The Prosocial Interactive Narrative
On the exploration, development and validation of a new measuring method.

Graduation thesis
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Abstract

Prosocial behavior is a core property from our evolutionary lineage in a social cooperative environment. However, prosociality is not fully understood yet, because it is partly beyond rationality. The issue is that prosocial behavior does not always rely on intentional processes; it can be the result of subconscious motivational processes, which makes prosociality above all notoriously hard to measure. Therefore, this thesis sets out to develop a new measurement of prosociality in four steps. First, a literature research on prosociality provides information about the current state of the field. Next, participants (N = 31) identified through an online survey the most influential factors of prosocial decision making for each of eight situations where someone needs help. On average, it was found that top three influential factors in prosocial decision making were: (1) whether someone believed their help has an effect on the outcome, (2) how acute the situation appeared, and (3) whether their help was directly asked. Subsequently, based on the top three of the eight situations individually, the Prosocial Interactive Narrative (PIN) was created. The PIN is predominantly a behavioral measurement, rather than a self-report questionnaire, and it is hypothesized as being an effective method for measuring prosociality. Lastly, the PIN is put to the test with existing measures of prosociality to determine its validity. Participants (N = 102) completed the PIN test together with three existing questionnaires that measure (an aspect of) prosociality. Contrary to the hypothesis of being a valid single factor method of measurement, the PIN showed low internal consistency (Cronbach's alpha = .359). Nonetheless, moderate significant positive correlations with existing measurements show promising concurrent validity. The value and contribution of the PIN are further discussed in light of existing literature.

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Introduction

In the year 2000, an artist called Marco Evaristti displayed his artwork in a museum in Denmark (BBC News Europe, 2003). His artwork consisted of ten plugged-in blenders within each of them live goldfish. The audience was given the opportunity to press the blenders' power buttons to kill the fish. According to the artist, this setup was designed to test the good or bad in people and to have them struggle with their conscience. One person could not resist the temptation and turned on one of the blenders, killing two fish. This left the audience and media (Boogaerdt, 2010) disgusted and accusing the artist, the museum director and the person killing the fish of being morally bad. The artwork was closed down only one hour after its opening. Interestingly, one of the questions this raises is whether the person pressing the button truly is a bad person for killing the fish? Or could it be that this person turning on the blender is as evil as the rest of us, but that most of us decide not to act upon bad urges? This idea, paraphrased in the famous quote above this paragraph, holds that humankind is inherently evil, with a thin layer of kindness around it. This theory, also called the "Veneer Theory" by de Waal (2006), states that true selflessness or altruism would not exist, but that we are egoistically driven and only interested in maximizing our own benefit (i.e. increasing our biological fitness; Ghiselin, 1974).

This might be a very cynical perspective, but the good versus evil dilemma has been a philosophical issue for millennia. It has been long known and reported that humans are capable of actions on both ends of the spectrum. From heroic altruism on the one end to unthinkable crimes that outline the worst in man on the other. This thesis is about prosociality and helping behavior. Prosocial behavior consists of actions that people perform to benefit another being (Hawley, 2014). For the sake of this argument, to define what evil is, we will focus on the moral evil caused by the intentions of people, or moral agents (Calder, 2020). Moral evil is the outcome of intentions or negligence of a moral agent, where the outcome is experienced as bad and the moral agent can be held responsible for it. Therefore, being good or bad could be defined as: an attribute defined by the actions performed by moral agents resulting in either a good or bad state respectively, experienced by a recipient or recipients, for which the actor can be held responsible. However, this definition is still not clear-cut or solid, because it would mean that morally bad or good behavior is a matter of choice of the actor. Frans de Waal (2006) criticizes the view (of philosophers Hobbes and Huxley) that human morality is a choice or cultural agreement our ancestors supposedly made when they started living in groups. De Waal criticizes the "Veneer Theory" by arguing the evolution of morality from our mammalian ancestry, based on empirical evidence from studies done with primates. De Waal argues for the existence of innate comprehension of good and bad, which we share with many other animals.

Different believes about this have been expressed throughout history and it might very well be possible that there will never be a definite answer to the question whether we are inherently good or bad. However, despite disagreeing on the question whether morality is innate, historical philosophers and psychologists, such as Aristotle (Barnes, 2000), Rousseau (Rousseau & Scott, 2012), Freud, Piaget, and Kohlberg (Barnett, 2007), argue that morality is a developmental trait. Psychologists reason morality is learned in stages, from experiences and through our upbringing (Barnett, 2007). Small children already show interest in helping others and by experiencing reciprocity, reward and punishment, they develop their morality and capability of prosociality further (Tomasello, 2009). But this raises the question what drives us to do good or bad. If morality is something that develops over time, then what is needed for us to happen in this time to make us act good or bad?

After the Holocaust in World War II, which might be our worst-case example of human evil, behavioral psychologists started to investigate why and how humankind is capable of committing those uttermost heinous crimes. The controversial studies into submissive and controlling behavior of people, called the Milgram Experiment from 1963 and the Stanford Prison Experiment from 1971, suggested that people only need to be in the wrong situation to become a kind of tyrant capable of oppressing and even killing other people (Milgram, 1963; Zimbardo, 2006). Besides the factors influencing bad behavior, this time frame provided circumstances for studying prosociality or helping behavior as well. The murder on Kitty Genovese with presumably 37 spectators to watch her die (Gansberg, 1964) sparked the interest in investigating helping behavior and in a broader sense prosociality.

Besides De Waal, other biologists point out that prosociality is a common phenomenon throughout the animal kingdom (Hawley, 2014). We share a great part of our genes due to common ancestry with other animals that exhibit behavior such as cooperation and food sharing. These forms of prosocial behavior, seen from the biological perspective or ultimate level (Tinbergen, 1963), are defined as actions voluntarily performed and beneficial to another animal (Hawley, 2014). If the beneficial act comes with a cost for the actor, biologists would define the prosocial behavior as altruism. In the psychological perspective, or at the proximate level (Tinbergen, 1963), intentions and motivations play an important role. Those are not the same, though, but often confused as such (Hawley, 2014). Intentions are conscious, attentive and directed psychological processes, and can therefore be self-reported. Motivations do not require such conscious processes and are more difficult to investigate (Bargh & Morsella, 2008; Batson & Shaw, 1991). Prosocial behavior at the proximate level requires the beneficiary actions to be both voluntary and intentional (Hawley, 2014). Other than cooperation, prosocial behavior consists of acts of comforting, aiding, or sharing, performed with many possible intentions and motivations (Eisenberg & Spinrad, 2014). Altruistic behavior at the proximate level requires next to voluntariness and intentionality also other-concerning motives, such as empathy or sympathy (Batson & Shaw, 1991; Eisenberg, 1991; Eisenberg, Shea, Carlo, & Knight, 1991). Actions motivated by e.g. enhancing positive emotions or reputation, do not count as altruism, because these actions are egoistically motivated (Batson & Shaw, 1991; Carlo & Randall, 2002).

Interestingly, being a crucial property of humankind and from our evolutionary lineage, prosocial behavior is yet not fully understood. Moreover, due to underlying motivational processes, in contrast to intentional processes, prosocial behavior cannot always be rationally explained. This makes prosociality notoriously hard to measure. Therefore, this thesis sets out to (1) investigate influential factors of prosociality and (2) develop and explore a new measurement method of prosociality. It does so in four steps and mostly from a psychological perspective, therefore, when prosociality and altruism are used in this thesis, those definitions apply. First, a literature review of prosociality is given, discussing prosociality in the evolutionary context and the social group, followed by personality characteristics and prosocial decision making. Subsequently, an overview of influential factors of prosocial decision making is given, categorized over three dimensions: situational, emotional and intentional. The literature review ends with an overview of existing approaches and measurements of prosociality. Thereafter, this research and its aim to develop a new measurement of prosociality is explained in the context of existing work. The second step in this thesis consists of the study done in Part 1 of this graduation project. By means of a survey, it is investigated what factors are influential in the decision to help in specific situations. Thirdly, with the outcome of the survey in Part 1, an interactive narrative is written in Part 2 of this graduation project. The last and fourth step consists of the exploration and testing of the interactive narrative, by investigating its internal and concurrent validity with three existing methods. At the end, an overall conclusion is provided, where the role and contribution of the interactive narrative is discussed.

Literature review

Prosociality as a function of the social group

Primates' social abilities have been found to correlate with living in groups (Dunbar & Schulz, 2007). It has been shown that over the course of evolution the size of the social group correlated strongly both to the size of the brain's neocortex as to social intelligence. In larger primates' groups, primates have to uphold more social ties and this means a higher demand for social skills, ranging from basic behavior to more complex behavior as social strategies. Through means of (social) grooming, and supported by biological mechanisms as endorphin release, it has been shown that monkeys and apes form very strong coalitions in their social groups (Gamble, Gowlett, & Dunbar, 2018). Probably, certain prosocial behaviors are part of this; cooperation and helping other group members are needed to maintain the structure of a social group. It has been shown that primates would even endure painful activities for family and other close members of the group (Madsen et al. 2007), and defend them against perils, no matter how slim the chances are (Gamble et al., 2018). However, much more than other primates, humans show an innate tendency for prosocial behavior, such as helping, sharing and informing others, already from an early age onwards (Tomasello, 2009). Our prosociality develops in our youth, by for instance experiencing reciprocation (i.e. prosocial behavior is returned). Moreover, we are subject to other's opinions and by learning whom to trust, we develop a sense of "we-ness and shared intentions".

It has been stated that prosocial behavior evolved as a consequence of being part of a group in which each individual competes for their share of limited resources (this is called the resource control theory; Hawley, 1999; Hawley, 2014). As a way to protect the group from exploiters or acts that otherwise hurt the group, it is stated that monitoring, badmouthing, and even ostracizing evolved (Williams, 2007). As an explanation for the evolutionary success of prosocial behavior, it is also argued that prosocial people raise group performance, because they cooperate more often and can be exploited, making them indispensable for survival of the group (Sheldon, Sheldon, & Osbaldiston, 2000). This effect is still found in smaller societies, where the prosocial individuals, by cooperating more often and monitoring others contributed for a great part to the success of the group performance (Ostrom, 2009; Rustagi, Engel, & Kosfeld, 2010). Moreover, the prosocial other-concerned individuals, who cooperated and monitored more often, were also found to punish or sanction free-riders more in experimental games.

To put it short, living in groups had its benefits (e.g. safety, higher chances of reproduction, or more food) and downsides (e.g. more competition for the same resources), which needed to be handled strategically by social behavior, of which prosociality is part (Adolphs, 1999).

