resistance to peer influence	-.111*	.054	-.217	-.005	.040
Age	.005	.030	-.053	.063	.863
Gender					
Male	.020	.092	-.160	.200	.829
Non-binary/Other	-.177	.195	-.559	.205	.364
Education	-.007	.039	-.083	.070	.865
Ethnicity (white = 1)	-.151	.085	-.318	.015	.075
Political leaning	.058	.032	-.006	.121	.074

*$p<.05$, **$p<.01$

Situational control variables also significantly predicted the likelihood of taking the

wallet. Thwarted need to belong in the wallet vignette had a significant positive relationship

with the likelihood of taking the wallet ($p<.01$). For every one point increase in the thwarted

need to belong scale, the likelihood of taking the wallet increased by .130 units. In other

words, increased fear of losing acceptance with peers was associated with greater likelihood

of offending. Situational emotions had a significant negative relationship with the likelihood

of taking the wallet ($p<.01$). For every one unit increase in the situational fear scale, the

likelihood of taking the wallet decreased by .070 points. Similarly, for every one unit increase in the situational anger scale, the likelihood of taking the wallet decreased by .171 units. Simply put, scoring higher on situational fear and situational anger predicted lesser likelihood of stealing the wallet.

Individual differences in personality were also significantly related to the likelihood of offending. Impulsivity significantly related to likelihood of taking the wallet ($p<.05$). Every one unit increase in self-reported impulsivity predicted a .036 unit increase in the likelihood of taking the wallet. Higher levels of impulsivity were associated with greater likelihood of committing the offence. Resistance to peer influence had a significant negative association with the likelihood of taking the wallet ($p<.05$). Every one unit increase in the resistance to peer influence scale predicted a .111 unit decrease in likelihood of taking the wallet. More ability to resist peer influence predicted lesser likelihood of taking the wallet. Age, gender, education, ethnicity, and political leaning did not significantly relate to likelihood of taking the wallet ($p>.05$).

Model 2: Perceived worth of Taking Wallet

Table 4 shows the results of the second multivariate bootstrapped linear regression model. This model examined the relationship between peer message framing and the perceived worth of taking the wallet while controlling for situational emotions, thwarted need to belong, impulsivity, resistance to peer influence, and sociodemographic variables. The model explained 22.95% of the variance in perceived worth of taking the wallet. Framing effects were not significantly related to the perceived worth of stealing the wallet ($p>.05$). These

results did not support our hypotheses. Social loss framing and social gain framing did not

significantly increase perceived worth of taking the wallet.

Table 4. Perceived worth of taking wallet model

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.252	.212	-.163	.667	.233
Social loss	.292	.232	-.163	.747	.208
Controls					
Need to belong	.163**	.035	.094	.232	.000
Situational fear	-.117*	.055	-.226	-.009	.034
Situational anger	-.317**	.061	-.237	-.106	.000
Impulsivity	.054	.035	-.014	.123	.120
Resistance to peer influence	-.185	.109	-.399	-.029	.089
Age	-.012	.055	-.119	.095	.824
Gender					
Male	-.197	.174	-.538	.145	.259
Non-binary/Other	-.280	.364	-.992	.433	.441
Education	-.103	.070	-.242	.036	.147
Ethnicity (white = 1)	-.167	.162	-.485	.151	.304
Political leaning	.112	.058	-.001	.225	.053

*$p<.05$, **$p<.01$

Similar to the first multivariate model, situational fear and anger and thwarted need to

belong were found to significantly predict the perceived worth of taking the wallet. However,

impulsivity and resistance to peer influence did not reach statistical influence in these

models, though the direction of the effect was similar to the prior model. The effect of age,

gender, education, ethnicity, and political leaning remained non-significant ($p>.05$).

Model 3: Likelihood of Driving Drunk

Table 5 illustrates the results of the third multivariate bootstrapped linear regression

model. This model tested the effects of peer message framing on the likelihood of driving

drunk. The model explained 22.28% of the variance in the likelihood of driving drunk.

Framing of peer messages was not significantly related to the likelihood of driving drunk

($p>.05$). Those in the social gain condition and social loss condition were not more likely

drive drunk than those in the control condition. This did not support our first hypothesis that

peer verbal prompts would increase the likelihood of offending. These results also did not

support the second hypothesis, which predicted that loss framing would increase risk-taking

behavior.

Table 5. Likelihood of driving drunk

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.220	.147	-.067	.508	.133
Social loss	.010	.142	-.268	.288	.944
Controls					
Need to belong	.113**	.022	.071	.155	.000
Situational fear	-.058	.039	-.1337	-.018	.133
Situational anger	-.155**	.039	-.230	-.079	.000
Impulsivity	.071**	.025	.023	.119	.004
Resistance to peer influence	-.131	.075	-.277	.016	.080
Age	-.039	.041	-.120	.042	.347
Gender					
Male	-.168	.125	-.413	.077	.178
Non-binary/Other	-.443	.349	-1.127	.240	.204
Education	.030	.055	-.079	.139	.590
Ethnicity (white = 1)	-.142	.117	-.371	.087	.223
Political leaning	.033	.041	-.046	.113	.412

*$p<.05$, **$p<.01$

The effects of the control variables were similar to previous models, with thwarted

need to belong and situational anger emerging as particularly consistent in their effect.

Situational fear, impulsivity, and resistance to peer influence varied in their effects across

models. Socio-demographic predictors were consistently non-significant.

Model 4: Perceived Worth of Driving Drunk

Table 6 shows the results of the fourth multivariate bootstrapped linear regression model.

This model tested the effects of peer message framing on the perceived worth of driving

drunk. The model explained 20.91% of the variance in the perceived worth of driving drunk.

Framing effects did not significantly relate to the perceived worth of driving drunk ($p>.05$).

Those in the social gain condition and social loss condition did not tend to rate driving drunk

as more worth it compared to those in the control condition. This did not support our

hypotheses. The effect of the other covariates largely aligned with previous models.

Table 6. Perceived worth of driving drunk

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.095	.170	-.238	.427	.577
Social loss	.026	.153	-.274	.326	.863
Controls					
Need to belong	.112**	.020	.072	.152	.000
Situational fear	-.064	.037	-.136	.008	.083
Situational anger	-.182**	.039	-.259	-.105	.000
Impulsivity	.083**	.025	.033	.132	.001
Resistance to peer influence	-.158	.082	-.319	.004	.056
Age	-.077	.046	-.167	.013	.095
Gender					
Male	-.094	.135	-.358	.171	.488
Non-binary/Other	-.458	.359	-1.16	.245	.201
Education	-.051	.057	-.060	.163	.367
Ethnicity (white = 1)	-.122	.130	-.378	.133	.348
Political leaning	.039	.050	-.060	.137	.441

*$p<.05$, **$p<.01$

Supplementary Analyses

Ordered Logistic Analyses

The results of the four ordered logistic multivariate models can be found in Appendix A. These models tested the effects of peer message framing on the likelihood of taking the wallet, the perceived worth of taking the wallet, the likelihood of driving drunk, and the perceived worth of driving drunk while controlling for need to belong, situational emotions, resistance to peer influence, and sociodemographic measures. These models were conducted to ensure robustness of the main analyses. The findings from the ordered logistic models supported the main results. Peer message framing did not significantly predict any of the dependent variables, except for the likelihood of taking the wallet. Results for the first ordered logistic model showed that social gain framing compared to the control condition predicted greater likelihood of taking the wallet ($p<.05$).

