On Peer Effects: Contagion of Pro- and Anti-Social Behavior in Charitable Giving and the Role of Social Identity

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Abstract:

Social interactions and the resulting peer effects loom large in both economic and social contexts. This is particularly true for the spillover of pro- and anti-social behavior in explaining how such behavior and norms spread across individual people, neighborhoods, or even cultures. Although we observe the outcomes of such contagion effects, little is known about the drivers and the underlying mechanisms, especially with respect to the role of social identity with one's peers and the pro- and anti-sociality of behavior one is exposed to. We use a variant of a power-to-take dictator game to shed light on these aspects in a controlled laboratory setting. Our experiment contributes to the existing literature in two ways: first, using a novel approach of inducing social identification with one's peers in the lab, our design allows us to analyze the spillover-effects of behavior under varied levels of social identity. Second, we study whether pro- and anti-social behavior are equally contagious. Our results suggest that anti-social behavior is more contagious than pro-social behavior and that the extent of social identification to one's peers particularly drives the contagion of anti-social behavior. Our findings yield strong policy implications with regards to designing effective nudges and interventions to facilitate (reduce) pro- (anti-) social behavior.

Keywords: Anti-Social Behavior, Behavioral Contagion, Charitable Giving, Peer Effects, Social Identity

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1. Introduction

Individuals do not co-exist in pure isolation but interact within social contexts, or as emphasized by Elliot Aronson (2011): individuals are *social animals*. Despite the long tradition in anthropology and sociology, economists have been rather negligent of the relevance of norms, values, and social influence of peers on one's behavior. Fortunately, over the last two decades there has been a push in the economic discipline to expand our understanding of what comprises a more sophisticated individual decision maker by accounting for the individual's identity, morals, and other-regarding concerns (cf. Akerlof & Kranton (2000), Charness & Rabin (2002), Benjamin, Choi & Strickland (2010), Bénabou & Tirole (2011)). These approaches have enriched our understanding by regarding social and economic decisions as a function of the respective social and economic environment and the relevance of peer behavior. Scholars in economics and psychology have attempted to shed light on the mechanism of peer effects using both lab and field experiments. Peers are found to affect investment decisions (Bursztyn, et al., 2014), littering behavior (Cialdini, et al., 1990), education (Sacerdote, 2001), productivity at work (Falk & Ichino (2006), Mas & Moretti (2009)), and the development of children (see the seminal Moving-to-Opportunity (MTO) literature by Case & Katz (1991), Katz, Kling & Liebman (2001), Kling, Ludwig & Katz (2005), among others).

Studying behavioral contagion and adaptation of observed peer behavior, particularly in the domain of (un)ethical behavior, looms large due to its economic and social significance. Some anecdotal evidence highlights this notion. Exemplarily, a stream of suicides happened after reading Goethe's *The Sorrows of the Young Werther* two hundred years ago. "My friends […] thought that they must transform poetry into reality, imitate a novel like this in real life and, in any case, shoot themselves; and what occurred at first among a few took place later among the general public […]" (Goethe, quoted in Rose (1929, p. 29)). The outbreak of the Tanganyika laughter epidemic of 1962 in Uganda is another infamous example of behavioral contagion. There, a mass hysteria infected almost 100 pupils with contagious laughter, forcing several schools to close (Rankin & Philip, 1963). Much like emotional contagion, the underlying idea of behavioral contagion depicts a form of social influence leading to the emulation of behavior one is exposed to. Most existing studies have focused on analyzing ethical and unethical behavior in isolation. Economic research has highlighted peer-effects in pro-social behavior and voluntary cooperation (Frey & Meier (2004), Thöni & Gächter (2015)), and within the unethical domain, such as doping (Gould & Kaplan, 2011), and dishonesty (Innes & Mitra, 2013).

In this paper, we aim at expanding the existing knowledge on the drivers of charitable giving with a focus on both the (un)ethicality of the observed behavior and the degree of social identity with the observed individual. A salient state of social identity is found to trigger favoritism towards those of stronger social kinship (Charness, et al., 2007). These findings motivate our study. In this paper, we shed light on two questions: first, does social identification to one's peers facilitate the spread of (un)ethical behavior, in particular with respect to charitable giving? [1] Second, which type of behavior is more contagious? By answering these questions, we contribute to the growing economic literature on the role of identity and spillovers resulting from peer effects in charitable giving. Understanding the drivers of pro- and anti-social behavior charitable giving is pivotal from a policy perspective. To the best of our knowledge, our paper is the first experimental examination of behavioral contagion as a function of varied levels of social proximity and the (un)ethicality of observed behavior, which in combination with the methodological novelty depicts our principal contribution.

Our work adds to existing literature by broadening our understanding of how peer effects and the resulting behavioral contagion play out within the spheres of both ethical and unethical behavior simultaneously. Further, we use a novel approach to induce social identity and measure its distance between individuals (we will refer to this as varying levels of *social proximity*) in a in order to study behavioral contagion in different social settings.[2] In particular, we construct a list of personal statements taken from a major American dating website to categorize participants according to overlaps in preferences and interests (for a discussion, see Hitsch, Hortaçsu & Ariely (2010)).[3] This approach allows us to create a measure of social proximity and use this as an exogenously varying matching device to study peer effects in the lab. This allows us to combine the best of both approaches: for one, the controlled laboratory setting mitigates the previously discussed arising difficulties when studying peer effects in the field.[4] Additionally, our novel measure of social proximity allows us to mimic social affection that is normally absent in the artificial laboratory setting due to its intended nature of anonymity.

[1] Henceforth, we will refer to pro-social (anti-social) as ethical (unethical) behavior and use these terms interchangeably. In the charity-context of our experiment, the basic assumption here is that giving money to (taking money away from) the charity can also be understood as an (un)ethical act.

[2] In economics, social identity has previously been studied by Bohnet & Frey (1999), Charness, Rigotti & Rustichini (2007), Chen & Li (2009), Benjamin, Choi & Strickland (2010), among others. For a review see Costa-Font & Cowell (2015)).

[3] We use these questions to generate a composite matching score with other participants and randomly vary the information set across treatments given to matched pairs of participants. The exact matching mechanism and the treatment variations will be explained in more detail in the experimental design section of this paper.

[4] In a recent meta-study, Herbst & Mas (2015) found that laboratory studies on peer effects generalize quantitatively to findings in naturally occurring environments in the field, rendering both approaches to be important complements in the study of behavioral spillovers.

Our results indicate the validity of this proximity measure as the observed peer effect (i.e. the magnitude of the behavioral reaction) is aligned with the degree of measured social proximity.

Embedded in a controlled lab experiment, our approach to measuring peer effects is a variation and extension of a power-to-take game as has been used by List (2007), among others. We capitalize on a one-shot power-to-take setting in which participants are given the opportunity to give to or take money away from the charity before and after learning peer behavior. That is, we introduce a revision option to account for behavioral contagion. We deal with the noted reflection problem (Manski, 1993) by introducing a novel design, which we will discuss in more detail in the design section of our paper. In short, our approach centers on two key design elements: first, only those who *actively observe* another participant's behavior can react and revise initial behavior.[5] Second, behavior of those who *are observed* is held fixed and cannot be changed afterwards, which is public knowledge. Such an approach allows us not only to study general peer effects in an unbiased way, but also to shed light on the relevance of factors such as the social proximity to one's peers and the (un)ethicality of observed behavior in driving behavioral changes. This experimental set-up allows us to contribute to existing research on peer effects in multiple ways and thus open a venue for future research.

A substantial contribution of our research is the direct comparison of behavioral contagion of pro-social and anti-social behavior. In general, existing research has focused on shedding light separately on either type of behavior (cf. Gino, Ayal & Ariely (2009), Thöni & Gächter (2015)). Current research does not identify whether and to what extent behavioral contagion differs conditional on the ethical dimension. To fill this gap, our experiment places participants in a uniform environment and allow for the simultaneous spillover of ethical and unethical behavior. The results reported by Offerman (2002), Shang & Croson (2008), and Croson & Shang (2008) motivate the intuition that behavioral contagion is likely to be asymmetric and dependent on the (un)ethicality of the behavior. In their studies, the authors assess the effect of downward and upward social information in contribution decisions to fund public goods. Their results indicate that the downward adjustment of pro-social behavior (own contributions to the public good) is larger than the upward adjustment. While these field experiments only

[5] In our study we report lower-bound peer effects because adaptive behavior remains unobservable by one's peers and thus carries no signaling value. Because such a setting sets us apart from what is typically meant by the term conformity, we use the more encompassing term behavioral adaptation. For a discussion of the mechanism and empirical literature on conformity see Bernheim (1994) and Bikhchandani, Hirshleifer & Welch (1998). See Wheeler (1966) for a discussion and differentiation from other frequently used terms such as conformity and imitation.

focus on the magnitude of ethical behavior, our study goes a step further and looks at differences in contagion between ethical and unethical behavior. Other research has found identity priming to be a relevant factor in charitable giving. Kessler & Milkman (forthcoming) find that such priming encourages public good provision. In our paper, we go a step further and show how identity among peers affects both public good provision and removal.

Briefly summarizing our results, we find that the magnitude of behavioral contagion is a function of the degree pf social proximity that is asymmetrically biased towards the contagion of unethical behavior, especially for initially unethical individuals. Overall, our results suggest that within a given peer context it is more likely to observe behavioral contagion in the form of unethical than ethical behavior. Across different specifications, we find that social proximity to the peers is more relevant to the crowding-out than to the crowding-in of ethical behavior. The interaction between social identification and type of observed behavior adds to the understanding of peer effects and yields relevant policy implications.

The paper is structured as follows: in Section 2 we discuss the focus and contributions of our study. In Section 3 we assess existing literature on peer effects and behavioral contagion. In Section 4 we discuss the concept of social identity. In Section 5 we present our experimental design, derive contestable hypotheses, and discuss our results. We conclude in Section 7.

2. Focus and Contributions of the Study

Our study extends the existing literature on peer effects in a number of ways. We do not only provide a clean approach to test *whether* peer effects exist in the context of both ethical and unethical behavior, but also deliver sound evidence on *how* such peer effects depend on social identification with one's peers. From a content perspective, our work focuses on better understanding the drivers of behavioral adaptation in the domain of both ethical and unethical behavior. In particular, we analyze whether the spillovers of ethical and unethical behavior on peers differs and if so how. In addition, we shed light on the role of social identity in moderating the contagion of behavior.