Through evolution primates obtained the higher functional cognitive processes that underlie the complex behavioral interactions we have with others, referred to as social cognition (Adolphs, 1999). One aspect of social cognition, named Theory of Mind, is the ability to attribute mental states to others (Adolphs, 1999; Apperly, 2010). When our ancestral social groups grew larger, we needed the abilities of social cognition to infer whom to trust in cooperation (Declerck & Boone, 2016). Humans did this by gathering social information such as tracking others' (dis)honorable activities, their expressed emotions and by mentally placing oneself in someone else's position. This with the possible goal to figure out the other's strategy and intentions, to come up with one's own (Barrett, Cosmides, & Tooby, 2010). The ability to cooperate and detect whether the other is cooperating or free-riding (i.e. cheating) are likely skills that have coevolved with our social-cognitive and Theory of Mind capacities. Therefore, prosociality relies in part on our empathic and Theory of Mind abilities as well (Frith & Singer, 2008), because Theory of Mind allows to infer trustworthiness.

Even more, by living in the largest social groups, humans had to be attuned to social cues, such as facial expressions and gestures, to survive within the group (Dunbar, 1998). It is argued by Dunfield (2014) that prosocial behavior develops in response to and by recognizing of three different kinds of negative states or problems of the person in need. These are (1) difficulty accomplishing a goal called *instrumental need*, (2) problems obtaining a certain resource called *unmet material desire*, and (3) being in an *emotionally distressful* situation. This is corroborated for instance, by the findings that people who have difficulty recognizing emotions from facial expressions, show antisocial behavior (Marsh & Ambady, 2007; Marsh & Blair, 2008).

Furthermore, people with a more "prosocial personality" score higher on performances related to social cognition. Empathic people, who have better abilities to match and experience the emotional state congruent to that of another person's, are found to be more prosocial (Eisenberg & Miller, 1987; Hawley, 2014). Stable personality traits from the Big Five personality dimensions that predict prosocial behavior well are agreeableness and extraversion (e.g. Smith & Nelson, 1975; Burke & Hall, 1986; Kosek, 1995; Graziano & Eisenberg, 1997; Carlo, Okun, Knight, & de Guzman, 2005; Graziano, Habashi, Sheese, & Tobin, 2007). Also, people who score high on honesty (i.e. a HEXACO model trait to be fair and genuine with other people) are found to be more prosocial (Hilbig, Glöckner, & Zettler, 2014).

Prosocial decision making is often investigated from an economical perspective. Combining both the psychological and biological perspectives, this view holds that, to maximize our interest, i.e. our chances of survival or reproduction[1], we use our cognitive abilities to calculate the benefits for ourselves in prosocial decisions, taking into account and predicting other's intentions (Declerck & Boone, 2016). In decision making, we use heuristics relying both on affective and cognitive processes. Depending on social value orientation (SVO), Declerck and Boone (2016) argue people rely more on either the affective or cognitive neural processes. People who attach value to the well-being of others are said to be prosocial, whereas people who attach more value to their own well-being are "proself" (Bogaert, Boone, & Declerck, 2008). SVO is often considered as part of a personality with preferences of resource division in social dilemmas, accompanied with a decision to cooperate or not.

Much processes that would classify as social cognition appear to take place subconsciously, expressing itself in, for example, stereotypes (Banaji, 1995). However, there is a cognitive capacity problem with (social) decision making and to overcome these limitations, we use simple decision rules called heuristics, a framework first proposed by Tversky and Kahneman (1974). For instance, some heuristics are in all probability used in social decision making to infer the trustworthiness of other people and the likelihood of occurrences (Lee & Harris, 2013). It has been proposed that our cognition functions as a limited "toolbox" with heuristics that are shortcuts or easy rules in decision making instead of a mind that has an unlimited capacity for calculating probabilities and utilities (Gigerenzenzer & Todd, 1999). Therefore, when (social) information becomes too complex, the boundaries of the cognitive system are hit and "fast and frugal" building blocks from the heuristic toolbox alleviate the cognitive load in order to make a right (or good enough) decision. Also Van Duijn (2016) argues that to choose the appropriate helping behavior, people make use of these heuristics to infer others' believe states, without overloading the cognitive system with too much "mindreading" information.

Declerck and Boone (2016) propose two prosocial decision heuristics, one to determine a more prosocial outcome than the other. The first, *"I am selfish unless there are cooperative incentives",* which is more self-regarding, making people more sensitive to incentives as reward. This heuristic relies more heavily on the rational and computational processes in the brain. The second, *"I am cooperative unless my partner is untrustworthy"*, is prosocial and other-regarding. It relies more on social and emotional cognition and makes people directed towards social information and signals of trust.

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[1] As mentioned before in the introduction, this is a complex and undecided debate, in part due to observations that show that to maximize biological fitness, an actor sometimes has to choose egoistic one time, and prosocial the other time, e.g. by improving the performance of the group or offspring (Richerson & Boyd, 2006).

To eventually come to a decision to act prosocially or not, research has found certain aspects to be influential. These factors can generally be placed on one of the three dimensions: situational, emotional and intentional. The distinctions and definitions of the different dimensions and the different factors are explained below, however, it should be noted that the factors show some overlap with other dimensions. The division of the influences of prosocial decision making in this thesis is one of many ways to do so, since prosociality is a complex, not fully understood, and multidimensional concept (see e.g. Eisenberg & Spinrad, 2014). The division as provided in this thesis, hopefully, is aimed at giving a more insightful and structured overview than existing literature.

Situational - There are several examples of how (social) context influences prosocial behavior. Most importantly, the presence of other people determines the likelihood of helping in emergency situations. The more people present, especially when those other people act passively, the less likely we would help another person in need or interfere with the situation (Latané & Darley, 1968; Latané & Darley, 1970). This is known as the bystander effect. Moreover, the urgency of the helping behavior (i.e. how acute is the emergency) matters. Research has found that when the potential danger increases, the bystander effect does not exist and people act equally when they are alone as with others (Fisher, Greitemeyer, Pollozek, & Frey, 2006). A meta-analysis was consistent with these findings (Fisher et al., 2011). Moreover, it was shown that bystander effects were stronger in experiments and laboratory environments, in comparison to quasi-experiments and "real life". The bystander effect was also found to be stronger for women than for men and for strangers than for friends. Lastly, more bystanders reinforced the bystander effect. Similarly, research done on the influence of providing help in a medical emergency showed the bystander effect as well (Shotland & Heinold, 1985). It showed the influence of an ambiguous situation (ambiguity decreases likelihood of helping) and gender (men helped more often) on the bystander effect.

Furthermore, the term diffusion of responsibility refers to the accountability of an individual for coping with the situation (Latané & Darley, 1968). Recent neuroscientific research has found that the presence of a bystander induced diffusion of responsibility by weakening the linkage in the brain between the action and outcome (Beyer, Sidarus, Bonicalzi, & Haggard, 2017). This suggests that the presence of others makes it more difficult to point out who or what caused the outcome, which reduces the sense of agency over our actions.

Lastly, when some form of help was directly asked, Eisenberg and colleagues (1981) showed that the pattern of behavior and the frequency of help differed from that of spontaneous prosocial behaviors. Therefore, motivations and effects of prosociality might differ whether the help is asked for, and thus planned, or spontaneous, which is also corroborated by the findings of Amato (1990).

Emotional - This dimension includes the factors such as predispositions, characteristics and performances of a person that make them more likely to act prosocially. As stated by Declerck and Boone (2016), trust is very important when it comes to cooperation. People who act more prosocial rely more on emotional cognitive processes and are more sensitive to social cues of trustworthiness. Abilities to correctly identify facial expressions and personality characteristics such as empathy, theory of mind, extraversion, agreeableness and/or honesty influence people's own trustworthiness and/or their ability to infer other's trustworthiness or loyalty. Additionally, emotional closeness plays an important role and this relates to the belonging to the social group. Researchers state that more loyalty is expected from ingroup members and consequently we treat them more altruistically (Yamagishi, Terai, Kiyonari, Mifune, & Kanazawa, 2007). This is corroborated by studies showing we tend to help friends more frequently than strangers (Thompson, Kray, & Lind, 1998; Yamagishi & Sato, 1986), this is even shown to rely on different neural structures (Saulin, Baumgartner, Gianotti, Hofman, & Knoch, 2019). When people help friends, brain areas associated with self-control and strategic behavior were found to be most active, whereas helping strangers relied more on brain areas known to play a role in social cognition processes. This is also shown by Amato (1990), where people tend to help friends more often on planned occasions (i.e. strategically), whereas helping strangers happens mostly spontaneous. Moreover, Amato's (1990) study also showed that a larger social network was a good predictor of (self-reported) prosociality; even a better predicator than certain personality traits

Moreover, when people share more of the same characteristics (i.e. social distance is reduced), it presumably becomes easier to predict someone else's behavior and prosocial behavior and trust increase (Hoffman, McCabe, & Smith, 1996). A study done by Laakasuo and colleagues (2020) showed that personality similarity, of which personality traits conscientiousness and neuroticism specifically, predicted group formation and performance. These social distance similarities hold for situations where people are more likely to act prosocially towards other people versus computers (Kiesler, Sproull, & Waters, 1996), "a partner" versus "an opponent" (Burnham, McCabe, & Smith, 2000), people who are facially similar (DeBruine, 2002), and people who appear to be geographically close by (Cole & Teboul, 2004). Moreover, communication makes people cooperate more often, because it presumably increases trust (Balliet, 2010), such as when previously anonymous opponents introduce themselves (Boone, Declerck, & Suetens, 2008).

Intentional - Intentional factors consist of believes, intentions and strategies of the actor to act prosocially. Economic decision games are often used to measure aspects of this dimension, due to the fact they measure rational concepts or considerations. For instance, ultimatum and dictator games investigate cooperation and have been of great value to investigate intentions behind sharing and cooperation (Cappelen, Nielsen, Sorensen, Tungodden, & Tyran, 2013). Using these experiments, it was shown that people act prosocially in the desire to signal prosociality or to follow a social norm. As part of a decision-making process, people make a subjective, and mostly egoistical, calculation of the costs and benefits of the situation that determine the outcome of the decision to help (Dovidio, Piliavin, Gaertner, Schroeder, & Clark, 1991).

This cost-reward model for helping behavior is based on the idea that people only help when the costs of helping are low and not helping has a high cost. A possible outcome can be in the form of reciprocity, alliance, punishment or prestige and it influences the decision by aligning own and group concerns in order to profit from them maximally (Declerck & Boone, 2016).

It has been shown that when anonymity is reduced people were more likely to make a prosocial decision (Kurzban, DeScioli, & O'Brien, 2007; Piazza & Bering, 2008), possibly taking a reward into account, such as another favor in the future or a better reputation (Nowak & Sigmund, 2005). This can also hold for group reputation, as shown in the study of Hopkins and colleagues (2007), where Scottish people were more likely to help out-group members as a strategy to behave opposite to the stereotype held by the English of being mean. Thus, only by means of improving their group's reputation they acted more prosocially.

