

Helpers and Halos: Examining social evaluation
within the domain of prosocial behavior

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Abstract

Humans are not only universally prosocial (Tomasello, 2009) but also selective when engaging in prosocial behavior (Kuhlmeier, Dunfield, & O'Neill, 2014). Despite numerous observations of selective helping, the proximate mechanisms underlying this critical social behavior remain unclear. In a series of 3 studies, two possible evaluative mechanisms, *global evaluations* and *dispositional evaluations*, was examined, regarding how individuals identify and track good social partners. To test between these two possibilities, these studies varied the type of information participants had regarding an individual's characteristics and examined how this information influenced participants' partner choice decisions. The stimuli to be used in the latter two studies were normed (Study 1), and the items were finalized because these various descriptions across characteristics shared similar positive or negative valence. In Study 2, adults read descriptions of two characters varying on prosocial (Helpful and Generous), social (Prestigious and Considerate), or non-social (Attractive and Intelligent) characteristics. They were then asked to indicate who they preferred to help or interact with. Adults took both valence and specificity of characteristic described into account to make decisions, suggesting a flexible use of dispositional evaluations. Study 3 extended these findings by examining how 4-year-olds used similar characteristics to determine who to help, play with, and assign food to. Children appeared to engage in global evaluations - preferring to help, to play with, and to assign the preferred food to the positive characters regardless of specific characteristic described. Taken together, these results suggest that the evaluative mechanisms supporting selective prosociality change over development.

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Chapter 1. General Introduction

Prosocial behavior, defined as any voluntary behavior that aims to benefit another (e.g., Eisenberg, 1986), is universal and ubiquitous in human society (e.g., Tomasello, 2009; Henrich et al., 2005). Yet, the existence of this behavior poses an important theoretical puzzle because, from a strict survival of fittest perspective, indiscriminate prosociality creates challenges that can make it maladaptive for the survival of individuals (Hamilton, 1964). Specifically, prosocial behavior entails expenditure of personal resources (Axelrod, 1984) such as time, energy, money, or in extreme situations even life, often without immediate payoff. Individuals who are indiscriminately prosocial can be exploited by free-riders, that is, those who take advantage of others' prosocial acts without returning the efforts or contributions. A single free-rider in a group of cooperators can lead to the collapse of prosociality (Nowak, 2006). One might ask: why would "selfish genes" allow people to benefit others at a cost to themselves? A key insight into the solution to this puzzle came in the realization that prosocial acts can be selectively exchanged between individuals (e.g., Trivers, 1971) and that doing so minimizes the risk of being exploited by "free riders" (e.g., Bshary & Noë, 2003).

1.1. Reciprocity as an effective strategy

Given the costs and risks of prosocial behavior, there has been considerable interest in understanding how prosocial behaviors are maintained among unrelated individuals. Typically, reciprocity – cooperating with the cooperators, while not cooperating with the defectors – is identified as an important strategy. Reciprocity helps solve the problems of prosociality because initial costs can be repaid in future interactions. Theorists have identified two basic forms of reciprocity: one is *direct reciprocity* where the interaction takes place between two individuals A and B; A helps B because B previously helped A (Trivers, 1971). The other is *indirect reciprocity* where the interaction involves a third party C, A helps B because B previously helped C (Nowak & Sigmund, 2005). Reciprocity enables prosociality to be maintained because it is mutually beneficial such that the recipient benefits from the actor's initial investment and the actor's initial cost gets repaid by either the recipient or a third party. Importantly, though it is widely accepted that reciprocity supports the maintenance of prosocial behavior (e.g., Rand & Nowak, 2013), it is less clear what cognitive mechanisms support the maintenance of reciprocity. Sustainable reciprocity requires reliable give-and-take between individuals, but it is possible that

one's investment is directed towards a free-rider. A variety of models have attempted to address this issue including partner-control and partner-choice models.

1.2. Models: partner-control vs. partner-choice

In partner-control models, partners are set and individuals are forced to repeatedly interact with the same individual (e.g., Axelrod & Hamilton, 1981; Bull & Rice, 1991). The critical challenge in partner-control situations is to effectively prevent cheating by the partner. Partner-control models are clearly illustrated by the Iterated Prisoner's Dilemma (IPD; Axelrod & Hamilton, 1981). In the IPD, two players play multiple rounds of the game with each other; each player has the option to *Cooperate* (e.g., behavior that increases collective payoffs of both players) or *Defect* (e.g., behavior that increases immediate payoff of the defector but reduces the immediate payoff of the partner). In the typical payoff matrix of the Prisoner's Dilemma, the best payoff occurs when a player defects while the partner cooperates; the second best payoff occurs when both players cooperate; the third best payoff occurs when both defect; and the worst payoff occurs when a player cooperated while the partner defects. In IPD games, cooperation can evolve because players expect to meet again in subsequent rounds. One simple, yet effective, strategy that has been proposed to yield stable cooperation in the IPD is called "*tit-for-tat*": players start with cooperating and thereafter simply copy their partner's last behavior (Axelrod & Hamilton, 1981). Consequently, the reciprocal system gets maintained mainly through preventing the partner from defecting by defection in return (i.e., punishment).