From a methodological perspective, our contribution in this paper is to introduce an approach that allows us to saliently induce social identity in the lab, measure differences in proximity of social identity between individuals, and exogenously vary its degree. If successful, such an approach opens the venue for a broad range of more refined future research examining the role of social proximity in cooperation, reciprocity, and punishment behavior.

So far, the economic literature has been fairly silent on answering two naturally arising questions with respect to peer effects that we will attempt to answer in this paper.

<u>Question 1</u>: *Is there a systematic difference in behavioral contagion with respect to unethical behavior (e.g. taking away) as compared to ethical behavior (e.g. donating)?*

It is reasonable to assume that behavioral contagion is a function of the observed behavior's nature, as different natures carry with them different costs. Good behavior implies bearing costs in order to improve the well-being of others, while bad behavior often implies improving one's own well-being in one way or the other at the expense of a third party. This reasoning is in line with findings on the asymmetry between positive and negative reciprocity (i.e., Offerman (2002)). In addition, research examining neighborhood effects indicates that the adaptation of behavior is asymmetric and depends on whether one has been exposed to good or bad influences and to what extent (cf. Kling, Ludwig & Katz (2005)).

<u>Question 2</u>: *To what extent is behavioral contagion in either direction (i.e. of moral and immoral behavior) mediated by the social proximity to the peers?*

Following the existing literature on social identity, it is reasonable to assume that observing the behavior of people who are socially closer or similar depicts a more salient signal in terms of what is socially accepted or an existing norm (i.e., for the case of reciprocity, see Charness et al. (2007)). However, the exact interaction between social proximity and the contagion of (un)ethical behavior remains unclear.[6] In addition, good and bad behavior differs in terms of the information set available to the individual. While good behavior might entail some ambiguity with respect to what is *appropriate* within a given context, bad behavior is less ambiguous: the nature of bad or unethical behavior implies the overstepping of (social) boundaries or infringing laws. The wiggle-room for self-justification is narrower in the latter case.

Our experimental set-up allows us to study these questions. Participants play a one-shot dictator game in which they decide how much money to donate to or take away from a charity, which resembles a variation of a power-to-take game. The (un)ethicality of (taking away) donating money to the charity is stressed by explaining the consequences of their behavior clearly to the participants. All the money that is (taken away) donated to the charity will (not) be given forward to the charity, thus individual behavior will (harm) benefit the charity. Hence,

[6] In his popular book, Dan Ariely (2013) shares a plethora of anecdotal evidence and supporting research studies that highlight the role of social factors affecting moral contagion and the transgression of unethical behavior.

participants face a riskless but in terms of its (un)ethicality precisely defined situation in which they have to decide whether or not to personally benefit at the expense of a charity of their choice. After reaching a decision, participants are given the opportunity to learn about other participants' initial decisions followed by the option to revise their own initial decision.

3. On Peer Effects and Behavioral Contagion: Literature Overview

This chapter is devoted to provide an overview of existing motivating our work on peer effects. We approach the discussion of existing research on behavioral adaptation by subdividing the literature based on its methodological approach, that is: evidence from the field or from the lab. While this discussion is certainly not exhaustive, the experimental studies we describe will give further meaning to the relevance of peer effects in driving one's behavior.

Recently, both economists and psychologists have started engaging in a promising dialogue on behavioral ethics and the drivers of (un)ethical behavior by bringing together classical and behavioral approaches (for a recent review see Irlenbusch & Villeval (2015)). A standard economic argument is the assumption of fixed preferences, translating into one's conforming behavior being the result of social conventions or norms. Conversely, psychologists, sociologists, and recently some economists, among others, have challenged this fundamental assumption, suggesting that behavioral adaptation is the result of converging preferences and fluid tastes. Bernheim & Exley (2015) refer to the former as *belief mechanisms*, and to the latter as *preference mechanisms*. Recent work by cultural psychologists and anthropologists even emphasizes the impact of social influences on cognition and perception suggesting the durability of social influences besides pure priming effects (Hoff & Stiglitz, forthcoming).

Several economic and psychological theories speak to reasons why individuals comply with peer behavior. The economic concepts include *social decisions and social distance* (Akerlof (1997), Glaeser & Scheinkman (2004)), *image related concerns and taste for conformity* (Bernheim, 1994), and *imitation of behavior or preferences* (Alós-Ferrer & Schlag (2009), Sliwka (2007)). Some of the (social) psychological concepts are *social learning* (Bandura (1971)), *norms* (Cialdini et al. (1990), Bicchieri (2006)). Some research even indicates that peer pressure exhibits shame and guilt, which can translate into behavioral contagion (Kandel & Lazear, 1992). Many of these concepts are not strictly distinct, in both their assumptions and predic-

tions. In this paper we will not attempt to resolve which approach explains behavioral contagion best but rather focus on shedding light on the drivers of behavioral contagion and its interrelation with the social identity dimension.[7]

Although explicit research on peer effects and the resulting behavioral spillovers (in the literature sometimes referred to as behavioral or social contagion) has its origins in the late 19th century, the underlying concept has been observed long before. Initially, the concept of social contagion has been introduced in the form of a social phenomenon – as opposed to a biological one – explaining why and how certain forms of behavior soak through society (for early work see Baldwin (1894)). Since the 1950s, empirical research on this topic has been on the rise with evidence suggesting that the mere exposure to and contact with individuals or culture is sufficient to trigger behavioral contagion. Conditional on a sufficiently salient trigger, behavioral contagion leads to behavioral adaptation towards observed behavior. In sum, there exists ample evidence that peer effects are a phenomenon occurring across different contexts, social environments, and cultural groups, demonstrating that individuals often adjust their own behavior to resemble one's peers. We will discuss some of those findings in more detail.

Evidence from the Field

An extensive line of research suggests that peers decisively affect individual behavior. Several field experiments have investigated the change of individual contribution levels in response to the observation of other people's contribution decisions (cf. Frey & Meier (2004), Croson & Shang (2008), Shang & Croson (2008)), social pressure (DellaVigna, List & Malmendier (2012)), and identity priming (Kessler & Milkman (forthcoming)). Existing literature attempts to tackle the topic of behavioral spillovers from various angles to better understand the channels at work. For example, Mas & Moretti (2009) argue that peers have a substantial, positive effect on a worker's productivity levels (see also Azmet & Ichiberri (2010)). Bandiera & Rasul (2006) find that the farmers in Northern Mozambique condition their decision to adopt a new crop on the choices of their family and friends. Interestingly, they find an inverse U-shaped relationship suggesting that the observed social effects are positive if their social network contains few adopters and negative if a certain threshold is overstepped. Sacerdote (2001) highlights that among college roommates, peers have an impact on grade point averages and the willingness to join fraternities. Ichino & Maggi (2000) find empirical evidence for shirking behavior

[7] See Dimant (2015) for an extensive discussion of these channels and their implications on behavioral contagion.

within organizations, in particular for the case of a large Italian bank. They find a close relationship between an individual's absenteeism with the rate of absenteeism of co-workers. Cialdini et al. (1990) and Mas & Moretti (2009) show that the observation of another person's behavior leads to less littering and higher productivity, respectively. Bursztyn et al. (2014) find evidence for peer effects in financial decisions within a high-stakes field experiment in Brazil.

A seminal line of controlled experiment-in-the-field research has provided robust evidence on the effects of neighborhoods and peers on the development of children, criminal attitudes, and education, among other things. Case & Katz (1991) found evidence for criminal behavioral contagion both within families and neighborhoods in the Boston area. Ever since, multiple research projects have examined the short- and long-run effects of the Moving-to-Opportunity (MTO) project in which families are eligible to participate in a lottery for vouchers that would potentially help them to move to a better and safer neighborhood. Katz, Kling & Liebman (2001) examined the short-run effects of the MTO project on the well-being of the families who were offered a voucher. Their findings indicate a substantial improvement of well-being along different dimensions, including increased safety, and improved health conditions both mentally and physically. Surprisingly, especially young men were susceptible to the neighborhood change, while the young women's disobedience remained invariant. For criminal behavior, Kling, Ludwig & Katz (2005) found a strong gender effect. In terms of reduced arrests for violent crimes, men react positively to improved living conditions in the short-run. In the long-run, however, these effects vanish. Opposite to what can be expected from moving to a better neighborhood, males' general problem behavior and property crime arrest soar irrespectively. Conversely, females' criminal behavior decreases. Capitalizing on a different but comprehensive dataset that includes the assignment of refugee immigrants to Denmark from 1986 to 1998, Damm & Dustmann (2014) find that the share of convicted young people in the neighborhood significantly increases both the probability for a male's convictions later in life and the total number of convicted crimes executed by men. Their findings suggest that the spillover-effects of neighborhood crime are distinctively linked through the channel of social interaction, which is, however, only true for youth criminal behavior. All in all, these studies provide robust evidence not only for peer effects in general but particularly within the domain of criminal behavior.

Evidence from the Lab

Over the last decade, an extensive stream of literature studying spillover-effects and behavioral adaptation in the lab has emerged that motivates the ongoing important work in the field. As discussed previously, the methodological shift of using controlled laboratory studies was strongly driven by challenges relating to identifying these effects in a clean way using observational data. Several researchers claim that although the most recent generation of studies measuring such effects with observational data has succeeded to make important steps forward, controlled lab experiments are still the gold standard in reducing noise and potential confounds (Angrist, 2014). “However, even if the setting offers an almost perfect opportunity to identify peer effects in many of these studies, the impossibility of controlling for all local or personal confounding factors and for endogenous sorting makes the identification strategy not fully convincing" (Falk & Ichino, 2006, p. 40).

Early laboratory research studying peer effects and social identification jointly has been pioneered by Hoffman, McCabe & Smith (1996) and Bohnet & Frey (1999). These studies made use of variation in the instruction’s wording or implementing face-to-face communication among students to study the role of social identification in giving decisions, equivocally finding support for its relevance (see also Charness & Gneezy (2008)). Other studies have looked into peer effects in productivity decisions. In a highly regarded study, Falk & Ichino (2006) found robust evidence for the existence of peer effects in a productivity task. Their results indicate that low-productivity workers are particularly susceptible to peer effects, which results in an over-proportional raise in productivity.