The role of empathy in prosocial decision making is illustrated in the study by Coke, Batson and McDavis, 1978). Their method, called the Katie Banks paradigm, consists of playing an audio segment in which a young woman asks for a donation after telling the personal sad story explaining how she got in this dire situation. It was shown that by increasing the participants feelings of empathy in this way, people decided more often to donate. However, it could be that empathizing with those in need is part of a strategy resulting from a cost-reward calculation. When people were informed beforehand that they would be asked to help someone later and that helping would be costly, they implemented an empathy-avoiding strategy (Shaw, Batson, & Todd, 1994). In this research the information about the cost of helping someone was determinative of empathy-avoidance (i.e. participants avoided to hear the empathic story) and the outcome to help. Therefore, the researchers state, it could be that people often refrain from helping others, because they are less empathized with them as a result of a strategy that is based on a cost calculation.

It has been hypothesized that people show helping behavior in order to share the happiness the victim experiences when their situation improved (Smith, Keating, & Stotland, 1989; Batson et al., 1991). This would mean people would have an empathically evoked, but egoistic intention to gain personal pleasure from relieving the victim's distress. It is also proposed people want reduce the negative feelings of experiencing such emotions induced by the victim's emergency, called the negative state relief model (Cialdini et al., 1987). However, a study done by Batson and colleagues (1991) showed support for an alternative hypothesis, called the empathy-altruism hypothesis: people help because they have altruistic intentions to improve the victim's situation. This differs from the intrinsic motivations (see emotional dimension) because of its cognitive component: people take the outcome into account. It was shown that when feelings of empathy were evoked and people were denied of feedback about the result of their help, they were no more likely to help than people who were not empathically evoked (Smith et al., 1989). Furthermore, research done on helping behavior in medical emergencies showed that training (i.e. having more knowledge or assurance about own influence on the outcome) did not influence the decision to help (Shotland & Heinold, 1985).

To summarize, prosociality is an innate crucial trait presumably evolved from our lineage by living in larger groups. The complexity of larger social structures put a higher demand on social intelligence (Dunbar & Schulz, 2007), of which prosocial behavior is part. Cooperation for instance, needed in resource division and coalition formation, depends heavily on the ability to infer and remember others' mental states, strategies, activities, and thereby their trustworthiness (Adolphs, 1999; Declerk & Boone, 2016; Hawley, 2014; Williams, 2007). Prosocial decision making relies on rules of thumb, called heuristics, to make quick and "good enough" decisions (Declerck & Boone, 2016; Tversky & Kahneman, 1974). It prevents overloading the brain with (social) information. In this thesis, situational, emotional, and intentional were introduced as the three dimensions of prosocial decision making. The situational dimension consists of (social) contextual factors. A famous example is how the presence of other people influences a prosocial decision, known as the bystander effect (Latané & Darley, 1968). Also, acuteness and ambiguity of the situation play a role (e.g. Fisher et al., 2006; Shotland & Heinold, 1985). The emotional dimension consists of a person's internal characteristics (e.g. personality traits) that influence prosocial decision making. Besides these characteristics, there are several factors, such as emotional closeness and similarity (e.g. Laaksuo et al., 2020; Yamagishi et al., 2007), that can also influence the inference of trustworthiness and thus the decision act prosocial. The intentional dimension consists of factors that are the result of a costs and rewards calculation. The result of the calculation can be a strategy to, for instance, signal their prosociality, follow a social norm or increase their chances of reciprocity in the future (e.g. Cappelen et al., 2013; Hopkins et al., 2007; Shaw, et al., 1994).

This research

As a widely investigated, multidimensional topic (Eisenberg & Spinrad, 2014), researchers previously have tried to measure prosocial behavior in many ways. Cooperation is often one of the measured behavioral aspects in research of prosociality in the domain of psychology and economics, due to applicability of economic decision games such as the dictator game (Kahneman, Knetsch, & Thaler, 1986) and prisoner dilemma games. However, other forms of prosocial behavior and their underlying intentions are researched often by observations (e.g. Darley & Batson, 1973; Latané & Darley, 1968) and questionnaires (e.g. Baumsteiger & Siegel, 2019; Carlo & Randall, 2002). The downside to those measurements is that observants can be subjective, existing methods are found to be too hypothetical or lack reality (Eisenberg & Miller, 1987), or they often need confederates or counter-players. Observations of prosociality in real life might also be hard to find and control. These difficulties, together with the multidimensionality of prosociality, make prosocial behavior difficult to measure. Hence, several studies (e.g. Baumsteiger & Siegel, 2019; Carlo & Randall, 2002; Dunfield, 2014), argue in favor of the development of a measurement method that takes the multidimensionality of the prosocial construct into account.

Therefore, this research project set out to investigate such a method and does this by developing an interactive measurement, that is a reliable, controllable, and repeatable method of evaluating prosociality which participants can do individually and online. It could therefore be administrated remotely, i.e. without the physical presence of an administrator, such as a psychologist.

This research is done in two parts. In Part 1, influential factors on prosocial decision making in different emergency situation are investigated with a survey. The factors are based on the findings on the three named dimensions of prosocial decision making: situational, emotional and intentional. It is hypothesized that these factors are situation specific, i.e. it depends on what kind of situation the help is needed what factor is most influential. Part 1 is aimed to answer the first research question: *What are influential factors of prosocial decision making in certain situations?*

In Part 2, a new method for measuring prosociality is based on from the outcome of the survey from Part 1. It will be consequently validated by means of experimental research, in which outcomes of the new method will be compared to those from existing methods. By using the software Twine (Klimas, 2019), participants will read a non-linear story, in which they are the main character. They are presented with a narrative form of the same situations from the survey in Part 1. The outcome of the survey from Part 1 will also provide information about the important factors to manipulate and name explicitly in specific situations. Subsequently, the data gathered from the participants will be compared to responses to existing prosociality measurements to answer the research question: *How effective is measuring prosocial behavior through an interactive narrative in Twine as a psychometric method?*

Method

Survey - A survey was designed to investigate which factors influence prosocial decision making in specific situations. The aim is to know which factors to manipulate in the interactive narrative in Part 2 of this research. This will be done by compiling a top 3 of most important factors each situation.

First, the influential factors were taken from the named literature in the section *Three dimensions of prosocial decision making* from this thesis and some items from the *Prosocial Tendency Measure* (Carlo & Randall, 2002) were grouped and summarized, see *Table 1* below for an overview.

Factor or consideration in prosocial decision making as phrased in survey	Dimension	Short (used in analysis and plots further in this thesis)
Whether the help is asked directly from me.	Situational	Directly asked
How many people are around that could also provide help.	Situational	Helping bystanders
How many people are able to see if/how I help.	Situational	Judging bystanders
How acute the situation appears to me.	Situational	Acuteness
What emotional bond I have with this person (e.g. family, friend, etc.)	Emotional	Emotional closeness
The emotional distress cues of the other person (e.g. crying, fearful expression).	Emotional	Distress cues
How similar the person is to me (e.g. supporter of the same football team, same gender, culture, etc.).	Emotional	Similarity
How much time/effort/money it will cost me.	Intentional	Cost
Whether I believe my help has an (positive) effect on the situation.	Intentional	Effectiveness
Whether I (expect to) gain something from helping (reward or better reputation).	Intentional	Reward

Table 1. Overview of influential factors of prosocial decision making as asked in the survey.

Subsequently, eight different situations were chosen that will later be used in Part 2 of this study to write the narrative about. For these situations and concurrent validity in Part 2, three existing questionnaires are used. The *Community Feeling* domain of the *Aspiration Index* from (Kasser & Ryan, 1993) is a relevant questionnaire to this research, because it is associated with measuring prosocial values (Schwartz & Bilsky, 1987, 1990) and altruism commitments, (Novacek & Lazarus, 1990) and therefore, reflect aspirations about actions to benefit the world and other people (Kasser & Ryan, 1993).

The *Prosocial Tendency Measure* from Carlo & Randall (2002) measures to what degree an individual tends to act prosocial. The items describe some of the common types and are context specific, e.g. emotional or anonymous. The third, the *Prosocial Behavioral Intentions Scale* by Baumsteiger & Siegel (2019), is developed as a reliable and valid method of measuring and predicting prosociality.

An overview of the situations is given in *Table 2* below. Several items have one or more of the mentioned questionnaires as inspiration. Two items, *Helping in queue* and *Picking up item*, were taken from everyday experiences of living in an urbanized social environment. Inspired by the researcher's own history, where she herself had to decide to help or not in these situations, and conversations with others about these experiences, made these two situations an interesting and legitimate item to include in a study of prosocial behavior.

The situations are stated as general as possible in order to be able to manipulate as many influences as possible in the stories in Part 2. For instance, the situations in the survey were phrased as such that the person in need was named "someone", so that later in Part 2, the emotional closeness (e.g. a family member, friend, etc.) could be manipulated. Secondly, the locations of the situations were kept as general as possible, or in the outside world, in order to manipulate the anonymity and bystanders in later use. Thirdly, this generality was supposed to suggest nothing other about the form of help or influences other than asked about.

Situation where someone needs some form of help as phrased in survey	Short (used in analysis and plots further in this thesis)
1. Someone from a charity needs something from you (e.g. monetary donation, volunteer work or goods). [A,B,C]	Charity donation
2. Someone on the streets drops their groceries and falls. [C]	Falls on the streets
3. Someone needs help with moving something out their house or lifting something heavy. [C]	Helping moving
4. Someone behind you in line in the supermarket is only buying one item.	Helping in queue
5. Someone is losing/dropping something without noticing (e.g. money/phone).	Picking up item
6. Someone lost something and needs help searching (e.g. item or pet). [C]	Helping searching item
7. Someone is lost and needs directions. [C]	Giving directions
8. Someone needs something from you of value (e.g. money, phone or jacket). [C]	Lending item of value

Table 2. Overview of situations where some form of help is needed as asked in the survey
Item adapted from: A. Kasser & Ryan, 1993; B. Carlo & Randall, 2002;
C. Baumsteiger & Siegel, 2019

Participants – For this survey, participants (N = 31) were recruited from own personal social networks and via social network sites and apps such as Facebook, Whatsapp and Instagram. The survey was taken anonymously, therefore, no data about age, nationality or gender was collected.