Across all four models, thwarted need to belong had a significant positive association with the likelihood of offending and perceived worth of offending ($p<.01$). Greater fear and concern with losing social ties predicted significantly greater likelihood of offending and greater perceived worth of all criminal opportunities. For all four models, situational anger significantly predicted the likelihood and perceived worth of offending ($p<.01$). Greater feelings of anger and irritation were associated with decreased likelihood of offending and lower perceived worth of all criminal opportunities.

Situational fear was found to be negatively related to the likelihood and perceived worth of offending. While the direction of the effect remained consistent across the various models, there was some inconsistency in terms of it reaching statistical significance.

Similarly, resistance to peer influence was also consistently related to lower likelihood of offending and lower perceived worth of the offences. Those who were more able to resist peer pressure tended to be less likely to offend and to report lower perceived worth of the criminal opportunity. While the direction of the relationship was consistently negative for all models, this variable was not always statistically significant. Impulsivity had a positive relationship with the likelihood of stealing and driving drunk, and the perceived worth of these crimes. Individuals who scored higher on impulsivity tended to be more likely to offend and to rate the crimes as more worthwhile. However, this relationship was not statistically significant across all four models. For all four models, age, gender, education level, ethnicity, and political leaning were statistically non-significant ($p>.05$). They did not have a consistent positive or negative association with the outcome variables. When interpreting the results of the ordered logistic models, it should be noted that the models for the perceived worth of taking the wallet and the likelihood of driving drunk violated the proportional odds assumption. For this reason, the bootstrapped linear regression models are presented as the main findings.

Mediation Analyses

Wallet Stealing Mediation Models

Table 7 shows the results of the four mediation models.[1] The first and second mediation models tested if thwarted need to belong mediated the effects of peer message framing on the

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[1] Note: All models control for resistance to peer influence, impulsivity, situational emotions, and sociodemographic measures. Shading indicates significance. Full models can be found in Appendix B.

likelihood of taking the wallet and the perceived worth of taking the wallet, respectively. The

effects of social gain framed peer messages on the likelihood of taking the wallet and

perceived worth of taking the wallet were not mediated by thwarted need to belong. The

effects of social loss framed peer messages on the likelihood and perceived worth of taking

the wallet were mediated by thwarted need to belong. These results demonstrate that social

loss framing leads to increased thwarted need to belong, which in turn, results in a greater

likelihood of taking the wallet and greater perceived worth of taking the wallet. This lends

partial support to our hypotheses that framing effects on the likelihood of taking the wallet

and perceived worth of taking the wallet are mediated by a thwarted need to belong.

Table 7. Mediation Models

	DV = need to belong (mediator)		DV = likelihood/ worth		Indirect effect of experimental treatment on likelihood of taking wallet through need to belong	
	b	SE	b	SE	ab	95% BCCI
Likelihood of taking wallet						
Experimental condition						
Social gain	-.371	.345	.419**	.114	-.048	-.145 to .032
Social loss	.775*	.342	.278*	.113	.101	.010 to .219
Worth of taking wallet						
Experimental condition						
Social gain	-.371	.345	.252	.208	-.060	-.188 to .038
Social loss	.775*	.342	.292	.207	.126	.014 to .282
Likelihood of driving drunk						
Experimental condition						
Social gain	-.131	.428	.220	.142	-.012	-.090 to .066
Social loss	-.066	.434	.010	.144	-.006	-.089 to .086

Worth of taking wallet						
Experimental condition						
Social gain	-.131	.428	.095	.161	-.012	-.085 to .061
Social loss	-.066	.434	.026	.163	-.006	-.083 to .079

**p<.01, *<p.05

Drunk driving mediation models

The third and fourth mediation models tested if thwarted need to belong mediated the effects

of peer message framing on the likelihood of driving drunk and the perceived worth of

driving drunk. Like the first two models, thwarted need to belong did not mediate the effect

of social gain framing on the outcome variables. However, unlike the theft models, need to

belong also does not appear to mediate the effect of social loss framing. These results did not

support our hypotheses that thwarted need to belong mediates the relationship between peer

message framing and the likelihood and perceived worth of driving drunk.

Interaction Analyses

Wallet stealing interaction models

Table 8 illustrates the results of the interaction models.[2] The first two interaction models

tested interaction effects between thwarted need to belong and peer message framing on the

likelihood of stealing the wallet and the perceived worth of stealing the wallet. The

interaction between peer message framing and thwarted need to belong on the likelihood and

perceived worth of taking the wallet were not significant (*p*>.05). Although the results were

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[2] Note: all models control for resistance to peer influence, impulsivity, situational emotions
and sociodemographic measures. Full interaction model results can be found in appendix C.

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not statistically significant, the interaction plots show a positive relationship between thwarted need to belong and stealing (see figures 1 and 2). Across all conditions, higher thwarted need to belong tended to predict greater likelihood and greater perceived worth of taking the wallet. In other words, regardless of peer verbal prompts, fear of losing social ties was associated with greater likelihood and perceived worth of stealing.

Table 8. Interaction Models

	b	SE	95% CI		p
			LL	UL	
Likelihood of taking wallet					
NTB x gain framing	.002	.056	-.108	.112	.968
NTB x loss framing	-.047	.052	-.149	.056	.371
Perceived worth of taking wallet					
NTB x loss framing	-.106	.082	-.266	.055	.198
NTB x gain framing	-.106	.087	-.276	.064	.222
Likelihood of driving drunk					
NTB x gain framing	.025	.050	-.074	.122	.623
NTB x loss framing	.004	.046	-.086	.094	.930
Perceived worth of driving drunk					
NTB x gain framing	-.035	.056	-.145	.076	.539
NTB x loss framing	-.047	.047	-.139	.044	.313

*p<.05, **p<.01

Figure 1. Interaction between peer message framing and need to belong on the likelihood of taking wallet

Interaction between peer message framing and need to belong on the likelihood of taking wallet
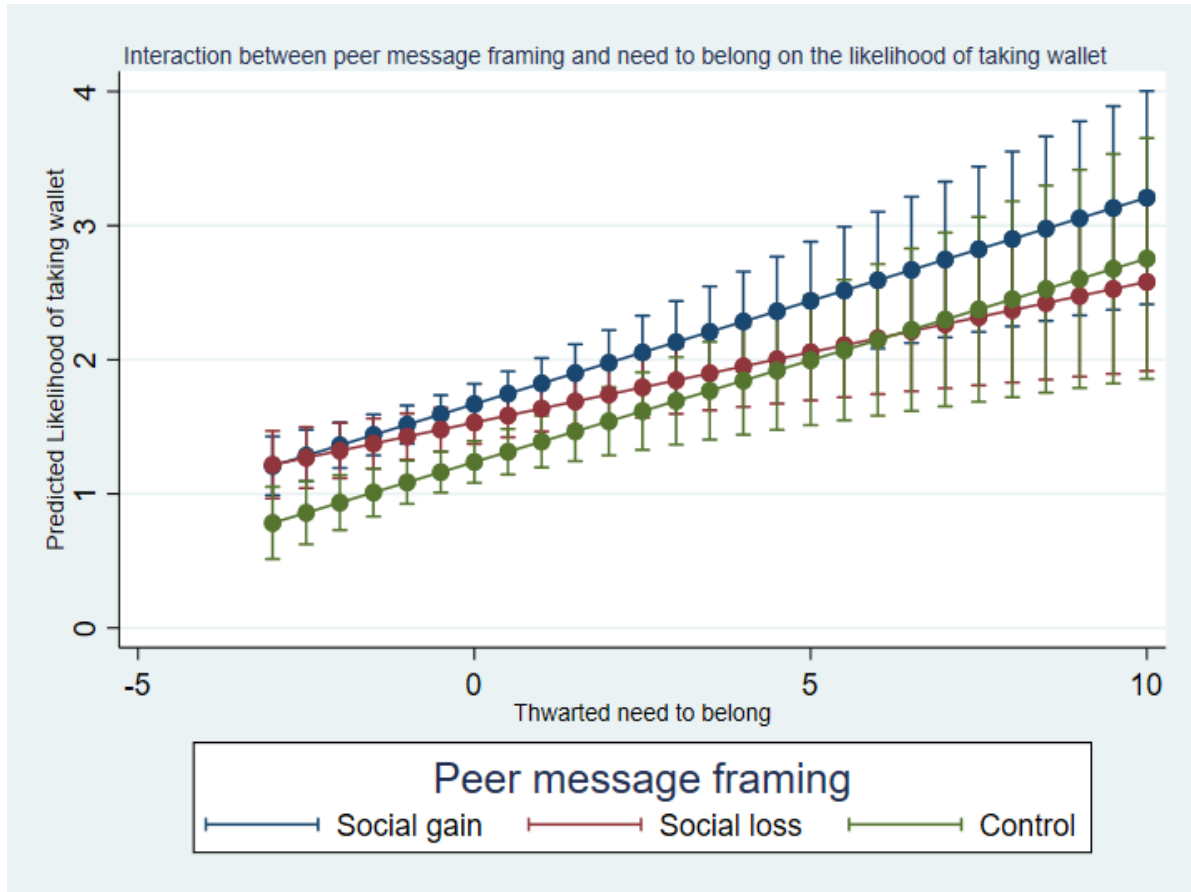
Figure 2. Interaction between peer message framing and need to belong on the perceived worth of taking wallet