Though widely supported by experimental studies, reciprocal behavior based on partner-control is relatively rare in more ecologically valid social interactions. First, partner-control models assume that individuals are trapped in dyad interactions and have no choice among different partners, which is not a valid assumption in typical social interactions. Second, partner-control poses a number of cognitive demands, such as memory, computational ability, and temporal discounting (Stevens & Hauser, 2004), which makes it a challenge for young children and nonhuman animals. Not surprisingly, human children do not demonstrate reciprocal behavior in partner-control situations until age 3 (e.g., Sebastián-Enesco, Hernández-Lloreda, & Colmenares, 2013; Warneken & Tomasello, 2013). Similarly, empirical evidence showing that animals use these strategies remains rare and controversial (Raihani & Bshary, 2011; Schino &

Aureli, 2017). In conclusion, partner-control strategies are relatively less frequent in social interactions, and less likely to be the simplest mechanism underlying cooperative interactions.

In contrast, partner-choice models assume individuals can freely choose their social partners, and the central theme of partner-choice is choosing, and being chosen as, good social partners (Bshary & Noë, 2003; Campenni & Schino, 2014). In other words, individuals identify good social partners based on their previous behaviors, strategically approaching cooperators and avoiding free-riders. Individuals maintain the interaction as long as the partner is cooperative and leave the interaction whenever the partner cheats or is non-cooperative. Partner-choice strategies enable an individual reap the benefits of cooperators and reduce exploitation by defectors by selectively interacting with good social partners (Aktipis, 2004). Thus, in partner-choice models, the general preference for good social partners helps maintain reciprocal systems, ultimately maximizing advantages of prosociality while minimizing costs and risks.

Compared with partner-control, the partner-choice model possesses advantages that make it prevalent in prosocial interactions (Schino & Aureli, 2017). First, partner-choice process entails minimal cognitive demands because individuals put minimal efforts into monitoring and remembering past interactions (Aktipis, 2004). Second, partner-choice strategies are purely cooperative in that individuals can safely ignore the defecting option. Moreover, because cooperators are generally preferred in social interactions and non-cooperators are socially excluded, partner-choice mechanisms can lead to escalating prosociality (Roberts, 1998; Barclay & Willer, 2007). Together, these advantages lead to increased ecological validity of partner choice strategies (Baumard, André, & Sperber, 2013; Schino & Aureli, 2017).

1.3. Prerequisites of partner-choice

The cognitive capacity to distinguish positive from negative potential social partners has been theorized to be a necessary cognitive mechanism supporting the evolution of our cooperative tendencies (Trivers, 1971). In order to effectively and reliably engage in partner choice behavior, it is necessary for individuals to be able to distinguish positive interactions from negative ones, use past behaviors to predict others' future behaviors, and use these evaluations to guide their approach towards those who are likely to be good social partners (Kuhlmeier, Dunfield, & O'Neill, 2014).

Partner-choice processes rely on social evaluations. For example, when observing two individuals, one who helps and the other who does not, we tend to judge positively the helpful person and judge negatively the unhelpful person. We may also predict that the helpful individual will be helpful again in the future whereas the unhelpful one will not. Eventually, we may learn to favor the helpful person over the unhelpful one. Importantly, such social evaluations along a positive-negative dimension could also apply to other behaviors and characteristics, such as intelligent and unintelligent, and individuals may choose the intelligent person as their social partners because intelligence is typically evaluated as a positive trait. It is therefore important to acknowledge that partner choice behavior has the potential to be based on a variety of evaluations that differ in their relevance.

There is considerable evidence demonstrating that humans' evaluative capacities develop at very early age. Infants' approaching behavior demonstrates their ability to make social evaluations. For example, 6- and 10-month-olds preferentially approached an animated wood shape that previously helped another wood shape climb up a hill and avoided a wood shape that previously hindered the shape's climb (Hamlin, Wynn, & Bloom, 2007). Relatedly, 12-month-olds expect third parties to approach helpers but not hinderers (Kuhlmeier, Wynn, & Bloom, 2003). Moreover, twelve-month-olds' looking patterns suggest that they recognize the valence of social interactions, and can categorize them based on valence (i.e., helping/caressing vs. hindering/hitting) rather than on superficial perceptual similarities (i.e., caressing/hitting vs. helping/hindering; Premack & Premack, 1997). Together, this line of research indicates that even very young infants evaluate others based on their behavior, long before considerable socialization has occurred. These preliminary evaluative processes lay an important foundation for the later emerging partner-choice behavior.