Procedure - The 31 participants filled out the survey that was distributed online and accessible via a link, using Qualtrics (2019). After stating their consent, participants read the instructions and were provided with the ten different considerations as stated in *Table 1* on page 16. The respondents were asked to rate on a scale from 1-100 (by using a slider) how important these considerations would be in the decision to provide some form of help in 8 different emergency situations as stated in *Table 2* on the previous page. It was explicitly mentioned that the form of help itself did not matter. However, the considerations they would have in the decision to help in the stated situation were relevant.

Design and analysis - For this study an 8x10x1 design is used, with two independent variables: situation (8 levels) and importance of consideration (10 levels). The rating of importance is the dependent variable. The next section will provide an overview of the results gained from data processing and analysis in RStudio (RStudio Team, 2020).

Participants rated on a scale from 1 to 100 how important (where 1 is not important at all, and 100 most important) a factor would be in the decision to act prosocially, given a certain situation. Consequently, a mean score of importance for each factor or consideration can be calculated for each situation specifically. *Figure 1* below shows a matrix where the mean scores are plotted against the considerations (y-axis) and situations (x-axis).
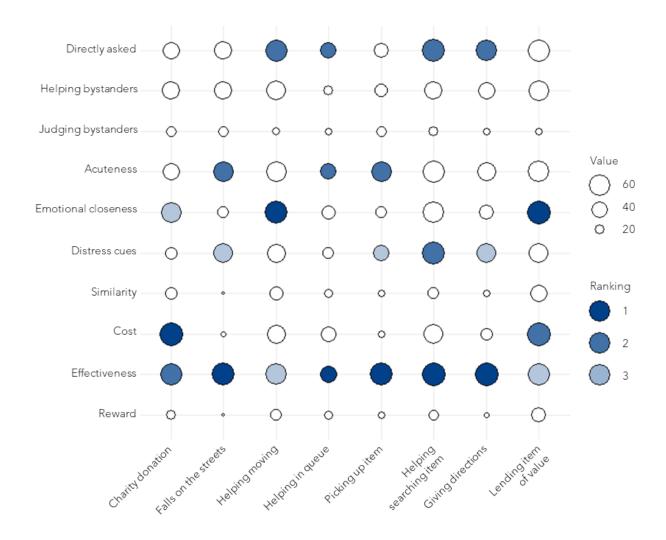

Figure 1. The mean values of importance (N = 31) are plotted as balloons against the influential factors (y-axis) and situations (x-axis). The size of the balloon corresponds to its value. The three most influential factors for each situation are colored by their ranking.

Next, for each situation separately the three most important influential factors were determined. In *Figure 1* above, this top 3 for each situation is colored by its ranking. Note that this ranking is only valid for each situation (horizontally), not per consideration or factor (vertically). Factors from the top 3 for each situation are manipulated in the interactive narrative in Part 2 of this research.

Interestingly, effectiveness, i.e. whether someone believes their help has a (positive) effect on the situation, is in the top 3 for each situation. Moreover, this was rated as most important consideration in five out of the eight situations. This effect can be seen as well in *Table 3* below, where effectiveness is overall the most influential factor (M=66).

Cost (i.e. how much time, money or effort it would cost someone to help) was the most important consideration when donating to charity (M = 73). Emotional closeness, i.e. what emotional bond someone has with the person in need (e.g. family, friend, etc.) was most important in two situations: (a) helping someone moving or lifting something heavy (M=68) and (b) when lending someone an item of value (M=77).

Judging bystanders, or the factor of how many people are around that can see whether or how someone helps, has both the lowest overall mean and standard deviation (M = 19, SD = 26). For reward as a consideration, the scores show almost the same (M = 20, SD =26). This suggests that not only people think these factors are least important in the decision to help, they also agree most upon this, since the spreads in scores for this factor are the lowest. See also *Appendix A* for boxplots of the data from the survey.

Consideration	Charity donation	Falls on the streets	Helping moving	Helping in queue	Picking up item	Helping searching item	Giving direction	Lending item of value	Total
Directly asked	42 (39)	45 (42)	67 (26)	40 (35)	33 (39)	68 (31)	60 (33)	66 (35)	53 (35)
Helping bystanders	44 (36)	44 (37)	53 (25)	19 (29)	28 (31)	47 (30)	42 (34)	56 (33)	42 (32)
Judging bystanders	22 (29)	21 (28)	17 (26)	16 (21)	21 (30)	19 (24)	16 (22)	16 (24)	19 (26)
Acuteness	43 (33)	58 (37)	57 (26)	40 (31)	55 (40)	64 (30)	50 (37)	63 (33)	54 (33)
Emotional closeness	59 (30)	24 (33)	68 (28)	30 (35)	24 (37)	60 (28)	33 (40)	77 (25)	47 (32)
Distress cues	25 (26)	54 (36)	48 (29)	24 (26)	39 (39)	68 (32)	53 (37)	53 (31)	46 (32)
Similarity	25 (28)	13 (23)	30 (29)	18 (26)	16 (25)	23 (30)	16 (24)	41 (33)	23 (27)
Cost	73 (29)	14 (14)	50 (28)	36 (34)	16 (23)	51 (30)	26 (28)	73 (27)	42 (27)
Effectiveness	67 (32)	68 (36)	60 (31)	43 (35)	71 (35)	73 (26)	76 (27)	67 (34)	66 (32)
Reward	20 (26)	13 (21)	23 (23)	18 (25)	16 (25)	22 (29)	14 (24)	32 (35)	20 (26)

Table 3. The mean values (standard deviations) for the influential factors and situations (N = 31). The last column contains the means and standard deviations for all situations taken together. Minima and maxima are colored in a lighter or darker blue respectively.

Firstly, from this survey the three most important factors influencing a prosocial decision were determined. Combining existing work on influential factors of prosocial decision making and prosocial situations, this study has shown that it depends on the situation what factors affect the decision to help. However, it should be noted that this survey had a relatively small sample size of 31 subjects, with a lot of unknowns about the effects of gender, age and culture. Moreover, subjects were obtained via the researcher's own network, therefore, it has to be noted that they were a convenience sample. This has some effects on the generalizability of the data, because some people might provide the same answers (e.g. because they are related, share the same culture, etc.) that skew the data. Nonetheless, the results of the survey are potentially very useful and cautions conclusions are discussed below.

If one were to look at the overall three largest influences, regardless of specific situations, of prosocial decision making, then *Table 3* (previous page) would show: (1) Effectiveness, (2) Acuteness, (3) Directly asked. This is not totally as one would expect from the literature. A bystander effect (see e.g. Latané & Darley, 1968; Latané & Darley, 1970) was expected to be of large influence, which would have emerged from the factor judging bystanders (i.e. how many people are around to see if/how one helps) or helping bystanders (i.e. how many people are around that could also provide help). The first item, judging bystanders, is found to be the smallest influential factor in prosocial decision making. The second, helping bystanders, is not found to be of large influence either. It could be this is due to unconscious processes, which would not be picked up from a self-report such as this survey, because people might simply be unaware of this influence. This role of a self-report and unconscious processes could also be the case for similarity and reward. Previously mentioned literature (see e.g. DeBruine, 2002; Balliet, 2010; Laakasuo et al., 2020), found that people tend to act more prosocially to, perform better with, and bond more with others that resemble themselves in some way. Contradictory to these findings, results show that similarity plays a very small role as consideration to act prosocially. Interestingly, emotional closeness, maybe also a form of similarity, is found is of larger influence in the situations of this survey. The results suggest that it is of great importance when lending an item of value (such as a phone, money or jacket): in this occasion it was the highest factor of all the results in this survey. It could also be that people do not (want to) admit they are discriminating based on similarity with the person in need, and think it might be more socially accepted to favor people they are close with, such as friends and family. This discrepancy between similarity and emotional closeness as an influence in prosocial decision making is interesting to research further.

Also, the role of self-report is an aspect that should be taken into account in future research, as well as in administrating and interpreting such measurements. As discussed in the *Literature review* of this thesis, reciprocity plays a role in prosocial development (Tomasello, 2019) and group performance (Declerck & Boone, 2016). However, reward (or better reputation), as a form of reciprocity is rated as the second lowest influential factor.

For situations in which there would be a higher cost, such as lending an item of value, reward was found to have a larger influence compared to other situations. Yet, still for that specific situation (i.e. lending item of value) it was the second lowest influence in the decision to act prosocially. As with similarity mentioned earlier, it could be the case that people do not (want to) admit reward or better reputation plays a role in their decision making.

Lastly, acuteness, i.e. how emergent the situation appears, has been found to be of great influence both in earlier research (e.g. Fisher et al., 2006) and this survey. Effectiveness and directly asked as influential factors are, surprisingly, mostly unsupported by literature. On the contrary even: increasing someone's knowledge and thereby their insight of how able or effective they could help, has been found to have no effect on the decision to help or not (Shotland & Heinold, 1985). It would be interesting to have these influences investigated further.

To conclude, this survey yielded interesting and potentially useful results. For each situation, the top 3 with most influential factors was determined and was used in Part 2 to write the interactive narrative. Future studies are advised to take the gap between self-report and observations into account. Moreover, more reliable results can be obtained from random sampling; convenience sampling might have influenced or biased the results from this part of the study.

Method

Interactive narrative – For each situation a short story or vignette was written, see *Figure 2* below, mentioning its top 3 influential factors found in Part 1 explicitly. These formed the basis for the narrative of the *PIN*.

Situation 1 – Charity donation

The wedding of a cousin is on a sunny Saturday and you have a great time, enjoying the music and food. You are chatting about work with another **cousin, one you're very close with**. Your cousin is also doing volunteer work for a NGO company. The company is doing good work in the battle against global warming. Your cousin is now involved in a campaign aimed to raise money and awareness. The money will be invested in a new and sustainable way of energy generation. The method has been **scientifically developed and proven and has a high efficiency**. Your cousin **asks you** for a monetary donation of **10 euros**. You take a look in your wallet and see that you **have a 10 and 20 euro note**.

Situation 2 – Falls on the streets

On your way to the store, you see someone walking across the streets carrying a large shopping bag. You walk on, thinking about how to make dinner. But then you suddenly hear a sound. You see the person across the street **lying on the pavement** and all the groceries from the bag are scattered around them. By quickly assessing the situation you conclude the person **must have tripped over the curb**. At this point, the person starts to **cry** and you see that their foot is bend in a weird direction. Is it **broken**? You are thinking about crossing the streets to help, maybe **you could call for help, provide first aid or pick up the groceries**.

Situation 3 – Helping moving

You turn on the TV and after zapping a bit you find a documentary about World War II. It is interesting for a while, but then you see your phone light up. It is **your sibling** calling. Your sibling is moving out their house and there is a heavy closet that needs to be carried downstairs into the moving van. Together with some other people **this should be doable**. Your sibling **asks you** to come over and help with moving the heavy closet.