In economics, conclusions of limited experimental research have also pointed to the contagion of both selfish and dishonest behavior. Bicchieri and Xiao (2009) studied the effect of a dictator game with varying information on other participant’s selfish or fair behavior, finding that fairness in actions is contagious. In a more delinquent context, Falk & Fischbacher (2002) investigate peer effects in the form of conditional stealing behavior. Their findings suggest that, on the aggregate level, people make stealing decisions conditional on the behavior of their peers. Innes & Mitra (2013) use a variant of Gneezy’s (2005) deception game to study whether dishonesty breeds dishonesty. Their findings suggest that already the beliefs about other’s dishonesty are contagious, driven by the wiggle-room created by such social cues and creating a justification device for one’s personal dishonest behavior.

4. The Concept of Social Identity

The term social identity is eclectic and several of its facets have been studied in existing economic research. The term social identity encompasses a broad range of conceptual elements, from shared preferences and experiences to shared cultural and religious beliefs. Field and laboratory research indicate that inducing social identity or making it silent affects time, risk, and other-regarding preferences (Chen & Li, 2009). Recent economic literature stresses that norms or prescriptions are associated with one's identity, thus potentially rendering behavioral adjustments more likely when identity to exposed behavior is salient (Akerlof & Kranton (2000), Benjamin, Choi & Strickland (2010)). In our experiment, identity is derived from preference similarity for things such as food, sports, and/or family. More precise, we refer to the existence of social identity if a person derives self-esteem from belonging to the peer group and has a preference for exhibiting similar behavioral patterns (for a similar approach, see Chen & Li (2009)). Arguably, common preferences and/or interests are the first step in creating a common identity. Using Chen & Li's (2009) definition in combination with a simple but rich implementation of social identity, as applied in our experiment via the observation of preference similarity, is conducive in both deriving lower bound results for the role of social identity in facilitating (un)ethical behavior. This line of research is important from a policy perspective in generating effective measures to trigger both more pro-social and less anti-social behavior, consequently reducing the otherwise resulting economic and social inefficiencies.

With notable exceptions, existing research has struggled to overcome a number of challenges in studying clean peer effects in the lab, especially in contexts where social identity plays a mediating role. Inducing or at least proxying the naturally occurring variation of social identity has proven to be difficult. Following the tradition of the minimal-group paradigm (Tajfel & Turner, 1986), examples of economic approaches that bridge anonymity and induce social identity, use face-to-face interaction (Bohnet & Frey, 1999), show pictures of participants (Eckel & Petrie, 2011), reveal names (Charness & Gneezy, 2008), reveal preferences such as those for paintings (Chen & Li, 2009), or recruit friends and family members (Brandts & Solà, 2010). Such studies typically yield the robust finding that stronger social identity triggers favoritism. Two natural problems arise with the concepts used in economics so far. Firstly, using face-to-face communication or allowing participants to interact with friends or family members introduces serious biases and crowds-out the revelation of true preferences (Roth, 1995). Secondly, and more relevant to the point of our experiment, the degree of social identification

measured in the lab by these concepts can hardly be varied and is rather binary. This requires us to turn to a novel approach that allows us to induce social identity, measure social proximity between peers, and vary this distance exogenously. In our experiment, we propose a method that allows us to naturally vary the degree of social identification in the lab without having to deal with the issues raised above. Our approach of using dating-website questions as a matching device allows us to induce and exogenously vary different levels of social proximity in the lab in order to study their role in the spillover of (un)ethical behavior.

5. The Experiment

5.1 Experimental Design and Procedure

It is this paper's aim to shed light on the two main questions stated above and to contribute to a better understanding of the general mechanism of peer-effects. For this reason, we propose a novel approach to proxy different levels of social proximity among peers in a laboratory setting. Such an approach allows us to exogenously vary social characteristics and study their role in behavioral contagion. We mimic social proximity by using statements taken from a major American dating website that capture individual preferences and interests. We use the matching scores of overlapping answers among lab participants as an exogenous matching device across treatments. This allows us to study decision-making beyond simple ingroup - outgroup comparisons. Rather, our approach provides us with an extensive array of possibilities to match participants according to their shared similarities. To the best of our knowledge, we are the first to use such an approach. Thus, we not only complement existing field studies, but also broaden the scope and utilization of lab experiments in explaining behavior and behavioral changes in peer settings, especially within the unethical domain.

Our basic design follows a straightforward procedure: action – peer observation – reaction.[8] Consider a variant of a two-player dictator game in which the participant (dictator) is matched with a charity (recipient). The dictator's action space entails taking away money from the charity, leaving the initial situation unchanged, or giving money to a self-chosen charity. In following Eckel & Grossman (1996), we use a charity to increase the saliency of the involved decisions. The experiment is played one-shot with a possibility to revise one's initial behavior. Be-

[8] Note that in order to exclude any hedging concerns throughout the whole experiment, information about the specifics of the design were only provided where necessary in order to reach a deliberate decision. That is, at Stage 1 participants were neither aware of the possibility to observe peers nor to revise their initial decision, ensuring unbiased initial behavior.

tween the initial decision and potential revision, individuals are given the opportunity to observe the initial behavior of another random participant. Alongside the actual behavior, treatment variations include the alteration of unveiled social proximity information of the observed participant. That is, in addition to learning actual behavior and the amount that was taken away or given by this participant, additional information on the social proximity between matched participants is varied with the random treatment assignment. The treatment variation lies in the information given about the social proximity to the observed peers: no information on proximity (Baseline), as well as high proximity (T1) and low proximity (T2) information. Proximity is calculated based on overlapping answers in the list of statements used in the beginning of each session and then presented to the participants in the form of below- or above-average proximity information to the observed peer.[9]

We capitalize on a shortened 25 item list of statements compiled from a major US American dating website to ensure the validity of the questions in successfully matching people (see Hitsch, Hortaçsu & Ariely (2010) for a discussion).[10] The business concept of dating websites is based on achieving high matching success rates, thus using validated questions improves the success of incepting social identification between participants in the lab. In order to be regarded as behavioral contagion, revised behavior has to be more similar to observed behavior than one's initial behavior that one has decided upon prior to learning peer information. That is, revision of one's initial behavior must follow the direction of observed initial peer behavior. The procedure is represented by a single iteration of the following three stages:

First Stage - The Action: Starting with an equal distribution of money, each individual decides whether to (i) donate own money to the charity's account, (ii) not change the initial equal distribution, or (iii) take money from the charity and keep it for self.

[9] The implementation of the low- and high-proximity information followed a very straightforward calculation. For each participant of the active group, an individual proximity score to both participants of the passive group was calculated based on overlapping answers in the list of statements. From each active participant's individual perspective, the passive participant with the higher (lower) score was labeled as the high (low) proximity peer. In fact, this calculation approach allows for the same passive person to be of high (low) proximity to one active person, while being of low (high) proximity to another active person, thus truly randomizing information. We abstained from providing explicit matching scores or percentages to retain maximum control. In addition, this allows us to alleviate the *false-consensus* effect, in which people systematically overestimate the degree of similarity to others. The provision of social cues of this kind allows the participants to update their beliefs reliably with respect to the actual degree of similarity. See Ellingsen & Johannesson (2008, p. 995) for a discussion.

[10] We should stress the fact that we report lower-bound results in this experiment. We induce social proximity in a very simple way by providing participants with either the high- or low-proximity signal in the social identification treatments 1 and 2. Although this approach allows us to provide a comprehensive set of information to induce even more salient and distinct forms of social identity (i.e. by providing the exact matching score, the exact answers to the questions, letting participants put different weights on questions according to their individual importance and so on), we resort to this easy-to-use-easy-to-reproduce approach. See Appendix B for the exact list of statements used in our experiment.

Second Stage – The Observation: Each active player is able to observe one passive player at random who has engaged in either ethical or unethical behavior. In all three treatments, the exact information entails the monetary amount taken away from or given to the charity. In the treatments, observers received additional information on the social proximity to the observed peer, stating that based on the initial answers this peer is of higher or lower proximity as compared to the other unobservable passive peer.

Third Stage – The Reaction: After observation, the active player is given the choice to revise his initial decision.

The experiment was concluded with a battery of non-incentivized questions to elicit attitude towards, among others, charitable giving and risk.[11]

Our design accounts for the aforementioned reflection problem by randomly assigning all participants into two groups: *active* and *passive*. Group assignment is relevant to the action space available to the participants. If assigned to the *active* group, the participant is given role of the *observer* and receives the opportunity to revise his initial decision. If assigned to the *passive* group, the participant is given the role of the *observed* and is neither allowed to observe others nor to revise his own initial decision. In other words, in the *active* group, participants are given the choice to request information about the behavior of one randomly chosen peer following their initial decision and are then given the chance to revise. Whereas in the *passive* group, the participant's initial behavior is held fixed and no further decisions are made.

Several points are worth noting. In order to retain maximum control and reduce heterogeneity in observed behavior, in each session exactly two participants were chosen at random as passive (that is, being observed by peers), while all other participants randomly chosen as being active (that is, observing peers) always observe exactly one of these two passive players. The treatment differences are based solely on the social proximity information. Importantly, the observing peers received the information that the passive players will always represent one participant who has money given to and one participant who has money taken from the charity.[12] In addition, participants knew that the observed social proximity to that peer will depend

[11] In addition, we elicit the strength of social identity to the observed peer using a variant of the self-evaluation scale of one's social identity following Luhtanen & Crocker (1992) to verify the robustness of our social identity implementation approach. The results remain robust, unless noted otherwise.