Interaction between peer message framing and need to belong on the perceived worth of taking wallet

Drunk driving interaction models

The drunk driving interaction models examined interaction effects between thwarted need to belong and experimental condition on the likelihood and perceived worth of driving drunk. The interaction between peer message framing and thwarted need to belong on the likelihood and perceived worth of driving drunk was not significant ($p>.05$). Although the results were not statistically significant, the interaction plots illustrate a positive relationship between experimental condition and thwarted need to belong on driving drunk (see figures 3 and 4).

Across all experimental conditions, higher scores on the thwarted need to belong scale predicted greater likelihood and perceived worth of driving drunk. This means that regardless of how peer verbal prompts were framed, fear of losing belonging predicted higher likelihood of driving intoxicated and greater perceived worth of doing so.

Figure 3. Interaction between peer message framing and need to belong on the likelihood of driving drunk
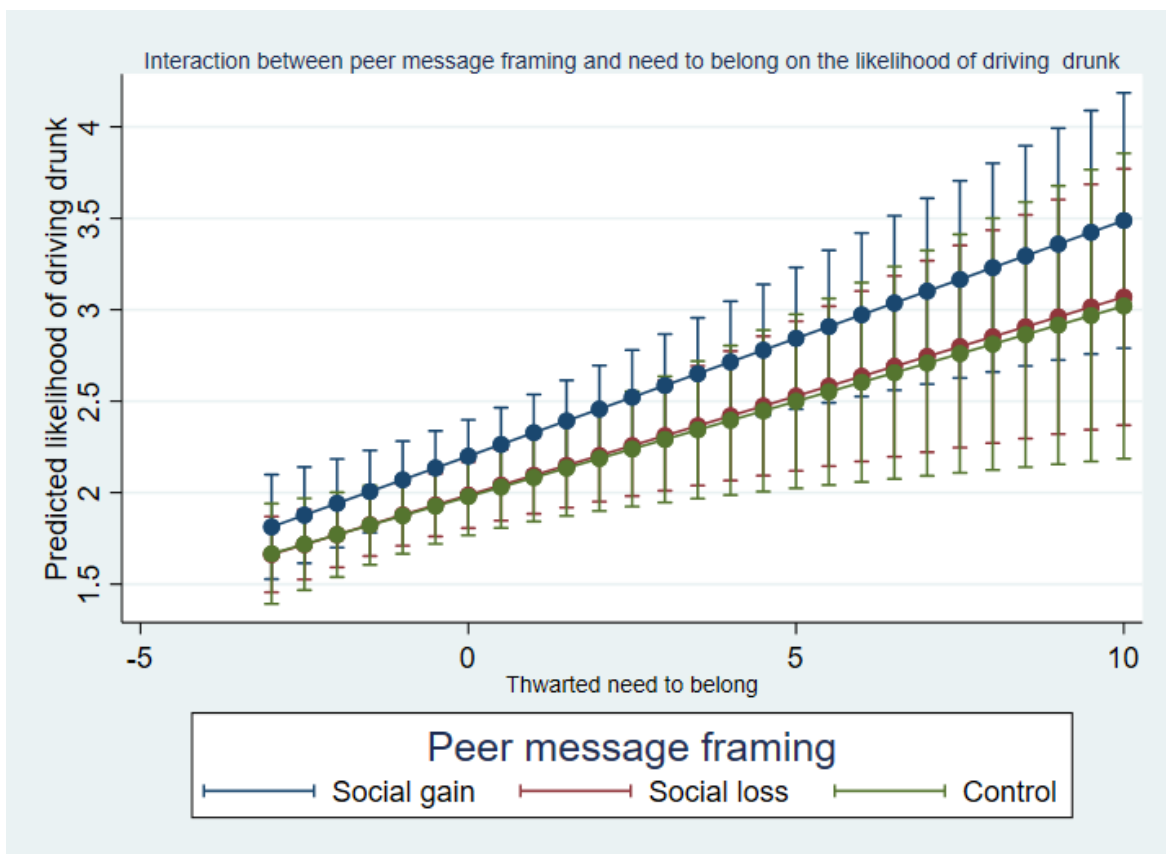
Figure 4. Interaction between peer message framing and need to belong on the perceived worth of driving drunk

Chapter 5

Discussion and Conclusion

This study investigated framing effects of peer messages on criminal decision-making. Using an online experimental design, we randomly assigned participants to a social gain, social loss, or control condition. Participants were instructed to read two hypothetical criminal offending vignettes where they were exposed to peer verbal prompts that highlighted the potential for social inclusion (social gain framed prompts), peer verbal prompts that emphasized the potential for social exclusion (social loss framed prompts) or no verbal prompts at all (control condition). We tested two hypotheses. First, we hypothesized that both social gain and social loss framing would increase the participants' willingness to offend, and their perceived worth of the criminal opportunity compared to the control condition. Then, based on prospect theory's loss aversion principle (Kahneman & Tversky, 1981) we hypothesized that peer messages framed as social losses would result in greater willingness to offend and greater perceived worth of the criminal opportunities than peer messages framed as social gains.

Our study revealed several key findings. First, we found that framing significantly predicted the likelihood of stealing. Both social gain and social loss framing tended to increase the likelihood of stealing a wallet with several hundred dollars in it, compared to the control condition. This supported our first hypothesis. However, we did not find support for our second hypothesis testing the loss aversion principle; the increase in likelihood of stealing was not greater for loss framing. Framing effects were non-significant for the

remaining offending outcomes. Social loss and social gain framing did not increase the perceived worth of stealing the wallet, the likelihood of driving drunk, or the perceived worth of driving drunk.

We also controlled for several theoretically relevant variables. We included measures of situational emotions, resistance to peer influence, impulsivity, thwarted need to belong, as well as sociodemographic items. While initially these variables were included only as controls, there were two measures that emerged significant across all regression models. Both situational anger and need to belong were found to significantly predict all offending outcomes. Feelings of anger and irritation decreased the likelihood and the perceived worth of stealing and driving drunk, while thwarted need to belong increased the likelihood and perceived worth of both of these crimes. The need to belong variable was particularly significant, with p values below .01 for each model. Once we noticed the importance of this variable, we conducted additional statistical analyses. Supplementary models revealed that thwarted need to belong significantly mediated the effects of social loss framing on the likelihood and perceived worth of stealing. Social loss framing tended to increase the fear of losing acceptance and belonging, which in turn increased the likelihood and the perceived value of stealing. The following sections outline potential explanations for our findings.