Situation 4 – Helping in queue

In the supermarket you walk through the aisles and find the items of your list. You walk in the direction of the check-out counter, but are surprised by the long queue. You take out your phone from your pocket to check your messages while you wait your turn when suddenly someone pats you on the shoulder. You turn around and there is a lady with a baby carriage. She looks rushed while she **asks**: "Do you mind if I go first in line? I have **another child waiting in my car** and I only need to buy this." She holds up a carton of milk.

Situation 5 – Picking up item

While you wait for the people to move out the train, you glance at the window and you see your next connection departing from the adjacent platform. Great. Your next train leaves in 15 minutes, so you **don't have to hurry anymore** now. You step out the train and walk over the other side of the platform. A woman walking in front of you is looking in her bag and while she takes something out, you see a note of **20 euros** falling down from her bag to the floor. She **doesn't notice it** while looking at her phone.

Situation 6 – Helping searching item

Your colleague comes to you and is **looking like she could burst into tears**. She lost an USB stick and needs it for the meeting that is in 45 minutes. She **asks you** to help her look for it. You're inclined to say yes, because you have **a feeling of the places where it could be.** However, you still need to answer two important emails and go through the agenda with your supervisor before the meeting.

Situation 7 – Giving direction

You decide to go for a walk in the park. To get to the park, you first have to walk ten minutes through the city center. **You've lived here for a while now, what is it? Five years**. You pass your favorite coffee bar and your hairdresser. You're almost near the park and you think about which route you are going to take through the park. In front of the park, there is a city map and a young teenager is looking at it. The teenager looks a bit **shabby and is clearly in distress**. While you pass by, the teenager **asks you** if you know the way to the police station. **You know this, you're familiar with the city.**

Situation 8 – Lending item of value

Your best friend is throwing a big party, it takes a while for you to even find her. You congratulate her and hand over her present. You chat about some small things, but you also see some other friends to talk to. Later, after some dancing and drinking, you find yourself talking to your best friend's boyfriend. You're reminiscing about the weekend away you all spend together. At that point, **your best friend** comes up to you and asks you if she could borrow **your new phone**. Hers is out of battery and she **wants to make a call** outside.

Figure 2. Short stories or vignettes of the eight situations written for the Prosocial Interactive Narrative.
In each vignette, its top 3 influential factors, based on the results from Part 1, is mentioned explicitly (here bold blue).

The vignettes were subsequently put into the software Twine (Klimas, 2019), to add different options for the reader to choose from and to keep track of variables (such as a score). Interactivity, by giving the reader options, is a method to make a story non-linear. Non-linearity in storytelling allows for the narrative to be told in a different order. This can be done achronological (e.g. when a character thinks about some event in the past or future) or by choosing different narrative paths in a fork. These paths can converge back to the main line or diverge into their own storyline. Moreover, giving the reader options to choose different paths might increase their feelings of agency and empathy, and immerse them in the story (see e.g. Hand & Varan, 2008; Green & Jenkins, 2014). These effects of an interactive narrative might help to overcome part of the unrealism these vignettes have as they are situated on a computer screen. It was expected that by designing the measuring method in this way, people would answer most prosocial and the narrative would pick up prosociality as a trait best.

To enhance the experience of reading a narrative and being engaged in the story, different "side situations" were created that had nothing to do with a prosocial decision. This included a story about reading a book at home, flipping through a recipe magazine, watching a TV documentary, and taking a break at work in the office. Decisions that people made in these situations, such as choosing what dish to make for dinner or either drinking coffee or answering emails, were not taken into account for prosociality. Instead, these decisions were taken into account as variables throughout the story to make the narrative more engaging and life-like.

However, to guarantee that users choosing different paths in the non-linear story still have comparable results, only one fork was implemented. The used software allows for many forks, with the possibility to make a narrative non-linear in many ways. However, for the purpose, time frame, and participants' experience of this study, this complexity was not needed nor wanted. At the very beginning, the implemented fork directed the user to different "side situations". This only changed the order in which the "side situations" were passed, but not the order of the situations that mattered for measuring prosociality. The order of the stories from *Figure 2* (previous page) is: Situation 3 – Situation 2 – Situation 4 – Situation 8 – Situation 7 – Situation 6 – Situation 5 – Situation 1.

A variable kept track of participants prosociality score. In each of the eight situations in the narrative, the subject was provided with three possible decisions. A decision was either 0 points worth: the subject would then choose not to help or act prosocial. Or it was scored 1 or 2, for being prosocial or very prosocial respectively. Scoring very prosocial, thus scoring 2 for the decision, contained an action whereby the actor would go "the extra mile" in helping. To give two examples, when asked for 10 euros as a charity donation, the subject could opt to give 20 euros. Consequently, deciding to give 10 euros scored 1, choosing a donation of 20 euros scored 2 for that situation. Secondly, when asked to help a sibling move a heavy object out of their house, subjects could choose not to help, to help right now or two days later. Not helping was scored 0, the "later" option was scored 1, and the "now" option was scored 2, for this last one being the most prosocial option (given the context). See *Appendix B* for a table showing the options for each situation.

Website - Lastly, a MySQL database was set up on a server of Leiden University. The ability to retrieve the prosociality score variable from the HTML file that Twine outputs was created by using PHP scripts, JavaScript and SQL. [2] Together with a hashed participant ID, this variable was stored in the database, see *Appendix C* for screenshots of the hosted website and database. The hashed ID number is used in analysis to couple participants' scores from the *PIN* to the data from a survey that asked about their demographics and their scores on validation questionnaires (see *Procedure* below). Moreover, the website provided the use of different pipelines, using PHP and JavaScript, that were needed for using the external software and platforms mentioned in *Procedure* and *Participants*. It was possible to login and partake in the study with credentials or with an anonymous link. However, to guarantee anonymity of the data, only this last option was eventually used in the study.

Procedure – Participants entered the study by clicking on a link that brought them to the website. They landed on a welcome page (see *Appendix C* for screenshots), where they read instructions of and gave consent to the first part, consisting of the *PIN* test. After reading the stories and making the decisions, they ended up on a page with a submit button, saying that by pressing "Submit", they would continue to an external page with additional questions. It also stated the necessity, for validation purposes, of completing the next part of the study as well. Participants pressed submit, and with this, their data from the *PIN* test was stored in the database and they were referred to the second part on an external website, using Qualtrics (2019).

Participants first saw again a welcome page, where they again read instructions of and gave consent to the second part. Next, their gender, their age, whether English was their mother tongue, their understanding of the written English language, and their highest completed level of education were asked.

To validate the new measurement method, three existing questionnaires were subsequently administered. These questionnaires, as discussed earlier, measure (an aspect of) prosociality effectively and can therefore be used as concurrent validation measurements. Questionnaire A consisted of the 7 items from *Community Feeling* domain of the *Aspiration Index* from Kasser & Ryan (1993). They were rated on a 5-point Likert-scale for two dimensions: (1) personal importance (1 = not at all, to 5 = very high) and (2) likelihood of attaining them in the future (1 = very low, to 5 = very high). Questionnaire B was the *Prosocial Tendency Measure* in total from Carlo & Randall (2002). The 23 items were rated on a 7-point Likert-scale on how well it describes the subject (1 = Does not describe me at all, to 7 = Describes me greatly).

Questionnaire C contained the 4-item questionnaire called *Prosocial Behavioral Intentions Scale* by Baumsteiger & Siegel (2019). The items were rated on a 7-point Likert-scale on how willing the subject would be to perform each stated behavior (1 = Definitely would not do this, to 7 = Definitely would do this).

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[2] All PHP, SQL and JavaScript code necessary for the workings of the database and website are a product of collaboration with and property of Martijn Wester.

In questionnaire C (*PBIS*) an attention check was added, in order to differentiate serious and unserious or inattentive responses, mainly from participants accessing the study via the platform stated in paragraph *Participants*.

Analysis – Participants' scores and other information were processed and analyzed using RStudio (RStudio Team, 2020).

Participants – The study was fully completed by 119 participants; the *PIN* test was completed by 4 more participants, who were excluded in analysis due to incomplete data. Next, another 17 participants were excluded from the dataset, because they either failed an attention check or their data was unusable for some other reason, e.g. unserious attempt. The evaluated responses from participants were assessed as unserious based on a combination of submission time (below five minutes or over 20 minutes for the items in Qualtrics alone) and a suspicious pattern. Moreover, participants submitting these responses and times often indicated a poor understanding of the English written language as well. These factors combined led to the conclusion to exclude them from further analysis. See *Appendix D* for screenshots of such suspicious patterns labeled as unserious attempt.

A group of participants (n = 27) was recruited from own personal social networks, by asking personally, via social network sites and group chats. It should be noted that there is some overlap between this group of participants and those in Part 1 of the study. Because the results from Part 1 were gained anonymously, the exact overlap is unknown, but estimated to be around 10 people (based on the number of people who provided the researcher with feedback about the studies).

To conclude, the definite sample consisted of 102 participants, of which about three quarters (n = 75) were recruited from Prolific's crowdsourced platform (Prolific, www.prolific.co). Another 27 participants were recruited from the researcher's personal networks.

Age	M = 29.68, SD = 12.214
Gender	Men = 57.8%, Female = 41.2%, Other = 1%
English as mother tongue	Yes = 30.4%, No = 69.6%
Understanding of the written English language	Poor = 2%, Moderate = 2%, Good = 25.5%, Very good = 70.5%
Highest completed level of education	High school or lower = 35.3%, Trade school (Dutch MBO) = 10.8%, Bachelor's degree of applied sciences (Dutch HBO) = 9.8%, Bachelor's degree of university (Dutch WO) = 25.5%, Master's degree = 16.6%, Ph.D. or higher = 2%

Table 4. Demographic information from participants completing study (N = 102).

On average, participants (N = 102) were 29 years old and predominantly male (57.8%), see *Table 4*. Overall, 30.4% had English as mother tongue and over half (53.9%) of all participants had completed some form of higher education. 96% of all participants rated their understanding of the English language as good or very good.

Participants first completed the *Prosocial Interactive Narrative (PIN)*; on average it took them 12 minutes and 42 seconds to complete the entire narrative[3]. Overall mean scores were calculated (M = 1.52, SD = 0.22). These indicated that, on average, participants chose to act prosocially on every situation (choosing to act prosocial on every situation gives one at least a mean score of 1). This can also be seen from *Figure 3* below. Overall, participants chose the prosocial and very prosocial options in 40.8% and 55.8% of the situations respectively. The non-prosocial option was only chosen in 3.4% of all cases.
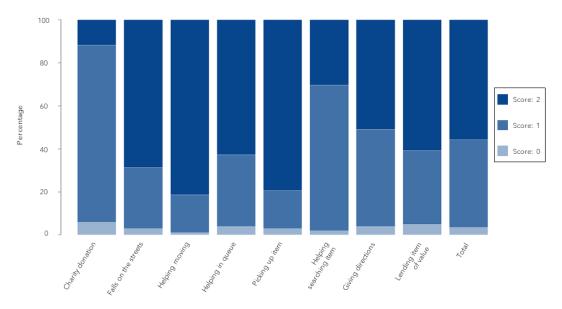

Figure 3. Stacked bar plot showing the proportional distribution of the responses on the Prosocial Interactive Narrative (N=102).