[12] We resort to this approach to avoid biases stemming from social learning or updated beliefs about distribution of (un)ethical behavior in the population. A random participant draw each from the ethical and the unethical spectrum contains no singnalling value on the true fraction of (un)ethical participants in the population, thus retaining the salience of the observation.

on the treatment one has been randomly assigned to. The observer would then learn the behavior of exactly one passive player but was never able to infer other participants' behavior from this information, neither active nor passive.[13]

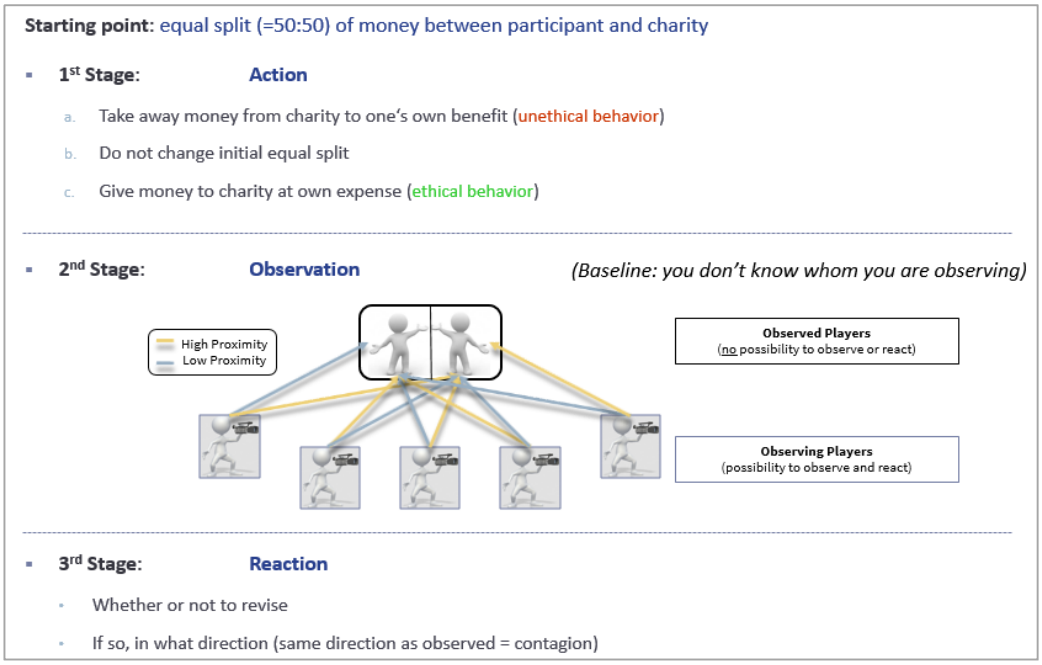

Figure 1: *Experimental Design and Procedure*

This procedure ensured that each active player's information set would be restricted to the peer's observed behavior and focus the participant's attention on processing this information. In addition, to allow for comparability across treatments, participants were randomly assigned to one of the three treatments within the same experimental session. In sum, this design allows us to measure clean peer effects every time a participant revises his/her initial decision after observing peer behavior.[14]

Payoff structure: Importantly, to exclude any form of strategic interaction that might potentially dilute results or affect their saliency, the participant's decisions only affected one's own

[13] Prior to the actual observation, we elicited incentivized beliefs about the behavior of the two passive participants. Those beliefs ended up being irrelevant in predicting the active participants' behavior. We will return to this point shortly in the analysis section.

[14] With reference to the different concepts in economics and (social) psychology explaining behavioral contagion and in light of our design, some theories are better at explaining behavior in our experiment than others are. Contagion observed in our experiment is likely to be explained by the theories of *social decisions and social distance* (Akerlof (1997), Glaeser & Scheinkman (2004)), *imitation of preferences* (Sliwka, 2007), as well as by some of the theories in (social) psychology, such as *social learning* (Bandura, 1971), *norms* (Cialdini et al. (1990) and Bicchieri (2006)). Other theories are not applicable due to reasons of absence of learning better outcomes (which is required by Alós-Ferrer & Schlag's (2009) imitation concept), or the ability to not only observe but also be observed by the peers (which is required by, among others, Bernheim's (1994) theory on taste for conformity). While it is questionable whether it is possible, we shall not attempt to disentangle clearly, which theory best explains behavioral contagion observed in our experiment. See Dimant (2015) for discussion.

and the chosen charity's payments but not those of other participants. That is, each individual's decision had no monetary impact on other individuals, making a change in behavior due purely to behavioral contagion and not to other-regarding concerns.[15] We make this even more salient by randomly picking one of the individuals at the end for which the behavioral decision was implemented, while everyone else received a flat income irrespective of his actual behavior. In monetary terms, each participant and the respective charity received the ECU equivalent of 15 Euro, thus allowing a participant to leave with a maximum (minimum) of 30 (0) Euro if the participant decided to take away all the money from (give all the money to) the charity. In order to increase the saliency of ethical behavior, we added a multiplier to the setting. That is, the experimenter doubled all Euro remaining in the charity's account at the end of the experiment. At the end, one participant was chosen at random and the respective decision was implemented with respect to taking from or giving to the charity. Every other participant in the session received a flat income of 7.50 Euro including a show-up fee of 2.50 Euro.

5.2 Hypotheses

In order to generate hypotheses that align with existing theory, we derived our predictions from previous research. Our hypothesis will mainly focus on two behavioral traits that we can observe in our experiment: the first is individual $\boldsymbol{i}$'s revised amount after observing a peer's initial decision. The second is the adaptation gap of individual $\boldsymbol{i}$ and $\boldsymbol{j}$ after $\boldsymbol{i}$'s revision decision, which indicates the similarity of behavior between two peers: the smaller the gap, the more similar individuals $\boldsymbol{i}$ and $\boldsymbol{j}$ are in terms of their (un)ethical behaviors. We will capitalize on these two aspects to support our hypotheses in the results section.

The slippery-slope argument (Gino & Bazerman, 2009), the findings on positive and negative reciprocity (Offerman, 2002), and the field experiments of Shang & Croson (2008) and Croson & Shang (2008) suggest that less ethical behavior is likely to be more contagious than more ethical behavior.[16] We thus derive our first hypothesis as follows:

H_1: ***Unethical behavior is more contagious than ethical behavior.***

Existing research indicates that social identification is a predictor of behavior in different contexts related to charitable giving, trust, punishment, and reciprocity (cf. Charness et al. (2007),

[15] To some degree, the experimental design resembles the theoretical considerations of Alós-Ferrer & Schlag (2009).

[16] The hypotheses can also be derived by extending Akerlof's (1997) model. See Dimant (2015) for a theoretical exercise.

Chen & Li (2009), Leider et al. (2009)), as well as neighborhood effects (cf. Damm & Dustmann (2014)). It has also been shown that norms or behavioral prescriptions are associated with one's identity, thus potentially rendering behavioral adjustments more likely when identity to exposed behavior is salient (Akerlof & Kranton (2000), Benjamin, Choi & Strickland (2010)).

H_2: ***Social identification amplifies the contagion of behavior in general and unethical behavior in particular.***

5.3 Results and Discussion

We conducted the experiment at the BaER-Lab at the University of Paderborn, Germany. Participants were recruited using ORSEE (2004). We used zTree (Fischbacher, 2007) to run our experiment. In sum, 227 participants throughout 9 sessions were randomly assigned to one of the three main treatments (unknown proximity, high proximity, and low proximity) as well as to one of the two sub-treatments (observing either ethical or unethical behavior).[17] Each session lasted about 45 minutes and the hourly average earnings were €10.50. What is more, an average of €30 was donated per session to various charities.[18]

Figure 1 details our behavioral data in two ways: before observation in pooled form and after observation by treatment. Starting with a descriptive observation, we observed some heterogeneity across treatments in terms of the distribution of (un)ethical behavior. On the x-axis, we depict the amount of money that was allocated to the charity. The point of departure is 0%, which represents the equal *a priori* distribution of money between the participant (300 ECU) and the charity (300 ECU). Thus, any value below (above) 300 depicts the individual taking from (giving to) the charity's account.

[17] Out of the 227 participants, 18 (8%) participants were randomly assigned to being observed and thus remained passive after their initial decision, and 24 (11%) decided to opt-out and not to observe peer behavior. The latter represents a significant portion of participants that refuse to learn about peer behavior and thus speak to the aforementioned problem of forcing participants to observe peers. In total, this leaves us with 185 observations entering our analysis. We will discuss the relevance of those 11% who deliberatively decided to opt-out at greater detail at the end of this section.

[18] See Appendix A for more details.

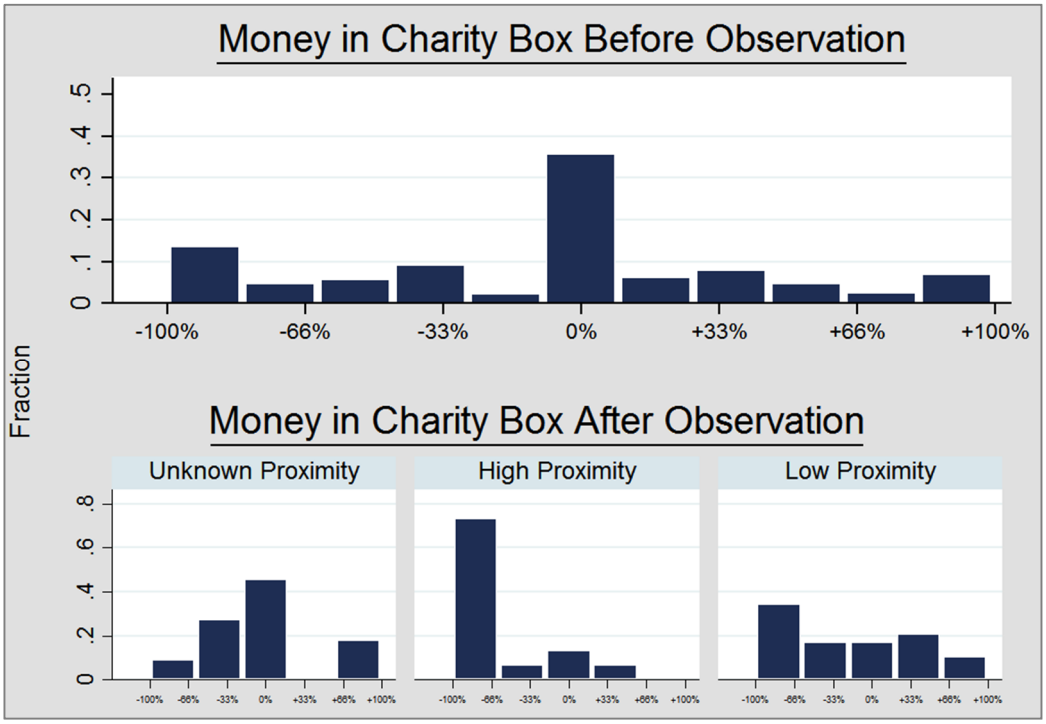

Figure 2: *Incidence of choices to not change the initial equal distribution / give money to / take money from the charity before and after peer observation. The horizontal axis depicts a continuum of ECU left in the respective charity's cash account, with 0% representing the starting allocation. Negative (positive) numbers indicate that the participant has taken money away (given money to) the charity. The choices were clustered in the figure for the sake of readability. The vertical axis depicts the fraction of participants indulging in the particular behavior.*

Our findings indicate that prior to observing their peer's behavior, active participants' decisions mainly clustered around 300 ECU (0%), which represents the decision to not change the initial equal distribution between oneself and the charity. Across all treatments, a total of 25% of participants decided to revise their initial decision. After the observation, however, we found a perceptible skewness towards unethical behavior, particularly in the high proximity condition. This finding provides us with a first indication that unethical behavior is more contagious than ethical behavior.