Social loss aversion: the importance of quantifying thwarted need to belong

According to prospect theory humans are particularly sensitive to losses. People tend to become more risk-seeking when decisions are framed as losses compared to equivalent gains (Kahneman & Tversky, 1981). There is ample empirical evidence for loss aversion in high-

stakes risky financial, policy, and insurance decision-making contexts (see Barberis, 2013 for a review). Based on this principle, we predicted that in an offending situation, loss framed verbal peer pressure would result in more risky decisions. Our study did not support this prediction. While loss framing was not a consistent predictor of risky decision-making, thwarted need to belong was. Every model showed that thwarted need to belong increased the likelihood and perceived worth of offending. Greater fear and concern of losing acceptance predicted more willingness to steal, greater perceived worth of stealing, more willingness to drive intoxicated, and greater perceived worth of driving drunk. Given the significance of this variable, we speculate that the direction and framing of the peer messages are less important than the underlying construct of the peer prompts: belongingness and acceptance in the group. Essentially, the social gain and social loss framed peer prompts present the same message but in different ways. In the gain framed conditions, participants could gain acceptance and fulfill their need to belong if they committed the crime. In the loss framed conditions, participants could lose acceptance and thwart their need to belong if they did not commit the crime. Although the messages differed in their delivery, both messages draw attention to belongingness needs.

Since Baumeister and Leary (1995) coined need to belong theory, a plethora of studies have shown that an unfulfilled need to belong is a significant predictor of increased aggression, violence, and risk-taking behaviors (Knapton et al., 2014; Twenge et al., 2001; Pfundmair et al., 2019). Individuals with unmet belongingness needs are more likely to exhibit violent behaviors towards those who have ostracized them and towards innocent,

neutral parties (Baumeister et al., 2007; Twenge et al., 2001). Relatedly, ethnographic analyses of school shootings reveal that school shooters tend to report feeling rejected, ostracized, and a lack of acceptance from their classmates (Leary et al., 2003). Beyond behavioral consequences, thwarted belongingness needs also predict altered cognitive functioning. Feelings of isolation and rejection have been shown to affect decision-making, self-regulation, and complex executive functioning (Baumeister et al., 2002; Baumeister et al., 2005; Twenge & Baumeister, 2005). Threatening belonginess needs predicts loss of self-control, decreased ability to perform on logical reasoning tasks, reduced extrapolation abilities, and decreased performance on intelligence tests (Baumeister et al., 2007). Taken together, these findings suggest that belongingness needs significantly impact decision-making under risk and behavioral outcomes in social contexts. As our results demonstrate, simply alerting participants to the possibility of social inclusion or exclusion through peer verbal prompts is enough to increase likelihood of stealing, regardless of whether the conversational partner frames the message as a gain or a loss.

It also appears that the thwarted need to belong scale does a better job quantifying social loss aversion than the loss framed peer verbal prompts. The scale asks participants to rate the extent to which they would fear losing acceptance and belonging in the peer group if they did not offend. While completing this three-item scale, participants responded to a series of questions on fear of damaging ties with peers if they did not commit the crime, concern with being unwelcome in social situations with peers if they did not commit the crime, and how painful it would be for them if peers stopped associating with them if they did not

commit the crime. Each of these questions explicitly asked participants to rate their fear of social losses. These questions were combined to create an average measure of thwarted need to belong.

The results of our mediation models support the idea that thwarted need to belong quantifies social loss aversion. When comparing the effects of social loss and social gain framing on offending outcomes, we did not find that loss framing predicted more willingness or perceived worth of the crimes. However, when we included a mediation term for thwarted need to belong, only loss framing effects were significant. We found that only peer messages which emphasized social losses increased the thwarted need to belong, which in turn increased the likelihood of stealing and the perceived worth of committing the offence. It seems that social loss framing makes people more sensitive to ostracism and fear of losing belongingness, which makes them feel like the crime is more worth it and makes them more likely to engage in the offence. Considering the outcomes of these mediation models in tandem with the significance of the need to belong variable and the items that compromise the need to belong scale, we propose that this scale provides support for the loss aversion principle in peer offending contexts.

Differentiating between the perceived worth of an offence and the likelihood of offending

Prospect theory delineates that decision-making occurs in two stages (Tversky & Kahneman, 1992). The first stage involves a preliminary analysis of the available prospects. In this phase, information is organized, re-structured and simplified. In the second stage,

known as the valuation phase, the decision-maker weighs the edited prospects, then chooses

the option of highest value. Prospect theory posits that framing equivalent decisions as

potential losses and potential gains can significantly alter a decision-makers' valuation of the

choice. Traditionally, studies of criminal decision-making have used a willingness to offend

measure to quantify criminal choice. However, in their study of framing effects on criminal

decision-making, Pickett and colleagues (2020) opted to use a "perceived worth" of criminal

opportunity measure to better reflect the valuative stage of decision-making. Instead of

asking about behavioral outcomes, they asked participants the extent to which they perceived

the criminal opportunity as worthwhile. For this experiment we incorporated perceived worth

of offending and willingness to offend measures. By doing so, we could measure the effects

of peer message framing both on the valuation phase of decision-making and the

participants' behavioral outcomes. Interestingly, our models showed that framing effects

were significant for the likelihood of stealing, but not the perceived worth of the act. We

speculate that peers alerting the respondents to the possibility of social inclusion or social

exclusion is enough to spur action, but not enough to change their valuation of the crime. In

other words, participants may not think that committing the crime itself is worth it, but would

commit it anyways to avoid rejection and ostracism.

The non-significance of framing effects on drunk driving outcomes

Our analyses showed that framing effects significantly predicted the likelihood of stealing

but did not predict drunk driving outcomes. We propose two potential explanations for these

findings. First, it is possible that verbal prompts from peers are not enough to sway offending

decisions, particularly for more serious crimes. Numerous studies have demonstrated the importance of non-verbal communication on offending outcomes. Both emotional expressivity and behavioral modeling significantly affect willingness to cooperate with peers and willingness to engage in deviant behavior (Boone & Buck, 2003; Gino et al., 2009; Harakeh & Vollebergh, 2012; Mercer et al., 2017; Paternoster et al. 2013). Since our experiment focused on peer language use, we did not describe non-verbal peer dynamics in our vignettes. This means participants were only exposed to verbal peer pressure. In real life offending contexts, participants would also be exposed to non-verbal cues from their peers, which could increase the likelihood of offending. Recent experiments testing peer influence on theft found that verbal prompts alone did not significantly increase offending behavior. However, verbal prompts combined with behavioral modeling from peers led to significant increases in stealing (Gallupe et al., 2016; 2019). Taking this into account, the non-significance of framing effects in the drunk driving scenario may in part be explained by lack of non-verbal cues in the vignettes.

Next, it is important to consider the severity and consequences of the offence. Driving under the influence puts the offender, the passengers, other drivers, and pedestrians at risk for serious, life-threatening, and even fatal injuries. On the other hand, stealing several hundred dollars from an unlocked car does not cause bodily harm. Framing effects may not be significant in decision-making contexts where there is potential for serious physical injury to oneself and others. This explanation is strengthened by our finding that thwarted need to belong mediated framing effects for stealing but not drunk driving outcomes. The need to

belong is a universal, fundamental human motivation that drives many behaviors. Its non-significance in the drunk driving mediation models signals that perhaps, in cases where the offence is dangerous and life threatening, fear of being rejected by peers is less relevant. For this reason, we encourage future research to investigate peer message framing effects on more minor offences, including petty theft, vandalism, and disturbing the peace.