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[3] Five participants completed the *PIN* in more than 45 minutes, indicating they left their browsers open for a while before returning and completing. They were therefore excluded in this calculation.

Correlations between mean test scores on the PIN, *Aspiration Index (AI (CF)*; Kasser & Ryan, 1993), the *Prosocial Tendency Measure (PTM*; Carlo & Randall, 2002), versus the demographic variables (e.g. age, gender, etc.), were all relatively small and mostly non-significant. The rating of understanding of written English correlated positively, but low and significant with scores on the AI (CF) (ρ =.27, p < .01) and scores on the PBIS (ρ =.22, p < .01). Level of education mattered somewhat for the scores on AI (CF) (ρ =.22, p < .05). As expected, a moderate significant correlation between mother tongue as English and understanding of the English written language was found (ρ =.33, p < .001). Lastly and not surprisingly, level of education correlated somewhat with age (ρ =.38, p < .0001).

Measurement	Means scores and standard deviations	Cronbach's alpha (missing values excluded from sample)
The Prosocial Interactive Narrative (scale range 0-2)	M = 1.52, SD = 0.22	α = ,359 (N = 102)
The Aspiration Index (Community Feeling domain) (scale range 1-5)	M = 3.51, SD = 0.64	α =.852 (N = 102)
The Prosocial Tendency Measure (scale range 1-7)	M = 2.68, SD = 0.49	α =.807 (N = 97)
The Prosocial Behavioral Intentions Scale (scale range 1-7)	M = 5.18, SD = 0.73	α =.618 (N = 101)

Table 5. Mean scores and standard deviations on the four measurements of this study (N = 102).

Internal reliability – Firstly, to determine the correlations between the questions to see whether the PIN is internally consistent, Cronbach's alpha was calculated. Being below an acceptable benchmark value of 0.6, the low Cronbach's alpha (α = .359) suggests that the questions of the PIN have a high error of measurement and do not overall measure the same construct (i.e. prosociality). Deleting the two lowest correlating items (situations *Falls on the streets* and *Giving directions*) did not yield a better alpha (α = .416). Correlations between the scores on the different items did not exceed the crucial value (r = 0.30). Moreover, the data does not pass any further assumption testing for factor analysis (Kaiser-Meyer-Oklin = .55 and Bartlett's test *p* $\approx$ .54). Therefore, the PIN could not be further internally validated.

	PIN	AI (CF)	PTM	PBIS
PIN	1			
AI (CF)	.29 (*p < .01*)	1		
PTM	.19 (*p $\approx$ .057*)	.35 (*p < .001*)	1	
PBIS	.47 (*p < .0001*)	.30 (*p < .001*)	.21 (*p < .05*)	1

Table 6. Correlations and their p-values between the scores on the four measurements (N = 102).

Concurrent validity - Mean scores and standard deviations on the PIN, AI (CF), PTM, and PBIS are displayed in *Table 5* above The Cronbach's alpha was determined for these measurements as well, to see if the low alpha for the PIN was possibly caused by overall measurement errors, such as external factors. This was not the case, internal reliability for these measurements were acceptable (alpha above 0.6) to good (alpha above 0.7), see also *Table 5* above for these values.

Spearman's ρ (instead of Pearson's ρ) was calculated to investigate the correlation between the PIN, AI (CF), PTM, and PBIS, because all four measurements were rated on an ordinal measuring scale. The PIN and PBIS have a moderately strong positive and significant correlation ($\rho = .47$, p < .0001). The PIN and AI (CF) have a low and positive, but significant correlation ($\rho = .29$, p < .01). The PIN and PTM however, had a weak positive correlation, just over significance level ($\rho = .19$, p $\approx$.057). See *Table 6* on the previous page for all correlations.

Part 2 of this thesis tried to answer the research question: *How effective is measuring prosocial behavior through an interactive narrative in Twine as a psychometric method?* Analysis showed low internal consistency by low correlations among the different items. The *Prosocial Interactive Narrative* could therefore not be proven as a reliable single factor measuring method. However, the *PIN* showed promising correlations in relation to other existing measurements. They suggest that the PIN measures prosociality effectively, especially taking the moderately strong correlation into account with the *Prosocial Behavioral Intentions Scale* from Baumsteiger and Siegel (2019), which has been shown to be a valid and reliable measure of prosociality. This concurrent validity and the high values of the scores on the *PIN* test imply that, even though the *PIN* could not be proven to be a reliable single-factor measurement method, it measures prosocial behavior on multiple dimensions or facets of prosociality.

The results depict how the *PIN* was designed in the first place; the influential factors from the different dimensions were manipulated and used in each situation specifically. How the situation was framed and its relation to the decision to help was found by Carlo and Randall (2002) in their study on the development of the *Prosocial Tendency Measure* as well. Different kinds of situations tend to elicit helping behaviors in people with different personality characteristics. Moreover, as mentioned in Amato (1990) prosociality does not rely solely on either situational or personality factors; it is a combination of those two, originating from participation in a social environment. Therefore, the *PIN* takes this into account by framing the situations in a certain way to maximize the number of prosocial decisions. The design of the *PIN* was based on the results of the first survey, which was in turn based on the findings from the literature review. Developing the *PIN* in this way clearly had this result; the non-prosocial option was rarely chosen. However, the individual situations still differ too much from each other to measure all the dimensional aspects of prosociality together as being the "prosocial trait". As an explanation for these results for instance, Dunfield (2014) identified three distinct forms of helping behavior in response to three different kinds of situations. It could be that the situations of the *PIN* also demand their unique form of helping. This is something that can be investigated further, by e.g. experimenting with the stated answer options to see if they ask a different form of helping.

As mentioned, the results from Part 1 were used in the *PIN* to evoke prosocial decisions. Instead, the results from Part 1 can also be used to not evoke them, by using the factors that mattered least. It would be interesting to research this possibility and see the effect on the decision to help or not. Amato (1990) showed spontaneous helping to occur more often in strangers than in friends. And perhaps, by using the least most influential factors, prosocial decision making would occur even more, since it might elicit prosociality more spontaneously. Taking this into account, future research should provide a more solid conclusion on this.

Also, there were no significant correlations found between the score of the *PIN* and ratings on English language skills and levels of education. This suggests that performances on the *PIN* test do not relate to semantic understanding of its language. By using certain English words in the *PIN* (e.g. "dire" or "shabby"), a certain understanding was assumed, however, this was a difficulty in creating the *PIN*. Moreover, these results imply that the *PIN* can be used with or administered to people that function on different levels of education or English skills.

Lastly, as with Part 1 from this study, part of the participant sample was obtained via convenience sampling (n = 27). Although there was some overlap between the samples (N =31 in Part 1 versus n =27 in Part 2), obtained this way via personal network, they overall comprised of different people. Nonetheless, this non-random sampling has to be taken into account in generalizing the results of this study. As mentioned in Part 1, convenience sampling can affect the data negatively due to shared factors (e.g. genes, culture, location, etc.) among subjects.

General conclusion

In this thesis, prosociality as a multidimensional concept was researched. The literature review showed many influential factors to play a role. Based on these literary supported factors, this graduation research first set out to investigate the different influential factors for specific situations in Part 1. By means of a survey, it was investigated which of the ten different factors in eight specific situation people considered most important in the decision to help. This study also identified the overall three most important factors of a prosocial decision: (1) whether someone believed their help to have a positive effect, (2) how acute the situation is, and (3) whether the help is directly asked.

For each of the situations individually, a top 3 of most influential factors was compiled that was used to write the *PIN* in Part 2. The *PIN* was put to the test together with existing methods to determine whether the *PIN* measures prosociality effectively. The PIN was found to measure prosociality in some way, but other than expected. The data depicted the multidimensionality of prosociality and did not prove to be internally reliable as a single factor measurement. However, due to high mean scores and its moderate significant correlations with existing methods, it can be concluded that the PIN is a valuable measurement in the research on prosociality.

The value of the *PIN* lies in the way it measures prosocial behavior on multiple dimensions or aspects. The narrative describing all the situations, or "vignette method", allows for more ecological validity than standard self-reports, since it is less hypothetical and people might be more engaged in the story. The *PIN* is also less subjective than observational methods by providing the reader with standard and limited options, that are the same for everyone. The *PIN* has the advantage to give cognitive reasons in its answer options and is therefore a middle ground between current behavioral measurements and the self-report questionnaires. The effect of the different provided answers, i.e. the possibility to mention considerations in the answer options, how this correlates with the influential factors, and the number of possible decisions that a participant can make, should be investigated further.

Moreover, it would be interesting to see in future research on what dimensions, or what aspects, of prosociality the *PIN* is an effective measurement. The *PIN* now makes a tradeoff between the certain behaviors and factors that normally are either picked up by observational measurements or self-reports. The bystander effect (Latané & Darley, 1968) is a good example of this. In Part 1 of this study, it was not picked up as an influential factor, whereas all kinds of studies describe this phenomenon on a whole spectrum of situations (see e.g. Fisher et al., 2011). Furthermore, intentions and personality characteristics, normally measured through self-reports, are not expressed directly or recognized in behavioral measurements. This middle ground between the behavioral and self-report methods, and the different kinds of trade-offs that it subsequently makes, should be explored further.

This study had some limitations that need to be taken into account in future research of prosocial behavior. Firstly, the sample of Part 1 and a quarter of the sample in Part 2 were obtained by convenience sampling and are relatively small. A larger and more random sample should improve the generalizability of the data. Secondly, it could be that antisocial people are not willing to participate in research studies as these. Meaning, it could be that while investigating prosociality, this research only contains samples of prosocial people, since they like to help others, society, and maybe in this case science. Thirdly, this study was done during the COVID-19 pandemic in Spring 2020, which might have (yet unknown) effects on the outcomes of research. Dutch media in time of the pandemic propagated prosocial behaviors such as doing groceries for others. Moreover, caring for a sick loved one (one of the prosocial behaviors identified in e.g. Baumsteiger and Siegel, 2019) could have been an issue for many people during this time frame. One could think of many examples during this time that might have influenced the prosocial attitudes of participants in this study. However, these factors are unknown and beyond the scope of this research.