Next, we turn to testing our hypotheses.[19] We were interested in whether unethical behavior is more contagious than ethical behavior. We answer this question by illustrating the amount revised (%) after observation purely depending on the (un)ethicality of observed behavior.[20] Figure 3 illustrates our findings.

[19] In general, non-parametric Mann-Whitney-U (MWU) specifications are used throughout this paper to test for differences among those who decided to revise initial behavior. Unless noted otherwise, these findings are robust to alternative non-parametric specifications, such as the Kolmogorov-Smirnov test, varying examinations of missing observations, and the use of absolute ECU numbers instead of percentages.

[20] For *amount revised (%), a* positive (negative) value implies that individual $\boldsymbol{i}$ has given more money to (has taken more money from) the charity as compared to his/her initial behavior prior to observing a peer's behavior. Robustness checks involve the analysis of differences in the *adaptation gap (%).* For adaptation gap (%), a value below (above) 1 implies that the peers' behavior has gotten more (less) similar after individual $\boldsymbol{i}$ had the chance to revise his/her initial decision. A value of exactly 1 means that the adaptation gap remained the same after the revision stage as compared to the initial decision. This

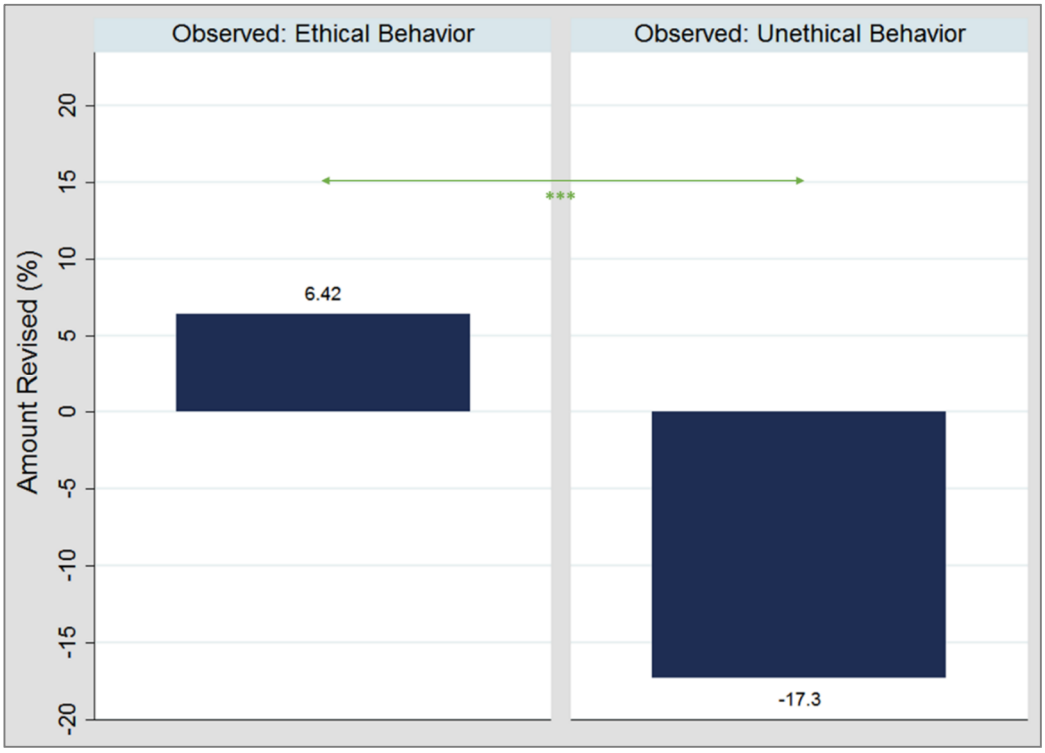

Figure 3: *Amount revised (%) and observed (un)ethicality. The figure depicts the amount revised as percentage of one's initial behavior. Any value above (below) zero indicates that more (less) ECU were given after the revision to the charity relative to one's initial decision. The analysis is broken down into the (un)ethicality of observed behavior by the active participants.*

The findings in figure 3 indicate that the (un)ethicality of observed behavior indeed affects the individual's revision decision. After observing ethical (unethical) behavior, either observing a peer give money to (take money from) the charity, participants gave on average 6.42% more (17.3% less) money to the charity as compared to their initial behavior prior to having observed a peer's behavior. The results are significant at the 1% level ($p = 0.000$, $z = 4.365$) and indicate a change in behavior almost three times as large when unethical behavior was observed as compared to ethical behavior. The results are highly suggestive of unethical behavior being more contagious.

As indicated in figure 4, conditional on one's initial behavior, we found that behavioral contagion is mostly driven by those who engaged in unethical behavior followed by individuals who decided to leave the initial fair split with the charity untouched at the 1% ($p = 0.000$, $z = 3.922$) and 5% ($p = 0.035$, $z = 2.113$) significance levels, respectively. In both cases, observing unethical behavior turns out to be more contagious than observing ethical behavior. Interestingly,

could be either due to individual $\boldsymbol{i}$ deciding not to revise his/her initial decision or due to a revision which is equidistant in monetary terms. The results support $\mathbf{H_1}$ and are presented in Appendix A.

we observed absolutely no behavioral contagion in either direction for individuals who behaved ethically in the first place.[21] This is in line with the idea that unethical behavior carries an inherent ambiguity unless the norm is validated through, i.e., observation, while ethical behavior is unconditional (for an elaborated discussion, see Bicchieri (2006)). These and the previous results strongly support hypothesis **H_1** and confirm that unethical behavior is indeed more contagious than ethical behavior.

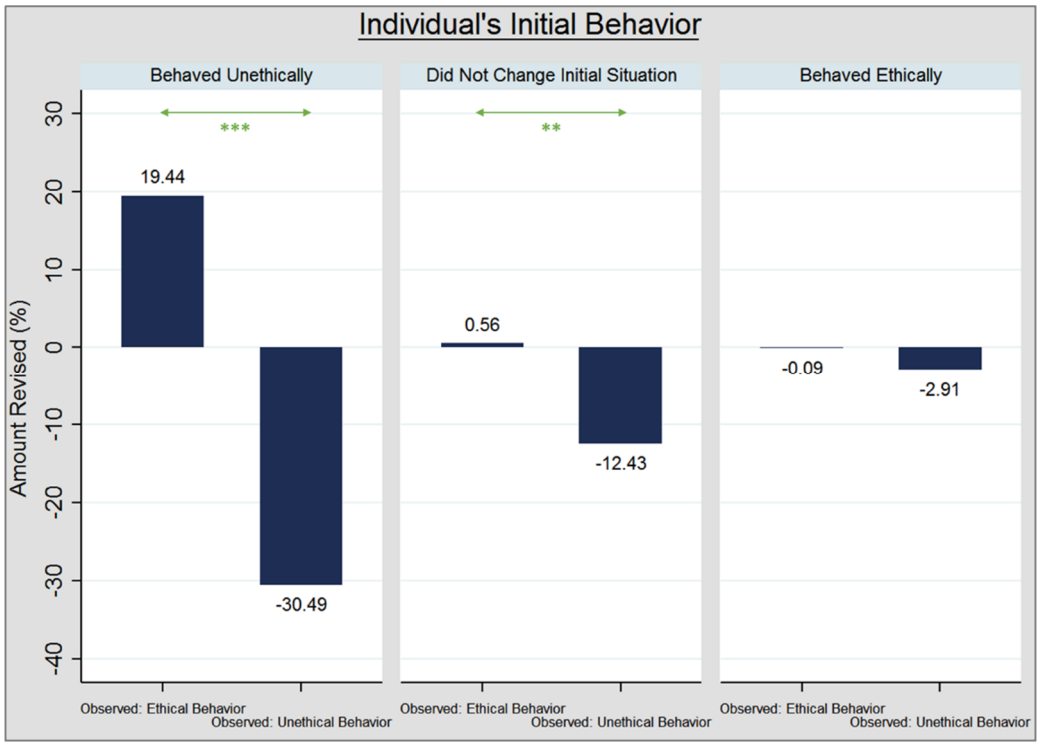

Figure 4: *Amount Revised (%), initial behavior, and Observed (Un)Ethicality. The figure depicts the amount revised as a percentage of one's initial behavior and the (un)ethicality of observed behavior.*

Following hypothesis **H_2**, we assumed that social identification amplifies the contagion of unethical behavior in an over-proportional way compared to contagion of ethical behavior. We thus examine the role of social identification in affecting the magnitude and direction of revision choices. Both findings are illustrated below in figure 5. Our results robustly indicate that higher social identity indeed triggers stronger behavioral contagion, particularly contagion of unethical behavior. As social identity increases, the magnitude of revised behavior increases as well, peaking at -29.8% for the high proximity condition. The differences in behavior are significant at the 1% level ($p = 0.000$, $z = 4.759$) when comparing behavior in the unknown proximity with the high proximity condition. Likewise, the results are significant at the 1% level

[21] We obtain the same results when looking at the extent of behavioral contagion as a function of social proximity and initial behavior, as depicted in the appendix figure A6.

(p = 0.000, z = -3.448) when comparing the high proximity with the low proximity condition. In terms of magnitude of revised behavior, unethical behavior is more strongly pronounced and thus more contagious than ethical behavior.

Figure 5: *Amount revised (%) and adaptation gap (%) by social proximity.*

The results also yield strong support for the idea that reduction in the adaptation gap is driven by social identification. Social identification to one's peer is a robust predictor (all at the 1% level) of one's adaptation gap to the observed peer after observation. We obtained p = 0.000 and z = 6.104 (p = 0.000 and z = -3.441) when comparing unknown proximity versus high proximity condition (high proximity vs. low proximity condition), finding that the adaptation gap is inversely correlated to the social identity as predicted.

As a robustness check, we examined the effect of social identity on general behavioral contagion. The results yielded thus far could also suggest that contagion is not only stronger in terms of magnitude but also in terms of frequency with increasing social identity. In Figure 6, we analyze behavior in the following form:

- **No Contagion:** after observing a peer's behavior, the participant either did *not* revise his/her initial behavior or revised it in the opposite direction of what he/she observed the peer has done.

- **Contagion:** after observing a peer's behavior, the participant revised his/her initial decision. The revision was made in the direction of the observed behavior. This behavior indicates the existence of behavioral contagion caused by peer effects.