Age, peer influence and risky decision-making

There is well documented evidence that peer influence varies across developmental stages (Brown, 2004; McIntosh et al., 2006; Steinberg & Monahan, 2009). Studies show that adolescents are particularly susceptible to peer pressure and are more prone to engaging in risky behavior in the presence of peers (Albert et al., 2013; Chein et al., 2011; Smith et al.; 2015; Warr, 2002). In an experimental study of risk-taking, risk-preference and risky decision-making in adolescence and adulthood, Gardner and Steinberg (2005) found that peer effects on risk taking and risky decision-making were stronger among adolescents than adults. Neuroscientific evidence suggests that this increased susceptibility to peer influence in adolescence is caused by heightened activation of neural reward systems (Chein et al., 2011). Results from an fMRI study of adolescents (ages 14-19) and adults (ages 25-35) demonstrated that peers increase activation in brain areas associated with reward processing, but that this increase is seen only in adolescents, not adults (Smith et al., 2015).

This study sampled young adults between the ages of 18-24. Since adults are less susceptible to peer influence and tend to engage in fewer risk-taking behaviors, it may be that peer message framing effects are not as significant. In the future, studies of loss aversion and

framing effects in criminal decision-making contexts should investigate developmental

differences and conduct studies with adolescent samples.

The complex relationship between framing effects and emotions

When interpreting the results of our study, it is important to note that criminal

contexts are highly emotionally charged (van Gelder, 2016). A large body of literature shows

that emotions play a significant role in decision-making under risk (George & Dane, 2016;

Hu et al., 2014; Lerner et al., 2015; Yang et al., 2020). While the relationship between

emotions and gain/loss framing is not well understood, there is emerging evidence that

emotions can influence framing effects (see Schuck & Feinholdt, 2015 for a review and Nabi

et al., 2019 for a meta-analysis). Some scholars suggest that emotions such as anger and

enthusiasm can act as mediators for gain and loss framing effects on decision-making

(Lecheler et al., 2015) but this area of study is relatively new and has not garnered much

empirical support. While we did control for situational emotions in our study, given that the

relationship between emotions and framing effects is not yet well understood, it may be

worthwhile to conduct research on peer message framing effects with less serious offences

that induce less fear and anger. Perhaps for less serious offences, participants would be less

emotionally charged and respond differently to framing effects.

Limitations and Strengths

Limitations

The following section outlines the limitations of our study. To begin, this experiment

relies on hypothetical scenarios to measure criminal decision-making. Some scholars are

hesitant to employ this method as they contend that decision-making processes differ in real life risky contexts (Bouffard & Exum, 2010). In their studies of prospect theory, Kahneman and Tversky (1979 p. 265) point out that relying on hypothetical scenarios requires the "assumption that people often know how they would behave in actual situations of choice." There is good evidence that this assumption is met; studies find that decisions made in hypothetical scenarios closely mirror real-life decision-making, even in high risk, high stakes situations (see Pickett et al., 2020; Pogarsky, 2004; Thaler 2016).

When designing this experiment, we considered both financial and time constraints. Conducting an in-person laboratory experiment would require considerably more time and resources than an online experiment. Participants would need to commute to the study location, take time off school/work to partake in the experiment and could not complete the study at their own pace. This means the compensation for an in-lab study would be greater. Conducting in-person studies was further complicated by COVID-19 and changing safety guidelines and protocols. Furthermore, obtaining research ethics board approval for in-lab research with human participants is more challenging and time-consuming than an anonymous online survey, particularly for studies of crime. Since there is strong empirical evidence that real life decision-making does not vary significantly from hypothetical scenarios, we opted to employ this design. In the future, it may be worthwhile to conduct a social gain and social loss framing study in-lab, where participants are exposed to real time verbal prompts from confederates and then given the opportunity to steal (see Gallupe et al., 2016; 2019).

Moreover, as previously mentioned, this study was limited to serious criminal offences. The first vignette described a scenario where the participant could steal hundreds of dollars from a car. In Canada, under the Criminal Code, theft under $5000 can result in up to 2 years in jail if the crown proceeds by indictment or up to 6 months in jail if the crown proceeds with a summary offence. The offender will also have a criminal record and will have their identity, fingerprint and charge information uploaded to an RCMP database (Government of Canada, 2023). This can "cause problems with employment background checks, Canadian immigration (IRCC) status and applications, and result in lifelong problems for those wanting to travel to, work in, or move to the U.S. in the future" (Zinck, 2023). The second vignette asks participants about their willingness and their perceived worth of driving drunk. Drunk driving also has serious consequences. Intoxicated driving is the leading criminal cause of death and injury in Canada (Government of Canada, 2022). The penalties for drunk driving vary depending on whether the offender has previous convictions, if the driving caused bodily harm, or if the impaired driving caused death. Under the Criminal Code, there is a minimum $1000 fine for each of these charges, or a maximum of life imprisonment (Government of Canada, 2022). For most participants, there would likely be at least some knowledge of the consequences associated with each of these criminal acts. The severity of these crimes may limit the generalizability of our results. Framing effects may be more significant for minor petty crimes such as vandalism or disturbing the peace where consequences may not be as dire.

Next, classic rational choice theories postulate that offenders will weigh various factors when engaging in criminal-decision making. One of these factors is risk of arrest (Becker, 1968). In our scenarios, we did not describe the likelihood of being caught or the probability of conviction. While we did account for various situational factors, including fear, nervousness, anger, and irritability, it is possible that probability of conviction would significantly alter the likelihood and perceived worth of offence. If our vignettes explicitly stated that there was a low likelihood of being caught, the framing effects may have been more significant. Alternatively, if participants knew they would certainly be caught, the framing effects may disappear altogether. In the future, studies of framing effects could control for likelihood of arrest and conviction.

It should also be noted that our study recruited a relatively small sample. Before beginning the experiment, we conducted a power analysis which showed that following Thomas and Nguyen's (2020) study, to detect an effect size of d=0.57 (a moderate effect) at a power of 0.8, we would need 315 participants. This is already a small sample size to begin with. Once we dropped participants who scored low on the honesty measure and were missing responses, we were left with 313 respondents. Previous studies looking at framing effects used significantly larger samples (see Pickett et al., 2020; Thomas & Nguyen, 2020). In the future, we encourage researchers to replicate this study with a larger sample size with the ability to detect more subtle effects.

Another limitation is the demographics of our sample. We made the survey available to 18–24-year-olds, which limits the generalizability of our results to young adults. Decision-

making differs across developmental stages, and the results we found for this age group may not be relevant for adolescents or older adults. Moreover, although we did control for sociodemographic factors, including gender, age, education, and political leaning, our sample may not be representative of the general North American population. Online sampling can only reach respondents who have access to the internet and know how to complete online surveys. There are survey websites, including prolific.co and Amazon MTurk, which offer the option to recruit a nationally representative sample for additional cost. This may be a useful option for future studies of framing effects on criminal decision-making.

Lastly, there were several technical limitations on the survey platform. An important limitation was that participants could not go back and re-read the vignettes. Once they read the vignette and hit the "next" button, participants were immediately prompted to respond to the dependent variables and control measures. They could not use a back arrow to return to the scenario page. This means if participants wanted to re-read the peer verbal prompts, they could not, which could have reduced or impaired the framing effects. The differences between social gain and social loss framing are subtle because ultimately, both choices result in equivalent outcomes. Without the opportunity to review the scenario, these subtle differences can be missed and render the framing effects less significant.