Finally, the vignette method could also work for other psychological constructs as well, and would be interesting to see this researched. The functions of Twine, such as adding more interactivity, non-linearity or multimedia, can also be further explored and might add something valuable to the field of psychometrics. Unfortunately, investigating this was something that was not possible given the time frame and purpose of the study. What these Twine functions effectively add to a psychometric method as the *PIN* should be investigated and could yield valuable information as well.

References

Adolphs, R. (1999). Social cognition and the human brain. Trends in Cognitive Sciences, 3 (12), 469–79.

Amato, P. R. (1990). Personality and social network involvement as predictors of helping behavior in everyday life. *Social Psychology Quarterly, 53*, 31-43.

Apperly, I. (2010). *Mindreaders: The Cognitive Basis of "Theory of Mind"* (1st ed.). Psychology Press.

Balliet, D. (2010). Communication and cooperation in social dilemmas: A meta-analysis. *Psychological Bulletin, 139*, 1090-1112.

Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102*, 4-27.

Bargh, J. A., & Morsella, E. (2008). The unconscious mind. *Perspectives on Psychological Science, 3, 73–79.*

Barnes, P. A. P. J. (2000). *Aristotle: A Very Short Introduction* (Vol. 32). Oxford University Press.

Barnett, M. A. (2007). Moral development. In K. D. Vohs & R. Baumeister (Eds.), *Encyclopedia of Social Psychology (2 Volume Set)* (1st ed., Vol. 2, pp. 586–587). SAGE Publications, Inc.

Barrett, H. C., Cosmides, L., & Tooby, J. (2010). Coevolution of cooperation, causal cognition and mindreading. *Communicative and Integrative Biology, 3*, 522–524.

Batson, C. D., & Shaw, L. L. (1991). Evidence for altruism: Toward a pluralism of prosocial motives. *Psychological Inquiry, 2*, 107–122.

Batson, D. C., Batson, J. G., Slingsby, J. K., Harrell, K. L., Peekna, H. M., & Todd, R. M. (1991). Empathic joy and the empathy-altruism hypothesis. *Journal of Personality and Social Psychology, 61* (3), 413-426.

Baumsteiger, R. & Siegel, J. T. (2019). Measuring prosociality: The development of a prosocial behavioral intentions scale. *Journal of Personality Assessment, 101*(3), 305-314.

BBC News Europe. (2003, May 19). Liquidising goldfish "not a crime." *BBC News Europe.* http://news.bbc.co.uk/2/hi/3040891.stm.

Beyer, F., Sidarus, N, Bonicalzi, S., & Haggard, P. (2017). Beyond self-serving bias: Diffusion of responsibility of agency and outcome monitoring. *Social Cognitive and Affective Neuroscience, 12*, 138-145.

Bogaert, S., Boone, C., & Declerck, C. (2008). Social value orientation and cooperation in social dilemmas: A review and conceptual model. *British Journal of Social Psychology, 47*, 453-480.

Boogaerdt, H. (2010, March 24). *"Helena" by Marco Evaristti.* Art & Electronic Media. https://artelectronicmedia.com/artwork/- 34 -tanfo-by-marco-evaristti/

Boone, C., Declerck, C. H., & Suetens, S. (2008). Subtle social cues, explicit incentives and cooperation in social dilemmas. *Evolution and Human Behavior, 29*, 179-188.

Burke, D. M., & Hall, M. (1986). Personality characteristics of volunteers in a Companion for Children program. *Psychological Reports, 59*, 819–825.

Burnham, T., McCabe, K., & Smith, V. L. (2000). Friend-or-foe intentionality priming in an extensive form trust game. *Journal of Economic Behavior & Organization, 43*, 57-73.

Calder, T. (2020). The Concept of Evil. In N. Zalta (Ed.) *The Stanford Encyclopedia of Philosophy (Summer 2020 Edition)*. Retrieved from https://plato.stanford.edu/archives/sum2020/entries/concept-evil/.

Cappelen, A. W., Nielsen, U. H., Sorensen, E. O., Tungodden, B., & Tyran, J. (2013). Give and take in dictator games. *Economic letters, 118*, 280-283.

Carlo, G, Okun, M. A., Knight, G. P., & de Guzman, M. R .T. (2005). The interplay of traits and motives on volunteering: agreeableness, extraversion and prosocial value motivation. *Personality and Individual differences, 38*(6), 1293-1305.

Carlo, G. & Randall, B. A. (2002). The development of a measure of prosocial behaviours for late adolescents. *Journal of Youth and Adolescence, 31*, 31-44.

Chekroun P. & Brauer M. (2002). The bystander effect and social control behavior: the effect of the presence of others on people's reactions to norm violations. *European Journal of Social Psychology, 32*(6), 853-67.

Cialdini, R. B., Schaller, M., Houlihan, D., Arps, K., Fultz, J., & Beaman, A., L. (1987). Empathy-based helping : Is it selflessly or selfishly motivated? *Journal of Personality and Social Psychology, 52* (4), 749-758.

Coke, J. S., Batson, C. D., & McDavis, K. (1978). Empathic mediation of helping: A two-stage model. *Journal of Personality and Social Psychology, 36,* 752–766.

Cole, T. & Teboul, J. C. B. (2004). Non-zero-sum collaboration, reciprocity, and the preference for similarity: Developing an adaptive model of close relational functioning. *Personal Relationships, 11,* 135-160.

Darley, J. M. & Batson, C. D. (1973). From Jerusalem to Jericho: A study of situational and dispositional variables in helping behavior. *Journal of Personality and Social Psychology, 27*, 100-108.

De Waal, F. (2006). *Primates and Philosophers.* Princeton: Princeton University Press.

DeBruine, L. M. (2002). Facial resemblance enhances trust. *Proceedings of the Royal Society of London Series B-Biological Sciences, 269*, 1307-1312.

Declerck, C., & Boone, C. (2016). Neuroeconomics of prosocial behavior: The compassionate egoist. Cambridge, MA: Academic Press Elsevier.

Dovidio, J. F., Piliavin, J. A., Gaertner, S. L., Schroeder, D. A., & Clark, R. D. III. (1991). *Thearousal: Cost-reward model and the process of intervention: A review of the evidence.* In M. S. Clark (Ed.), Review of Personality and Social Psychology, 12 (pp. 86-118). Thousand Oaks, CA, US: Sage Publications, Inc.

Dunbar, R. I. M. & Schulz, S. (2007). Understanding primate brain evolution. *Philosophical Transactions of the Royal Society, 362*, 649–658.

Dunbar, R. I. M. (1998). The social brain hypothesis. *Evolutionary Anthropology, 6*(5), 178-190.

Dunfield, K. (2014). A construct divided: prosocial behavior as helping, sharing, and comforting subtypes. *Frontiers in Psychology, 5*, 958.

Eisenberg, N. (1991). Values, sympathy, and individual differences: Toward a pluralism of factors influencing altruism and empathy. *Psychological Inquiry, 2*, 128–131.

Eisenberg, N., Cameron, E., Tryon, K., & Dodez, R. (1981). Socialization of prosocial behavior in the preschool classroom. *Developmental Psychology, 71*, 773–782.

Eisenberg, N. & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin, 101*, 91-119.

Eisenberg, N. & Spinrad, T. L. (2014). *Multidimensionality of prosocial behaviour*. In Padilla-Walker, L. M. & Carlo, G. (Eds.), Prosocial Development (pp. 17-39).

Eisenberg, N., Shea, C. L., Carlo, G., & Knight, G. P. (1991). Empathy related responding and cognition: A "chicken and the egg" dilemma. In W. Kurtines & J. Gewirtz (Eds.), *Handbook of moral behavior and development: Vol. 2. Research* (pp. 63–88). Hillsdale, NJ: Erlbaum.

Fisher, P., Greitemeyer, T., Pollozek, F., & Frey, D. (2006). The unresponsive bystander: Are bystanders more responsive in dangerous emergencies? *European Journal of Social Psychology, 36*, 267-278.

Fisher, P., Krueger, J. I., Greitemeyer, T., Vogrincic, C., Kastenmüller, A., Frey, D., Heene, M., Wicher, M., & Kainbacher, M. (2011). The bystander-effect: A meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychological Bulletin, 137*(4), 517-537.

Frith, C. D. & Singer, T. (2008). The role of social cognition in decision making. *Philosophical Transactions of The Royal Society B-Biological Sciences, 363*(1511), 3875-3886.

Gamble, C., Gowlett, J., & Dunbar, R. (2018). *Thinking Big*. Thames & Hudson.

Gansberg, M. (1964, March 27). 37 Who Saw Murder Didn't Call the Police. *The New York Times*. Retrieved from https://www.nytimes.com.

Ghiselin, M. T. (1974). *The Economy of Nature and the Evolution of Sex*. Berkeley, CA: University of California Press.

Gigerenzer, G., Todd, P. M., & The ABC Research Group (1999). *Simple Heuristics that Make Us Smart*. New York: Oxford University Press.

Graziano, W. G., & Eisenberg, N. H. (1997). Agreeableness: a dimension of personality. In R. Hogan, J. Johnston, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 795–824). San Diego, CA: Academic Press.

Graziano, W. G., Habashi, M. M., Sheese, B. E., & Tobin, R. M. (2007). Agreeableness, empathy, and helping: A person × situation perspective. *Journal of Personality and Social Psychology, 93*(4), 583–599.

Green, M. C. & Jenkins, K. M. (2014). Interactive narratives: Processes and outcomes in user-directed stories. *Journal of communication, 64* (3), 479-500.

Hand S. & Varan D. (2008) Interactive Narratives: Exploring the Links between Empathy, Interactivity and Structure. In: Tscheligi, M., Obrist M., & Lugmayr A. (eds) Changing Television Environments. EuroITV 2008. Lecture Notes in Computer Science, vol 5066. Springer, Berlin, Heidelberg.

Hawley, P. H. (1999). The ontogenesis of social dominance: A strategy-based evolutionary perspective. *Developmental Review, 19*, 97-132.

Hawley, P. H. (2014). Evolution, prosocial behavior, and altruism. In Padilla-Walker, L. M. & Carlo, G. (Eds.), *Prosocial Development* (pp. 43-69).
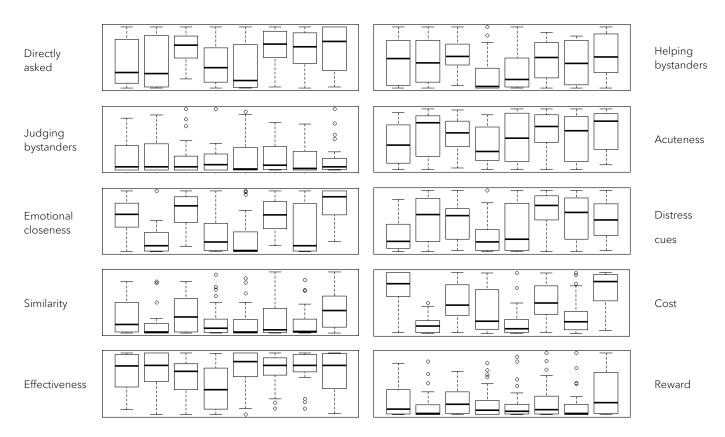
Hilbig, B. E., Glöckner, A., & Zettler, I. (2014). Personality and pro-social behavior: Linking basic traits and social value orientations. *Journal of Personality and Social Psychology, 107*(3), 529-539.