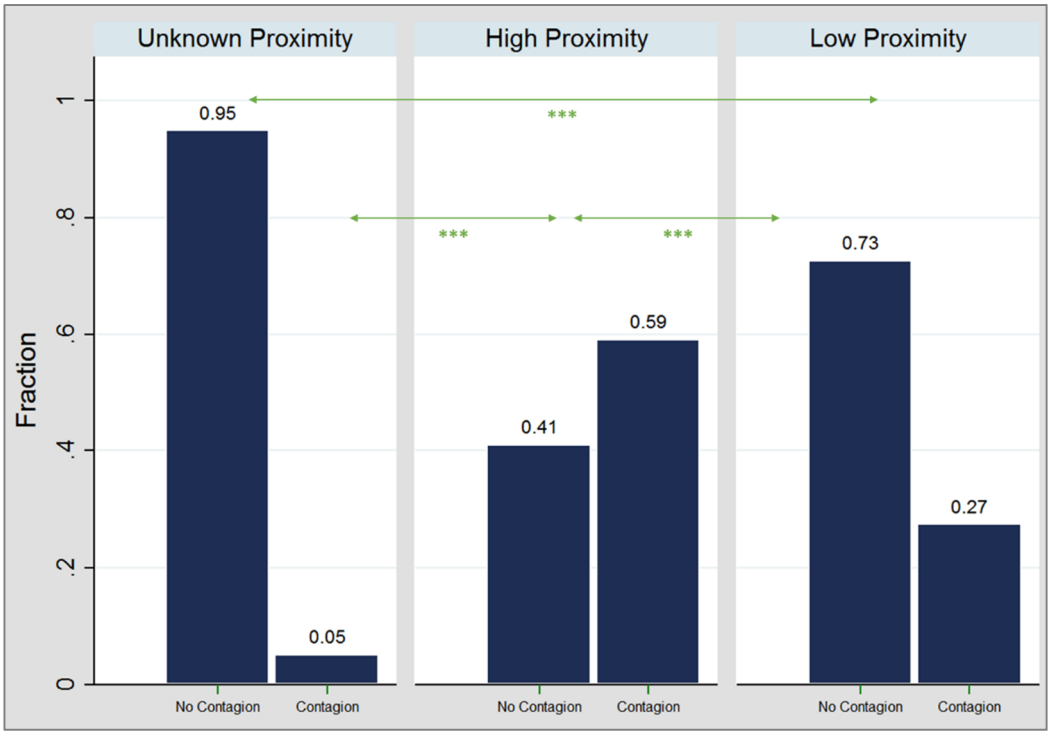

Figure 6: *Behavioral change by treatment and observed (un)ethicality. This figure illustrates the fraction of participants exhibiting behavioral contagion broken down into both the observed (un)ethicality of behavior and the social identity to one's observed peer. Unless the active participant revises his/her behavior into the direction of observed behavior the behavior is not classified as contagion.*

The breakdown of behavioral changes by different levels of social proximity provides additional evidence for hypothesis $\mathbf{H_2}$. When compared to the condition where no social proximity to one's observed peer was induced, behavior was more contagious for both low and high proximity situations in both the ethical and unethical domain. Binomial probability tests between each treatment revealed the differences were significant at the 1% level.

In addition, we investigated whether behavioral contagion was different under varied levels of social proximity when directly comparing contagion in the ethical versus the unethical domain using non-parametric comparisons. Our results provide strong support that behavioral contagion is asymmetric. In particular, a variation in social identification yields no significant variation in behavioral changes in the ethical domain. However, the results are strongly statistically significant when looking at behavioral changes as a function of social identification in the unethical domain. Here, when comparing the high proximity condition to the no proximity (low proximity) condition, we obtained results that are highly significant at the 1% level with $p = 0.000$ and $z = 6.025$ ($p = 0.000$ and $z = -4.005$). The results are illustrated in figure 7.

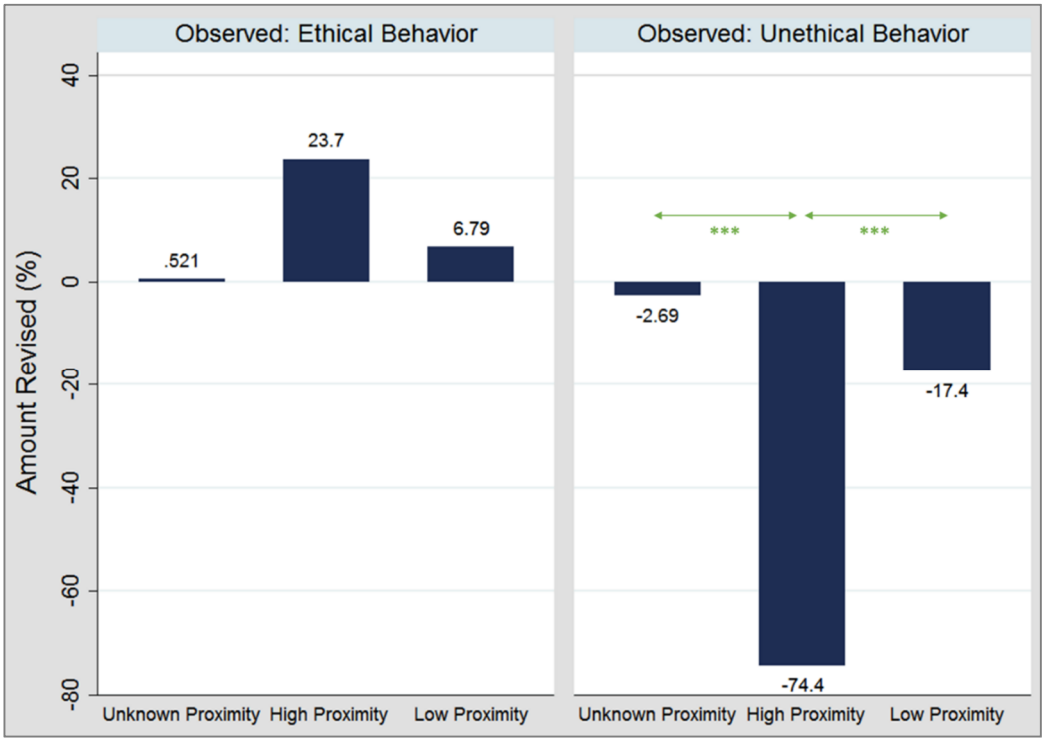

Figure 7: Amount revised (%) by social proximity and observed (un)ethicality.

All in all, we found convincing support for both of our hypotheses: unethical behavior is indeed more contagious than ethical behavior (H_1), and social identification drives the magnitude of behavioral contagion (H_2). These results highlight the importance of our contribution in this paper: peer effects are not uniform, but rather strongly dependent on both the (un)ethicality of observed behavior and the degree of social identification to the observed peer.[22] Again, since we report lower-bound results, this is a strong indication that our method of inducing social identification works and is likely to produce even stronger results when social proximity is introduced in a more sophisticated way.

Arguably, the presence of a charity in the experiment could potentially carry a norm of prosocial behavior in the lab in and of itself. That is, prior to observing one's peers, some participants at the margin of behaving unethically might carry the normative belief that taking from a charity represents inappropriate behavior and thus initially refrain for it. If so, it would come as no surprise to observe stronger contagion of unethical as compared to ethical behavior because those who wanted to behave unethically in the first place but refrained from doing so might now find justification in their peer's behavior. In this respect, two important remarks should be made: if anything, such an assumption would explain level effects but neither treatment

[22] We run several regressions, including OLS, Logit, and Tobit, where applicable, in order to assess the robustness of our results. Findings are presented in Appendix A.

differences, since such beliefs are by experimental design uncorrelated with the treatments, nor the differences of contagion. Irrespective of the existence of potential pre-existing norms, our design renders our main finding valid: behavioral contagion is highest where social identity is strongest.[23] In addition, we elicited incentivized beliefs about peer behavior prior to observation. As the regressions results suggest, such beliefs yielded no explanatory power and thus play no role in neither explaining the magnitude nor the differences of behavioral contagion.

The presence of a potential experimenter demand effects (EDE) is worth addressing since their presence has been problematic to prior peer effect studies (for a discussion see Thöni & Gächter (2015)). Because we are mainly interested in treatment differences rather than in overall levels, the experimenter demand effect is deemed less problematic as long as its existence and magnitude is orthogonal to the treatment variation (Zizzo, 2010). Nonetheless, we considered existing experimental studies to rule out experimenter demand effects to the furthest extent possible. Exemplarily, forced learning (i.e., forced observation of one's peer's behavior), as it is prominently used in peer effect studies, might potentially induce EDE or even lead to resentment on the side of the participants. Forced observation might trigger thoughts related to being expected to use the information to reconsider and potentially revise initial behavior. In previous general and peer effect studies in particular, this issue has normally been overlooked, mainly to avoid self-selection problems. However, when the option not to learn is withheld from participants, the obtained results are potentially confounded and should be addressed by the experimental design. Another potential concern might stem from the way social identity information has been implemented in the experiment. Despite the challenges to introduce salient identity in an artificial environment, any potentially existing EDE in the social identity information of one's peer would only be reflected in absolute level changes and would neither be able to explain the asymmetry between pro- and anti-social behavior, nor differences between low- and high-proximity conditions.

Existing research indicates that individuals sometimes choose to deliberately remain ignorant about the state of nature (see Carrillo & Mariotti (2000), Dana, Weber & Kuang (2007), Grossman (2014)). If present, such strategic ignorance might be an important component of our experiment. A potential reason not to acquire costless information is related to the avoidance to indulge in negative self-image updating or guilt aversion (Charness & Dufwenberg, 2006). One can plausibly assume that such aversion is even stronger when studying peer effects

[23] I would like to thank Gary Bolton, René Fahr, and Elena Katok for point this out and for related discussions.

within an (un)ethical dimension. Thus, forcing participants to learn potentially unpleasant information might lead to biased behavior and might even increase EDE. In order to address this challenge, our design follows Eckel & Petrie (2011) and draws on a mechanism in which learning peer information is voluntary.[24] Additionally, in order to rule out any reputational concerns, social learning, or reciprocity, the experiment includes an anonymously played one-shot interaction with another participant. Such an experimental design allows us to study behavioral contagion in the lab in an unbiased way. To our knowledge, this represents a novel design in studying peer effects in the lab in general and the behavioral contagion of (un)ethical behavior in particular while controlling for potential confounds that peer effect studies suffer from regularly (see Manski (1993) & (2000), Falk & Fischbacher (2002), Angrist (2014)). our experimental set-up, any treatment-specific information is provided only after one's deliberate decision to learn peer behavior. Thus, any still potentially existing form of EDE would be fully uncorrelated with the treatments and thus exhibit only a general level-effect, if any.