Strengths

Despite these limitations, our study makes a significant contribution to criminal decision-making literature. In a review of peer influence on criminal decision making, Hoeben and Thomas (2019) point to a shift away from traditional rational choice models of

criminal decision-making and towards dual process models of cognition and behavioral economics theories of choice. These models emphasize that humans are not rational decision-makers and posit that decision-making is non-linear and subject to cognitive biases. Based on behavioral economics studies of human decision-making, Hoeben and Thomas (2019) theorize that framing effects could play a significant role in criminal decision-making outcomes. They draw specific attention to framing effects of peer messages and the potential for conversations with peers to alter decision-making processes.

Pickett and colleagues (2020) conducted the first test of framing effects on criminal offending. They presented hypothetical scenarios which framed offending decisions in terms of potential for financial wins or financial losses. Their study did not find support for prospect theory's loss aversion principle. The authors speculate that framing of social losses and gains may play a more important role in criminal decision-making. That same year, Thomas and Nguyen (2020) conducted a test of social framing and criminal choice. Participants were presented with hypothetical criminal scenarios and were told that if they committed the crime, they would gain status and respect in the peer group, and if they failed to commit the crime, they would lose status and respect in the peer group. Participants tended to be more sensitive to status loss framing, and more willing to offend when the choice was framed as a potential loss. Thomas and Nguyen's (2020) study provided preliminary evidence for the loss aversion principle in criminal offending.

In this experiment, we sought to build on Pickett et al.'s (2020) study and Thomas and Nguyen's (2020) study by adding a peer language use variable. Despite widespread

knowledge that offending tends to happen in groups and that often, offending is preceded by conversation, very few studies have investigated the role of peer language use (Hoeben & Thomas, 2019). Up until now, there have been limited studies on peers as conversational partners and no studies that have experimentally manipulated framing of peer messages. By incorporating peer verbal prompt variables, this study is one of the first to test framing effects in a criminal decision-making context and is the very first to test the effects of peer language framing. Our study found support for social gain and social loss framing effects on willingness to offend; respondents were more likely to steal when they read social gain and social loss framed messages. This substantiates that framing of peer messages can significantly alter an individual's likelihood of offending.

Another major strength of our experiment is the creation of a variable that quantifies social loss aversion. Thwarted need to belong is widely acknowledged as an important determinant of cognition, emotion, and behavior in other areas of research, but it has been largely ignored in studies of criminal decision-making. Pulling from studies of peer dynamics and thwarted need to belong, we created a three-item thwarted need to belong scale that quantifies fear of losing acceptance and belonging in a criminal offending situation. This measure had high internal reliability and significantly predicted all offending outcomes. Across all main and supplementary multivariate models, we found that thwarted need to belong was associated with higher likelihood and perceived worth of serious criminal offending. Moreover, this measure mediated loss framing effects for likelihood and perceived worth of stealing. The thwarted need to belong findings align with Kahneman and Tversky's

(1981) loss aversion principle, which states that under risky decision-making contexts, fear of losing out makes individuals more prone to engage in risky behaviors. The creation of this scale advances theoretical understandings of peer influence on crime and provides a reliable, easy to implement measure of social loss version. In the future, researchers should consider incorporating this thwarted need to belong scale to better understand how social loss aversion affects other criminal decision-making outcomes.

In addition to the theoretical and methodological contributions of this work, a strength of this study was its research design. By using a randomized experimental design, we were able to isolate framing effects. In an effort to make our study more rigorous, we also controlled for theoretically relevant variables including situational emotions, resistance to peer influence and impulsivity. This minimized the effect of pre-existing individual differences that are known to affect peer influence and offending outcomes. We also controlled for age, gender, ethnicity, political leaning, and education to ensure that our study could better generalize to the North American population. Importantly, while recruiting our online sample, we also made sure to make the study available to participants with varying levels of education, as many studies of criminal choice tend to recruit only college samples (McGloin & Thomas, 2016; Paternoster et al., 2017; Thomas et al., 2018; Thomas & Nguyen, 2020). By taking these steps, we addressed common concerns in criminal choice studies.

Implications for Future Research and Policy

Future Directions

The results of this study have important implications for future research on peer deviance. This experiment illustrates that social loss aversion is a significant predictor of offending outcomes. The powerful impact of social loss aversion and thwarted belongingness needs is widely acknowledged in studies of terrorism, human trafficking, gang recruitment, aggression and bullying (Davis & Davis, 2007; Government of Ontario, 2021; Khan et al., 2013; Pfundmair et al., 2019; Twenge et al., 2001). However, this variable has been largely neglected in studies of criminal choice. Scholars such as Hirschi (1969) have drawn attention to the importance of attachment and commitment bonds to prosocial others, such as teachers and parents. While bond theories overlap with need to belong theory, they do not explicitly address universal need for connection or the fear of rejection and ostracism. In his work on peers and crime, Warr (2002) cites fear of losing status as a key determinant of gang involvement. However, his studies focused primarily on qualitative methodology and did not quantify social loss aversion or thwarted need to belong. As the field of criminology begins to incorporate quantitative behavioral economics models, this thwarted need to belong scale may be useful for measuring and testing the effects of social loss aversion. Using this scale could further our theoretical understanding of peer influence on criminal decision-making processes, facilitate empirical studies of social loss aversion, and have significant policy implications (discussed in the final section of this chapter).

Moreover, social psychologists differentiate between situational need to belong and need to belong as a personality trait (Pfundmair, et al., 2022). Research suggests that individuals with a higher dispositional need to belong are more sensitive to ostracism, peer influence, and subsequently are more willing to engage in radical and aggressive behavior (Pfundmair et al., 2019; 2022). Future studies of peer influence on offending can control for dispositional need to belong and investigate if threats of rejection and ostracism are particularly impactful for individuals with higher trait need to belong.

To address the shortcomings of this study, researchers could also attempt to replicate this online experiment with vignettes of less serious criminal offences, and with a younger sample. It would be of interest to see if social gain and social loss framing effects vary in significance for minor crimes and for age groups that are more susceptible to peer influence.

Peer message framing effects, and more generally, the influence of peers as conversational partners on criminal choice remains understudied (Hoeben & Thomas, 2019). While some research finds that verbal prompts alone do not increase individual offending (Gallupe et al., 2016; 2019) findings from this experiment suggest that verbal peer pressure is significant for certain crimes and not others. These mixed results imply that the relationship between verbal peer pressure and crime is complicated. The effects of peers as conversational partners on criminal choice may depend on a myriad of factors, including the content, direction and framing of the peer messages, the nature and severity of the crime, and the offenders' age. Research should continue to explore and disentangle the role of peer language use in criminal decision-making.

Lastly, this study could be re-created in a laboratory with confederate(s) providing gain and loss framed peer verbal prompts. This could increase the ecological validity of the study, as the manipulation would not be limited to online survey vignettes. Conducting the study in a peer group setting in lab may more closely reflect real-life criminal offending. While this would be interesting, it is also important to note that even with an in-lab study of framing effects, there would still be issues with ecological validity. Additionally, in a lab it becomes more difficult to isolate framing effects, as there is an added element of non-verbal communication, including tone, facial expressions and body movements that are not totally in the experimenters' control. It may be useful to conduct a semi-structured interview with participants after the experiment to parse out the effects of verbal framing versus non-verbal communication.