Hoffman, E., McCabe, K., & Smith, V. L. (1996). Social distance and other-regarding behavior in dictator games. *American Economic Review, 86*, 653-660.

Hopkins, N., Reicher, S., Harrison, K., Cassidy, C., Bull, R., & Levine, M. (2007). Helping to improve the group stereotype: On the strategic dimension of prosocial behaviour. *Personality and Social Psychology Bulletin, 33*(6), 776-788.

Kahneman, D., Knetsch, J. L., Thaler, R. H. (1986). Fairness as a constraint on profit seeking: Entitlements in the market. *The American Economic Review, 76*(4), 728–741.

Kasser, T. & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology, 65*, 410-422.

Kiesler, S., Sproull, L., & Waters, K. (1996). A prisoner's dilemma experiment on cooperation with people and human-like computers. *Journal of Personality and Social Psychology, 70*, 47-65.

Klimas, C. (2019, October 7). *Twine* [Software]. Retrieved October 10, 2019, from http://twinery.org.

Kosek, R. B. (1995). Measuring prosocial behaviors of college students. *Psychological Reports, 3*, 739–742.

Kurzban, R., DeScioli, P., & O'Brien, E. (2007). Audience effects on moralistic punishment. *Evolution and Human Behavior, 28*, 75-84.

Laakasuo, M., Rotkirch, A., van Duijn, M., Berg, V., Jokela, M., David-Barrett, T., Miettinen, A., Pearce, E. and Dunbar, R. (2020). Homophily in personality enhances group success among real-life friends. *Frontiers in Psychology. 11,* 710.

Latané, B. & Darley, J. M. (1968). Group inhibition of bystander intervention in emergencies. *Journal of Personality and Social Psychology, 10*(3), 215-221.

Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?* New York: Appleton Century-Crofts.

Lee, V. K. & Harris, L. T. (2013). How social cognition can inform social decision making. *Frontiers in Neuroscience, 7*, 259.

Madsen, E. A., Tunney, R. J., Fieldman, G., Plotkin, H. C., Dunbar, R. I. M., Richardson, J. M., McFarland, D. (2007). Kinship and altruism: A cross-cultural experimental study. *British Journal of Psychology, 98*, 339-359.

Marsh, A. A. & Ambady, N. (2007). The influence of the fear facial expression on prosocial responding. *Cognition and Emotion, 21*(2), 225-247.

Marsh, A. A. & Blair, R. J. R. (2008). Deficits in facial affect recognition among antisocial populations: A meta-analysis. *Neuroscience and Biobehavioral Reviews, 32*, 454-465.

Milgram, S. (1963). Behavioral study of obedience. *Journal of Abnormal and Social Psychology, 67*, 371-378.

Novacek, J., & Lazarus, R. S. (1990). The structure of personal commitments. *Journal of Personality, 58*, 693-715.

Nowak, M. A. & Sigmund, K. (2005). Evolution of indirect reciprocity. *Nature, 437*, 1291-1298.

Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science, 325*, 419-422.

Piazza, J. & Bering, J. M. (2008). Concerns about reputation via gossip promote generous allocations in an economic game. *Evolution and Human Behavior, 29*, 172-178.

Qualtrics (2019). Qualtrics [Software]. Provo, UT, USA. URL http://www.qualtrics.com.

Richerson, P. J., & Boyd, R. (2006). *Not by Genes Alone: How Culture Transformed Human Evolution* (First Edition). University of Chicago Press.

Rousseau, J., & Scott, J. T. (2012). *The Major Political Writings of Jean-Jacques Rousseau: The Two "Discourses" and the "Social Contract"* (Reprint ed.). University of Chicago Press.

Rstudio Team (2020). *Rstudio: Integrated Development for R*. Rstudio, PBC, Boston, MA URL http://www.rstudio.com/.

Rustagi, D., Engel, S., & Kosfeld, M. (2010). Conditional cooperation and costly monitoring explain success in forest commons managements. *Science, 330*, 961-965.

Saulin, A., Baumgartner, T., Gianotti, L. R. R., Hofman, W., & Knoch D. (2019). Frequency of helping friends and helping strangers is explained by different neural signatures. Cognitive, Affective, & Behavioral Neuroscience, 19, 177-186.

Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology, 53*, 550-562.

Shaw, L. L., Batson, C. D., & Todd, R. M. (1994). Empathy avoidance: Forestalling feeling for another in order to escape the motivational consequences. *Journal of Personality and Social Psychology, 67* (5), 879-887.

Sheldon, K. M., Sheldon, M.S., & Osbaldiston, R. (2000). Prosocial values and group assortation. *Human Nature, 11*(4), 387-404.

Shotland R., & Heinold W. (1985). Bystander response to arterial bleeding: helping skills, the decision-making process, and differentiating the helping response. *Journal of Personality and Social Psychology, 49*, 347- 56.

Smith, B. M., & Nelson, L. D. (1975). Personality correlates of helping behavior. *Psychological Reports, 37*, 307–310.

Smith, K. D., Keating, J. P., & Stotland, E. (1989). Altruism revisited: The effect of denying feedback on a victim's status to empathic witnesses. *Journal of Personality and Social Psychology, 57*, 641-650.

Thompson, L., Kray, L. J., & Lind, E. A. (1998). Cohesion and respect: An examination of group decision making in social and escalation dilemmas. *Journal of Experimental Social Psychology, 34*, 289-311.

Tinbergen, N. (1963). On Aims and Methods in Ethology. *Zeitschrift für Tierpsychologie, 20*, 410–433.

Tomasello, M. (2009). *Why we cooperate*. Cambridge, Massachusetts: MIT Press.

Tversky, A. & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and Biases. *Science, 185*(4157), 1124-1131.

Williams, K. D. (2007). Ostracism. *Annual Review of Psychology, 58*, 425-452.

van Duijn M. J. (2016). *The Lazy Mindreader. A Humanities Perspective on Mindreading and Multiple-Order Intentionality*. Ph.D. thesis, Leiden University, Leiden.

Yamagishi, T. & Sato, K. (1986). Motivational bases of the public goods problem. *Journal of Personality and Social Psychology, 50*, 67-73.

Yamagishi, T., Terai, S., Kiyonari, T., Mifune, N., & Kanazawa, S. (2007). The social exchange heuristic: Managing errors in social exchange. *Rationality and Society, 19*, 259-291.

Zimbardo. P. G. (2006). On rethinking the psychology of tyranny: The BBC prison study. *British Journal of Social Psychology, 45*, 47-53.

Appendix A

Boxplots depicting data from survey of Part 1

Boxplots per situation.
From left to right: (1) Charity donation, (2) Falls on the streets, (3) Helping moving, (4) Helping in queue,
(5) Picking up item, (6) Helping searching item, (7) Giving direction, (8) Lending item of value

Table with answer options for each situation in the Prosocial Interactive Narrative

1. Charity donation	• You love your cousin, but you think charities are a bottemless pit and want to keep your money. Therefore, you tell your cousin no. • You're happy to help in this way. If this money contributes to such a great cause and helps your cousin, you'll donate the 10 euros without any problem. • After talking about the charity work for half an hour, you got excited and give a little extra. You hand over the note of 20 euros.
2. Falls on the streets	• You hesitate, but it's not your job to help, so why should you? You continue your walk to the store. • Normally, you wouldn't do it, but you don't feel comfortable leaving the person there either. So, reluctantly, you go over to help. • It looks very serious and you're capable of helping, of course you will cross the streets to help this person.
3. Helping moving	• The longer you think about it, the more you think your sibling should ask someone else. You'll not do it. • You would like to help, but not right now. You'll suggest a later moment this week. • Of course you'll do it right away. You're happy to help your sibling and you'll do the groceries on your way home.
4. Helping in queue	• You really don't feel like it. 'Sorry, but I've had a long day as well and need to get home in time', you reply. • You hesitate, you've had a long day as well, but eventually you reply: 'Sure.'. • Of course, go ahead, ma'am. I have plenty of time.', you reply.
5. Picking up item	• You can use 20 euros. You maneuver your way over to the woman. When she moves further down the platform, you pick up the note and put in in your pocket. • Maybe she notices herself. You keep an eye on her and decide that if she doesn't notice it when the train arrives, or someone else tries to pick it up, you will go over there. • You walk over to the woman and point at the 20 euros. 'I saw it falling from your bag just now', you tell her.
6. Helping searching item	• She lost the USB stick, so she should solve the problem herself. You apologize, but you have to do your tasks before the meeting. • You tell her to continue searching and promise to help her in 20 minutes if she still hasn't found it by then. You can respond to the two important emails in the mean time. • Your colleague clearly needs your help, so you immediately join the search for the USB stick. The rest of your tasks can wait a little longer.
7. Giving directions	• You prefer to stay as far away from problems as possible and this teenager asks about the police for a reason. So you reply that you don't know either and can't help. • You walk over to the city map and point at the crossing where the police station is. So, if the teenager walks in the direction you came from, take the second street left and then after 100 meters, the police station is right around the corner. • The teenager must have a good reason to go to the police station and after giving the right directions, you ask if everything is ok and if you can help with anything else.
8. Lending item of value	• You don't feel comfortable lending your new phone to her. Can't she borrow it from her boyfriend, who is standing right here? • Your phone is new and you're very careful with it. So, if she returns it right away, it would be fine. • That's no problem, it's her birthday and she can borrow your new phone as long as she needs.

Answer options for each situation of *the Prosocial Interactive Narrative* ordered by
their score (0-1-2).

Appendix C
Screenshots of website developed and used for Part 2

Screenshots from website hosted on a server of Leiden University.
All PHP, SQL and JavaScript code needed for this website and database was written by Martijn Wester
Upper six images: content and design by Lilian Toonstra.
Bottom two images: developed by Martijn Wester and only visible to the researcher.

Unserious attempt example

Screenshot examples of responses on Questionnaire B (*PTM*; Kasser & Ryan, 1993), where a suspicious pattern is clearly shown. These responses were often accompanied with a short (under 5 minutes) or long (over 20 minutes) submission time. Together with participants' poor English comprehension, their responses were labeled as an unserious attempt.