Another source of concern might be a selection bias resulting from the way the matching mechanism was implemented. Because participants are matched upon their stated preferences and interests in the questionnaire, (unobserved) covariates among participants could bias the matching process. For the high proximity treatment, individuals who initially decided to be (un)ethical might be exposed to the same kind of (un)ethical behavior more often if they share a sufficient amount of the same preferences and interests. Thus, these individuals will observe each other more often than what is statistically expected (i.e., randomly observing any kind of behavior in 50% of the times), which might in turn bias the results. Various statistical tests robustly indicated that this is not the case in our experiment, thus strengthening our results that behavioral contagion is not driven by selection effects.[25]

6. Conclusion and Outlook

Deviant behavior that benefits oneself at the expense of others is socially harmful and brings about second-best solutions that are distortive from a welfare perspective. Conversely, the voluntary redistribution of money to those who have the least, e.g. in the form of donations, is socially desired. It is worthwhile to understand the underlying mechanism that drives pro-

[24] However, deliberately allowing participants to remain ignorant about peer behavior bears the risk of self-selection effects. It is worth noting that in our experiment 11% of all the participants decided not to acquire peer information. Importantly, however, this choice is unconditional on the participant's initial behavior, thus strongly suggesting the absence of any self-selection mechanism leading to potential biases in our analysis.

[25] We thank Judd Kessler for bringing this point to our attention. The outcome table is presented in the appendix A7.

and anti-social behavior in order to implement effective policy measures. Beyond pure self-maximizing considerations, behavior is also the result of social interactions in which conformity to particular behavior is affected by one's peers (Akerlof (1997), Glaeser & Scheinkman (2004)). One particular lens through which social interactions occur is through peer effects, which play a decisive role in explaining societal and economic outcomes. A battery of behavioral traits affects the shape and magnitude in which social interactions occur. An extensive stream of literature suggests that individuals are social animals and care for esteem, respect, reputation (cf. Akerlof & Kranton (2000), Charness & Rabin (2002), Bénabou & Tirole (2011)). As such, individuals steadily act and react in social environments that define their role and standing within the social group.

Although peer effects have been extensively studied in different contexts both in the field and in the lab, research is still at an early understanding of the role of peer effects in (un)ethical settings. It is this paper's goal to improve our understanding of whether, to which extent, and through which channels individuals are influenced by their peers to engage in more pro- or anti-social behavior. Scholars across various fields are still at odds about whether the methods used qualify to observe clean peer effects, or whether for a large part our observations are an artifact of potential confounds. A stream of literature points at methodological problems in soundly measuring such effects, especially outside the controlled laboratory environment (for a critical discussion see Manski (1993) & (2000) and Angrist (2014)). Our work addresses this criticism by the use of a design that allows us to study different types of behavior and behavioral spillovers. Being aware of the naturally occurring difficulty in studying social identity in an artificial but controlled laboratory setting without introducing potential confounds, we capitalize on a novel approach to mimic social identity as well as measure and gradually vary social distance between peers.

In this paper, we try to understand the spillovers of both unethical and ethical behavior and the role of social identity to one's peers by employing a controlled lab experiment. By extending existing research from both the methodological and the content perspective, our work contributes to a better understanding of the nature of peer effects and behavioral spillovers, and answers the following two questions in particular: for one, to what extent does the (un)ethicality of a peer's observed behavior influence one's own behavior? Also, what is the role of social identity to one's peers in affecting behavioral contagion? For our purposes, we extend a variant of the power-to-take dictator game as used by List (2007), among others, by

the use of an ethical setting. To provide clean evidence on peer effects, we capitalize on a one-shot dictator game in which participants are given the opportunity to give to or take money away from the charity before and after learning the (un)ethical magnitude of peer behavior. Treatment variations include different levels of social identity to the observed peers, which we incept by the novel use of a matching algorithm based on a series of dating website questions. We deliberatively refrained from applying sophisticated measures of this kind and rather resorted to an easy-to-use-easy-to-reproduce methodological approach that could be used in future experiments in which inducing salient social identity is key.

Our results suggest that unethical behavior is more contagious than ethical behavior, especially for initially unethical and fair individuals, and the extent of social identification with one's peers matters more for unethical than for ethical behavioral contagion. Our interpretation of these findings is that, in comparison to one's peers, individuals look for (mental) excuses to be less selfish, but are more eager to embrace a salient signal that it is socially acceptable to be selfish.

Understanding social interactions in general and in particular the potentially resulting peer effects is fundamental from a policy perspective. It does not only help to understand societal and economic outcomes beyond what standard economic forces can explain, but it also allows us to implement better-targeted policy measures to tackle a battery of challenges such as reducing crime rates, improving health conditions, or increasing labor market participation. Our results stress that social proximity is helpful in changing the behavior of unethical people in particular. In light of the very conservative implementation of social identification of providing very limited information on social identification, we deem these results to represent a lower bound thus strengthening the role of social identification within the context of behavioral contagion. Our lower-bound approach comes from the fact that participants were neither told the exact matching percentage nor the actual interests and preferences they had in common. In the treatments that included social proximity information, participants only knew whether they were observing a peer with above or below average congruence. A more sophisticated way to induce social identification and match participants accordingly is likely to produce more pronounced results. The well-engineered mechanisms implemented by dating websites to match people and achieve high success rates are a shining example for what is possible: excluding matching partners based on personality traits that represent a no-go (e.g.

smoking), putting emphasis on particular interests (e.g. sports, religion), or individual characteristics (e.g. looks, education).

Much more scientific research is required to generate reliable policy measures to achieve both, more ethical and less unethical behavior. Exemplarily, recent MTO-research points at gender differences in behavioral assimilation (cf. Chetty, Hendren & Katz (2016)). It is important to understand to which extent these differences are driven by the two factors studied in this paper: the (un)ethicality of peer behavior one is exposed to and the magnitude of social identity to one's peers. Our research is hopefully one of many more contributions to come.

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8. Appendix

A: Data Overview, Robustness Checks, and Additional Results

	Treatments			Total
	Baseline (no Proximity)	Treatment 1 (High Proximity)	Treatment 2 (Low Proximity)	
Observed Ethical Behavior	44	27	34	105
Observed Unethical Behavior	39	42	41	122
Total	83	69	75	227

A1: *Summary table of the observations by treatment variation and observed unethicality.*

As shown in figure A2, for *adaptation gap (%)*, the results suggest that the observation of ethical (unethical) behavior leads to a less (more) pronounced closing of the adaptation gap. More precisely, the results indicate that observing unethical behavior leads to a revision behavior that reduces the gap between own initial and observed peer's behavior more strongly (from 100% down to 69.4%) as compared to observing ethical behavior (from 100% down to 78.5%). The differences are marginally significant at the 10% level ($p < 0.074$, $z = 1.787$). This implies that, individuals who observe unethical behavior close the observed gap by some 66% through revising their initial decision, while individuals who observe ethical behavior reduce the gap only slightly by 14%. This result suggests that one's inherent conquest to do good is less pronounced than to do bad, which yields additional support for hypothesis $\mathbf{H_1}$.

A2: *Adaptation gap (%) by observed (un)ethicality. The gap is calculated as the difference between the individual's revised decision and the behavior observed from the peer relative to the difference between one's initial behavior and the behavior observed from the peer. That is, the adaptation gap indicates how different the behavior between two participants are after the active participant was given the chance to revise his/her initial behavior. The narrower the gap, the more similar the active and the respective passive participants are in terms of (un)ethical behavior. Participants who did not revise their initial behavior are treated as adaptation gap = 100%.*

Overall, the results relating to hypothesis H_1 (see Figure 3 and A2) indicate that not only is the contagion of ethical behavior only half as likely as contagion of unethical behavior but it is also less pronounced. As shown in our results, ethical behavior is imitated only to a limited extent as compared to the imitation of unethical behavior.

We ran several OLS specifications to control for treatment effects, initial behavioral heterogeneity, observed behavior, and gender (including several interaction effects). Although not explicitly shown in the regression table, controls for risk, self-control, and greed were insignificant and did not alter the robustness of the results presented here. Overall, the presented results are robust to the inclusion of controls and across different specifications and estimation methods. Estimations are available upon request. In addition, we ran robustness checks using Tobit estimations in order to account for potentially censored behavior caused by ceiling effects in revision behavior. The estimations yielded a number of interesting results. For example, the high proximity condition, in which social identity was highest, was significantly negative across different specifications. The negative coefficient suggests that comparing to a situation in which social proximity remained unknown to the observer (Baseline), being exposed

to a high proximity signal induced a downward revision of one's initial behavior. More precisely, participants took away 29%-36% more money from the charity in the high social identification condition independent of the (un)ethicality of the observed behavior. This effect is not statistically significantly pronounced for the low proximity condition. These numbers are in line with the findings presented previously, indicating that peer effects are particularly present in a high social identification environment, which crowds-out ethical behavior and leads to more unethical behavior. The adaptation gap (the difference between one's own and one's peer's initial behavior in monetary terms) observed by the individual leads to a similar conclusion: individuals over-proportionally react to a large gap by revising one's initial amount, indicating that an increase in observed adaptation gap leads to more unethical behavior overall.

In addition, our results also suggest that one's initial behavior strongly predicts the direction of behavioral contagion. This relates to the idea that the individual's predisposition to behave (un)ethically is essential for the direction of behavioral spillovers caused by peer effects. More precisely, behaving (un)ethically when peer effects are absent renders it likely to behave even more (un)ethically when exposed to peer effects. Compared to the base level of no change in the initially fair 50:50 split between oneself and the charity, the revision of one's initial (un)ethical behavior is similar in either direction in terms of magnitude. Relative to one's initial behavior, the numbers indicate that an individual is likely to donate (take) between 9%-19% (19-23%) more money when his/her initial decision was to donate (take) money after observing peer's behavior, thus again supporting the asymmetry of behavioral contagion. Consequently, beyond social identification one's initial behavior is highly predictive of how an individual reacts to peer effects. The results also suggest that initial behavior represents a trait that is consistent and robust to the exposure to peer effects: those who decided to behave (un)ethically in the first place are likely to remain (un)ethical, only to a more pronounced extent. We do not observe behavioral heterogeneity across gender. Table A3 below illustrates our results. In addition to analyzing the magnitude of behavioral change, we find the same robust results when looking at the drivers of behavioral contagion in general. What is more, we shed light on conformity decisions by using logit estimations and report them in Appendix A4. These results are in line with and robust to an alternative analysis of the data by subdividing *No Contagion* into those who were invariant to the observed behavior and thus did not react at all and those who reacted but into the opposite direction of what they have observed (anti-contagion). We apply a multinomial logit regression and report results in Appendix A5.