Policy implications

The emerging evidence that framing effects and status loss aversion drives criminal decision-making processes has implications for policymaking and crime prevention. Findings from this study and related studies (Thomas & Nguyen, 2020) suggest that people fear losing social status and ties, and that this makes them more likely to commit crimes. Programs that target thwarted need to belong may be an effective means for reducing crime. Extracurriculars, mentorship programs, clubs and groups that bolster youth's and young adults' sense of acceptance, belonging, and positive social ties could reduce offending rates. If youth feel they have meaningful connections within positive interpersonal peer groups, they may be less inclined to engage in risky behavior with deviant peer groups. A fulfilled

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need to belong may counteract social loss aversion and make individuals less inclined to give into peer pressure from deviant peer groups. There is evidence that intervention programs that increase belongingness and connectedness effectively reduce deviant behavior including bullying, gang involvement and violence (Davis & Davis, 2007; Khan et al., 2013).

Targeting the need to belong may be a promising avenue for reducing crime but since the thwarted need to belong has been overlooked in empirical studies of criminal choice, this may take time to implement and empirically evaluate. I hope that the findings from our study highlight the importance of social loss aversion in criminal decision-making contexts and will incite the use of the thwarted need to belong scale. Putting this simple 3-item scale into practice may advance our theoretical understanding of criminal choice and offer a method of evaluating criminal intervention programs that aim to foster bonds and bolster acceptance.

Conclusion

This online experiment tested the effects of peer language use on serious offending outcomes. Based on postulations from rational choice theory, prospect theory, and need to belong theory, we tested the hypothesis that peer messages framed as social gains and social losses would increase individuals' willingness and perceived worth of stealing and driving drunk, and that this increase would be greater for loss framed messages. We found that social gain and social loss framing increased willingness to steal, but that this increase was not greater for loss framed peer messages. This study provides evidence that verbal peer pressure does heighten individual offending for some types of criminal offences. Moreover, thwarted need to belong proved to be a particularly significant predictor of all offending outcomes.

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Across all statistical models, greater fear of losing acceptance, belonging, and social ties increased the willingness to engage in criminal activity and the perceived worth of the criminal opportunities. Thwarted need to belong also mediated social loss framing effects on the willingness and perceived worth of stealing, indicating that social loss framing increases fear of rejection/ostracism, which in turn increases the likelihood and perceived worth of stealing large sums of money. Taken together, these results provide support for the loss aversion principle. Our study revealed that although framing effects are not always significant, the fear of losing social acceptance and thwarting belongingness needs consistently drive criminal decision-making in peer contexts.

The current study combines three prominent theories from the fields of criminology, behavioral economics, and social psychology, and empirically tests their key principles in the context of peer deviance. By integrating rational choice paradigms, prospect theory, and the need to belong theory, data from this experiment contributes to refocusing theoretical interest in the field of criminology, particularly in the study of deviant peer influences. The study provides empirical evidence for framing effects and the importance of social loss aversion on criminal choice, while incorporating the previously neglected peer language use variable. It also provides a 3-item scale that measures social loss aversion in criminal contexts which can be easily implemented in future studies of peer influence on criminal decision-making.

Overall, this study sought to disentangle the role of peer language use on offending outcomes and provide insight on how individuals process social cues and weigh social risks and rewards when making offending decisions. This research contributes to a growing body

of literature on behavioral economics and peer delinquency, while highlighting the importance of quantifying the fundamental need to belong in studies of criminal choice. Findings from this experiment can inform policies and intervention programs aimed to reduce crime and peer delinquency among youths and young adults.

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Appendix A

Supplementary Ordered Logistic Models

Likelihood of taking wallet ordered logistic model

	b	SE	95% CI		*p*
			LL	UL	
Independent variables					
Social gain	1.267**	.387	.508	2.027	.001
Social loss	.580	.404	-.212	1.371	.151
Controls					
Need to belong	.455**	.066	.325	.584	.000
Situational fear	-.253*	.111	-.471	-.037	.022
Situational anger	-.554**	.105	-.760	-.347	.000
Impulsivity	.136*	.056	.026	.246	.016
Resistance to peer influence	-.277	.176	-.621	-.068	.115
Age	.024	.095	-.209	.161	.801
Gender					
Male	.304	.299	-.283	.890	.311
Non-binary/Other	-.432	.732	-1.866	1.003	.555
Education	-.149	.129	-.104	.401	.249
Ethnicity (white = 1)	-.492	.295	-1.070	.085	.095
Political leaning	.155	.010	-.040	.350	.119

*p<.05, **p<.01

Perceived worth of taking wallet ordered logistic model

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.542	.320	-.085	1.170	.090
Social loss	.335	.325	-.302	.972	.303
Controls					
Need to belong	.255**	.052	.154	.356	.000
Situational fear	-.088	.086	-.256	.082	.311
Situational anger	-.512**	.087	-.682	-.341	.000
Impulsivity	.067	.047	-.025	.158	.120
Resistance to peer influence	-.221	.151	-.519	-.076	.144
Age	-.0122	.0547	-.1194	.0950	.821
Gender					
Male	-.178	.252	-.672	.315	.478
Non-binary/Other	-.158	.533	-1.204	.887	.767
Education	-.103	.106	-.310	.104	.329
Ethnicity (white = 1)	-.334	.240	-.804	.136	.163
Political leaning	.146	.080	-.011	.304	.068

*p<.05, **p<.01

Likelihood of driving drunk ordered logistic model

	b	SE	95% CI		*p*
			LL	UL	
Independent variables					
Social gain	.451	.273	-.085	.987	.099
Social loss	.066	.282	-.486	.616	.816
Controls					
Need to belong	.218**	.039	.142	.295	.000
Situational fear	-.072	.075	-.219	-.074	.333
Situational anger	-.355**	.075	-.501	-.208	.000
Impulsivity	.139**	.044	.054	.225	.001
Resistance to peer influence	-.275	.142	-.554	.004	.054
Age	-.093	.075	-.240	.053	.212
Gender					
Male	-.342	.240	-.814	.129	.154
Non-binary/Other	-1.221	.627	-2.451	.008	.052
Education	.032	.104	-.172	.235	.761
Ethnicity (white = 1)	-.245	.228	-.691	.202	.282
Political leaning	.037	.077	-.114	.187	.631

*p<.05, **p<.01

Perceived worth of driving drunk ordered logistic model

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.153	.279	-.393	.700	.582
Social loss	.073	.285	-.486	.633	.797
Controls					
Need to belong*	.228**	.039	.151	.305	.000
Situational fear	-.145	.075	-.292	.001	.052
Situational anger	-.334**	.074	-.479	-.190	.000
Impulsivity	.152**	.043	.067	.237	.000
Resistance to peer influence	-.271	.146	-.557	.015	.063
Age	-.137	.077	-.289	.015	.077
Gender					
Male	-.239	.242	-.713	.234	.322
Non-binary/Other	-1.059	.606	-2.247	.129	.081
Education	.117	.106	-.092	.325	.273
Ethnicity (white = 1)	-.147	.233	-.604	.310	.528
Political leaning	.041	.080	-.115	.197	.607

*p<.05, **p<.01

Appendix B

Supplementary Mediation Models

Effects of peer message framing on the likelihood of taking wallet mediated by thwarted need to belong

	DV=need to belong (mediator)		DV=likelihood of taking wallet		Indirect effect of experimental treatment on likelihood of taking wallet through need to belong	
	b	SE	*b*	SE	*ab*	95% BCCI
Experimental condition						
Social gain	-.371	.345	.419**	.114	-.048	-.145 to .032
Social loss	.775*	.342	.278*	.113	.101	.010 to .219
Need to belong	-	-	.130**	.019		
Situational fear	.536**	.084	-.072*	.029		
Situational anger	-.062	.088	-.172**	.029		
Impulsivity	.198**	.048	.036*	.016		
Resistance to peer influence	-.160	.162	-.111*	.053		
Age	-.082	.087	.005	.028		
Gender						
Male	.020	.276	.020	.091		
Non-binary/Other	.106	.599	-.177	.197		
Ethnicity (white = 1)	.150	.259	-.151	.085		
Education	.111	.115	-.007	.038		
Political leaning	.097	.087	.058*	.029		

*p<.05, **p<.01

Effects of peer message framing on the perceived worth of taking wallet mediated by thwarted need to belong

	DV=need to belong (mediator)		DV=worth of taking wallet		Indirect effect of experimental treatment on worth of taking wallet through need to belong	
	b	SE	*b*	SE	*ab*	95% BCCI
Experimental condition						
Social gain	-.371	.345	.252	.208	-.060	-.188 to .038
Social loss	.775*	.342	.292	.207	.126	014.to .282
Need to belong	-	-	.163**	.034		
Situational fear	.536**	.084	-.117*	.053		
Situational anger	-.062	.088	-.316**	.053		
Impulsivity	.198**	.048	.054	.029		
Resistance to peer influence	-.160	.162	-.185	.097		
Age	-.082	.087	-.012	.052		
Gender						
Male	.020	.276	-.197	.166		
Non-binary/Other	.106	.599	-.280	.360		
Ethnicity (white = 1)	.150	.259	-.167	.156		
Education	.111	.115	-.103	.070		
Political leaning	.097	.087	.112*	.053		

*p<.05, **p<.01

Effects of experimental condition on likelihood of driving drunk mediated by thwarted need to belong

	DV=need to belong (mediator)		DV=likelihood of driving drunk		Indirect effect of experimental treatment on likelihood of driving drunk through need to belong	
	b	SE	*b*	SE	*ab*	95% BCCI
Experimental condition						
Social gain	-.131	.428	.220	.142	-.012	-.090 to .066
Social loss	-.066	.434	.010	.144	-.006	-.089 to .086
Need to belong	-	-	.113	.019		
Situational fear	.564**	.105	-.058	.036		
Situational anger	-.164	.108	-.154**	.036		
Impulsivity	.219**	.064	.071**	.022		
Resistance to peer influence	-.410	.213	-.131	.071		
Age	-.182	.114	-.039	.038		
Gender						
Male	.146	.368	-.168	.122		
Non-binary/Other	.339	.804	-.443	.267		
Ethnicity (white = 1)	.349	.349	-.142	.116		
Education	.149	.155	.030	.051		
Political leaning	-.018	.117	.033	.039		

*$p<.05$, **$p<.01$

Effects of peer message framing on the perceived worth of driving drunk mediated by thwarted need to belong

	DV=need to belong (mediator)		DV=worth of driving drunk		Indirect effect of experimental treatment on worth of driving drunk through need to belong	
	b	SE	b	SE	ab	95% BCCI
Experimental condition						
Social gain	-.131	.428	.095	.161	-.012	-.085 to .061
Social loss	-.066	.434	.026	.163	-.006	-.083 to .079
Need to belong	-	-	.112**	.021		
Situational fear	.564**	.105	-.064	.041		
Situational anger	-.164	.108	-.182**	.041		
Impulsivity	.219**	.064	.083**	.024		
Resistance to peer influence	-.410	.213	-.158	.081		
Age	-.182	.114	-.077	.043		
Gender						
Male	.146	.368	-.094	.138		
Non-binary/Other	.339	.804	-.458	.303		
Ethnicity (white = 1)	.349	.349	-.122	.131		
Education	.149	.155	.051	.058		
Political leaning	-.018	.117	.039	.044		

*p<.05, **p<.01

Appendix C

Supplementary Interaction Models

Interaction effects between need to belong and peer message framing on the likelihood of taking wallet

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain**	.432	.118	.202	.662	.000
Social loss*	.294	.126	.046	.542	.020
Interaction					
NTB x gain framing	.002	.056	-.108	.112	.968
NTB x loss framing	-.047	.052	-.149	.056	.371
Controls					
Need to belong**	.152	.043	.066	.237	.000
Situational fear*	-.075	.029	-.131	-.017	.011
Situational anger**	-.172	.034	-.238	-.106	.000
Impulsivity*	.037	.017	.005	.070	.025
Resistance to peer influence*	-.108	.055	-.215	-.000	.049
Age	.006	.030	-.053	.065	.836
Gender					
Male	.019	.093	-.162	.201	.834
Non-binary/Other	-.157	.191	-.532	.218	.411
Education	-.007	.039	-.084	.069	.850
Ethnicity (white = 1)	-.154	.085	-.321	.012	.070
Political leaning	.062	.033	-.003	.126	.060

*$p<.05$, **$p<.01$

Interaction effects between need to belong and peer message framing on the perceived worth of taking wallet

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.246	.213	-.172	.664	.249
Social loss	.316	.232	-.140	.772	.174
Interaction					
NTB x gain framing	-.106	.082	-.266	.055	.198
NTB x loss framing	-.106	.087	-.276	.064	.222
Controls					
Need to belong**	.241	.069	.107	.375	.000
Situational fear*	-.124	.056	-.233	-.015	.026
Situational anger**	-.322	.062	-443	-.201	.000
Impulsivity	.058	.035	-.010	.127	.096
Resistance to peer influence	-.185	.109	-.399	.030	.091
Age	-.015	.055	-.123	.094	.793
Gender					
Male	-.207	.173	-.546	.133	.233
Non-binary/Other	-.267	.359	-.971	.437	.457
Education	-.098	070.	-.236	.039	.161
Ethnicity (white = 1)	-.163	.163	-.482	.157	.318
Political leaning*	.118	.059	-.003	.232	.045

*p<.05, **p<.01

Interaction effects between need to belong and peer message framing on the likelihood of driving drunk

	b	SE	95% CI		p
			LL	UL	
Independent variables					
Social gain	.221	.147	-.067	.509	.133
Social loss	.008	.143	-.271	.288	.953
Interaction					
NTB x gain framing	.025	.050	-.074	.122	.623
NTB x loss framing	.004	.046	-.086	.094	.930
Controls					
Need to belong**	.104	.039	.028	.180	.007
Situational fear	-.058	.039	-.134	.017	.131
Situational anger**	-.154	.039	-.229	-078.	.000
Impulsivity**	.071	.025	.022	.119	.004
Resistance to peer influence	-.130	.075	-.277	.016	.081
Age	-.040	.042	-.121	.042	.342
Gender					
Male	-.171	.126	-.417	.075	.173
Non-binary/Other	-.448	.350	-1.133	.237	.200
Education	.028	.056	-.081	.137	.613
Ethnicity (white = 1)	-.147	.117	-.376	.083	.211
Political leaning	.033	.041	-.048	.114	.425

*p<.05, **p<.01

Interaction effects between need to belong and peer message framing on the perceived worth of driving drunk

| | b | SE | 95% CI | | p |
			LL	UL	
Independent variables					
Social gain	.094	.169	-.238	.426	.578
Social loss	.027	.152	-.272	.325	.860
Interaction					
NTB x gain framing	-.035	.056	-.145	.076	.539
NTB x loss framing	-.047	.047	-.139	.044	.313
Controls					
Need to belong**	.142	.040	.064	.220	.000
Situational fear	-.066	.037	-.138	.006	.074
Situational anger**	-.180	.039	-.257	-.102	.000
Impulsivity**	.082	.025	.033	.132	.001
Resistance to peer influence	-.158	.082	-.320	.003	.054
Age	-.079	.046	-.170	.012	.089
Gender					
Male	-.094	.136	-.360	.172	.490
Non-binary/Other	-.446	.353	-1.137	.245	.206
Education	-.047	.058	-.067	.161	.420
Ethnicity (white = 1)	-.126	.133	-.386	.172	.340
Political leaning	.043	.050	-.056	.141	.398

$*p<.05, **p<.01$