Dependent Variable: Amount Revised (%)	OLS Specifications				Tobit Specifications			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatments *(Base Level: Unknown Proximity)*								
High Proximity	-29.3860* (16.3469)		-28.7364* (16.5249)	-30.7496** (14.6992)	-34.9762*** (9.7107)		-34.2641*** (9.6609)	-36.0689*** (9.4863)
Low Proximity	-6.1454 (4.4392)		-5.1774 (4.5562)	-6.4478 (5.1175)	-6.8891 (6.2096)		-5.9119 (6.2084)	-6.9097 (6.4023)
Observed Unethicality		37.0772 (24.2322)	34.0409 (25.8306)	34.2158 (39.6806)		38.1142 (24.6067)	34.5891 (24.0454)	33.7526 (26.7849)
Initial Behavior *(Base Level: No Change of Fair Split)*								
Give	9.2353** (4.5455)	15.1657** (7.0586)	15.5747** (6.9108)	18.6116** (9.3087)	10.0438 (7.3871)	15.9512* (8.8428)	16.4712* (8.5974)	19.3937** (8.7559)
Take Away	-9.6093 (6.1702)	-21.4052*** (7.9535)	-19.6451*** (7.4600)	-18.7158* (10.1752)	-11.1630 (7.0013)	-23.3327** (10.1893)	-21.3697** (9.9465)	-20.5225** (9.9621)
Observed Behavioral Gap	-0.0436*** (0.0121)	-0.1022** (0.0480)	-0.0978* (0.0510)	-0.1085 (0.0756)	-0.0471*** (0.0096)	-0.1070*** (0.0405)	-0.1022** (0.0395)	-0.1102** (0.0428)
Number of Interests				-1.9073 (4.1709)				-1.8053 (3.9709)
Gender				-7.5626 (15.0804)				-7.8040 (15.7833)
Interaction 1 *(Gender x Observed Unethicality)*				-5.1273 (26.6440)				-4.9789 (25.8968)
Interaction 2 *(Gender x Observed Behavioral Gap)*				0.0345 (0.0548)				0.0318 (0.0410)
Constant	0.7803 (3.3260)	-22.9721* (11.8731)	-16.3068 (14.1127)	26.1370 (24.8911)	1.0529 (5.7302)	-24.0145* (12.9784)	-16.2959 (13.3357)	-13.1646 (14.5095)
Dummies Questionnaire	No	No	No	Yes	No	No	No	Yes
Observations	185	185	185	185	185	185	185	185
Adjusted R^2	0.138	0.105	0.144	0.137				

Standard errors in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

A3: *Amount Revised (%) as a function of social identification and observed (un)ethicality. Model 1 and 5 (Model 2 and 6) tests for the effect of the treatments (of observed unethicality) while controlling for initial behavior and the observed adaptation gap. Model 3 (Model 7) tests for both treatment effects and observed unethicality simultaneously. Model 4 (Model 8) adds controls for gender and some interaction terms as well as the number of interest. In order to rule out any endogenous concerns and stress the effectiveness of exogenous variation of social proximity we also add dummies for the dating website questions.*

Dependent Variable: Conformity	**Logit Specifications**			
	(1)	(2)	(3)	(4)
Treatments *(Base Level: Unknown Proximity)*				
High Proximity	35.4372*** (25.4433)		35.0685*** (25.2349)	54.4839*** (50.1293)
Low Proximity	7.7127*** (4.4677)		7.5854*** (4.4276)	16.4058*** (12.1507)
Observed Unethicality		0.2577 (0.3718)	0.6840 (1.1760)	0.5725 (1.5174)
Initial Behavior *(Base Level: No Change of Fair Split)*				
Give	1.3153 (0.7233)	1.0835 (0.6430)	1.2070 (0.8143)	1.0064 (0.8653)
Take Away	2.9752** (1.5292)	4.4048** (2.6915)	3.2950* (2.2759)	3.8362 (3.7619)
Observed Behavioral Gap	1.0015** (0.0007)	1.0035 (0.0024)	1.0021 (0.0028)	1.0030 (0.0043)
Number of Interests				0.9046 (0.3099)
Gender				1.6828 (2.7092)
Interaction 1 *(Gender x Observed Unethicality)*				2.6033 (6.5987)
Interaction 2 *(Gender x Observed Behavioral Gap)*				1.0006 (0.0043)
Dummies Questionnaire	No	No	No	Yes
Observations	184	184	184	184
AIC	157.0341	188.9185	158.9854	191.0477
BIC	176.0228	204.7425	181.1389	304.9800

Standard errors in parentheses. Odds ratios reported.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A4: *Examination of conformity decisions using Logit estimations, where 1 means decision to conform with observed behavior.*

	Dependent Variable: Conformity	Logit Specifications		
		(1)	(2)	(3)
Anti-Contagion (Repulsion)	Treatments *(Base Level: Unknown Proximity)*			
	High Proximity	1.7488* (1.0053)		1.7638* (1.0125)
	Low Proximity	0.2982 (0.7963)		0.3264 (0.8472)
	Observed Unethicality		0.8589 (3.1571)	0.8794 (3.3638)
	Initial Behavior *(Base Level: No Change of Fair Split)*			
	Give	1.5038* (0.8359)	1.7036 (1.0740)	1.6616 (1.0839)
	Take Away	-0.4926 (1.3722)	-0.8689 (2.2678)	-0.7659 (2.2235)
	Observed Behavioral Gap	-0.0000 (0.0013)	-0.0017 (0.0059)	-0.0014 (0.0059)
No Contagion (Invariance)	*Base Outcome*			
Contagion	Treatments *(Base Level: Unknown Proximity)*			
	High Proximity	3.6437*** (0.7034)		3.6327*** (0.7058)
	Low Proximity	2.0636*** (0.5895)		2.0453*** (0.5877)
	Observed Unethicality		-1.2356 (1.2851)	-0.5957 (1.6213)
	Initial Behavior *(Base Level: No Change of Fair Split)*			
	Give	0.3060 (0.5757)	0.1027 (0.6172)	0.1763 (0.7039)
	Take Away	1.1390** (0.5191)	1.4101** (0.5795)	1.2959** (0.6325)
	Observed Behavioral Gap	0.0016** (0.0007)	0.0032 (0.0022)	0.0025 (0.0027)
	Observations	184	184	184
	AIC	232.4102	264.1861	236.1646
	BIC	270.9894	296.3355	281.1737

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A5: *Examination of the drivers of behavioral contagion using a multinomial logistic regression. Behavior of participants who revised their initial decision but into the opposite direction of what they have observed from their peer is treated as anti-contagion (repulsion).*

As shown in the regression results, our results also support the idea that behavioral contagion seems to facilitate the magnitude of (un)ethical behavior rather than changing individual behavior to be better or worse, respectively. That is, those who behaved (un)ethically in the first place become even more (un)ethical after being exposed to their peers. This is true for both the revision of one's initial amount and the reduction of the adaptation gap to one's peer. In more detail and in line with our previous results, this relation is more pronounced the more salient social identity to one's peers is and in particular in the unethical domain. This is additional support for our hypothesis H_1 that unethical behavior is more contagious than ethical behavior. We find similar results for those who decided to keep the equal split in the beginning, while the behavioral change of those who donated initially seem unsusceptible to changes in social identity. The figure below illustrates results.

A6: *The upper (lower) graph depicts the amount revised (%) (adaptation gap (%)) conditional on initial behavior broken down by social proximity. Essentially, the figure illustrates the magnitude and direction of behavioral contagion after observing the passive peer conditional on one's initial decision prior to having observed a peer.*

Baseline (unknown proximity)		Observed		
		Ethical Behavior	Unethical Behavior	
Initial Choice	Ethical Behavior	50%	50%	*n.s. (p=1)*
	Unethical Behavior	48%	52%	*n.s. (p=0.87)*

Treatment 1 (high proximity)		Observed		
		Ethical Behavior	Unethical Behavior	
Initial Choice	Ethical Behavior	40%	60%	*n.s. (p=0.32)*
	Unethical Behavior	41%	59%	*n.s.(p=0.36)*

Treatment 2 (low proximity)		Observed		
		Ethical Behavior	Unethical Behavior	
Initial Choice	Ethical Behavior	57%	43%	*n.s.(p=0.54)*
	Unethical Behavior	48%	52%	*n.s.(p=0.84)*

A7: *Test for selection effects in observing (un)ethical behavior as a function of one's own initial (un)ethical behavior. Reported p-values represent the results of a t-test against a hypothetical mean of 0.5, as would be expected if there are no underlying selection effects. Tests remain insignificant across all treatments, indicating that our results are not driven by selection effects of having exposed individuals to a particular behavior more often than chance would suggest. These results remain robust to the use of alternative statistical tests, such as the chi² test.*

B: Social Identity Statements

1. I am a reliable person.
2. I am interested in politics and/or economics.
3. Money is important to me.
4. I am an honest and sincere person.
5. I like to watch movies.
6. I am interested in playing and/or watching sports.
7. I am a religious person and/or my faith is important to me.
8. I am fond of animals.
9. I am interested in fine art.
10. I am an active and adventurous person.
11. I am interested in cars and/or technology.
12. I am fond of children and family-oriented.
13. I am interested in traveling to foreign countries.
14. I am a warmhearted and helpful person.
15. I am a tolerant person.
16. I like to gossip.
17. I am a trustworthy person.
18. I play an instrument.
19. I like to go out and dance.
20. I am a goal-oriented person.
21. I spend a lot of time in front of the TV.
22. I am a sociable person and like to be among people.
23. I like to play videogames.
24. I am a humorous and entertaining person.
25. I am a strong-willed person.

Average amount of chosen statements (across all treatments): 15.8 (63%)

C (Experimental Instructions) and D (Screenshots of Decision Screens) can be found online:
https://sites.google.com/site/eugendimant/Behavioral_Contagion_Appendix.pdf