1.4. Selective prosocial behavior consistent with partner-choice models

In this section I review evidence for selective prosocial behavior that reflects the partner-choice model. "Selectivity" here refers to the target of an individual's prosocial behavior, especially when multiple potential recipients are available but the individual can only aid one. The review focus on selective helping and sharing because these have been extensively examined and documented in both adults and children.

The majority of the research on adults' selective prosociality has employed a variety of economic games, where selectivity is demonstrated by giving more resources to one partner than to another. The research examining young children's selective prosocial behavior often adopts experimental paradigms that manipulate behavioral and physical characteristics of the actors (e.g., Actor A helps another while Actor B hinders another; Actor A is generous while Actor B is stingy; Actor A distributes resources fairly and Actor B distributes resources unfairly), and the test variable is who the child chooses to help or share with.

Relying on these experimental paradigms, researchers have demonstrated that human's selective prosociality is often based on the recipient's prosocial history. Adults are more likely to be prosocial to those who have behaved (or intended to behave) prosocially toward them in the past (e.g., Barclay & Willer, 2007; Rand, Arbesman, & Christakis, 2011; Sylwester & Roberts, 2013). Like adults, children prefer helping others who have previously helped them or have demonstrated an intention to help them. For instance, by 21 months children demonstrate direct reciprocity, preferentially helping individuals who previously showed positive intentions to help them over those who accidentally helped or showed no intention to help at all (Dunfield & Kuhlmeier, 2010). Children also demonstrate indirect reciprocity. For instance, a recent study found that toddlers preferred to help an individual who distributed resources equally among third parties, over an individual who performed unequal distributions (Surian & Franchin, 2017). Further, by 3-years of age children preferentially share resources with those who have previously shared with others (Olson & Spelke, 2008) and selectively help those who have previously helped others (Kenward & Dahl, 2011; Vaish, Carpenter, & Tomasello, 2010). Through such selective prosocial behaviour, young children demonstrate their preference to cooperate with those who are prosocial or cooperative and their avoidance of interacting with those who are antisocial or non-cooperative, both towards themselves and towards others.

Importantly, past prosociality is not the only factor influencing individuals' prosocial behavior. Humans also engage in selective prosocial behavior on the basis of familiarity, similarity, and the group membership of the recipient to themselves. Adults are more prosocial towards people with whom they are familiar, close (Clark & Mills, 1979; Cole & Teboul, 2004), or share their group identity (e.g., Chen & Li, 2009; Levine, Prosser, Evans, & Reicher, 2005). Likewise, children demonstrate selective prosocial behavior on these dimensions as well. It has

been found that 2-year-olds prefer to give an object to individuals who speak their language (i.e., a signal of similarity or ingroup membership) than to individuals who do not (Kinzler, Dupoux, & Spelke, 2012). By about 4 years of age, children share (even at a cost to themselves) with their friends more than with peers or strangers (Birch & Billman, 1986, Moore 2009), By age 5, children prefer to give resources to those who share their gender, arbitrarily assigned group membership (Dunham, Baron, & Carey, 2011), and race (Weller & Lagattuta, 2012).

Taken together, both adults and children engage in selective prosocial behavior in relation to the recipient, such that they direct their prosocial acts to individuals who have previously acted prosocially *and* those who share other, less diagnostic, similarities with themselves. These selective prosocial behaviors are consistent with critical features of partner-choice models: first, there are two or more partners available; and second, the individual generally prefer the partner demonstrating positive traits. It is impressive that selective prosociality based on partner-choice emerges so early and occurs so frequently.

1.5. Evaluative mechanisms underlying selectivity

The findings presented above suggest that humans are often selective in terms of the recipient of their prosocial behavior. However, the proximate mechanisms of this selectivity are still unclear. Particularly, little attention has been drawn to the evaluative mechanisms that underlie selectivity in prosocial behavior in spite of the fact that social evaluation is crucial for selective prosocial behavior. In the past three decades, research on social cognition has revealed that evaluations along a basic positive-negative dimension can occur automatically, even in the absence of conscious intention or awareness (Bargh, Chaiken, Gendler, & Pratto, 1992; Draine & Greenwald, 1998; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). However, evaluations that are more complex and nuanced may involve more deliberate mental processes. Several models (e.g., Gawronski & Bodenhausen, 2006; Greenwald & Banaji, 1995) posit that there are at least two distinct systems that contribute to evaluation: *automatic/perceptual* and *controlled/reflective* sets of cognitive processes. Perceptual evaluations are crucial for survival and relatively automatic; whereas reflective evaluations are consciously constructed, typically involving controlled processing (Cunningham & Zaleso, 2007). Correspondingly, there are at least two types of evaluative mechanisms that may underpin selective prosocial behavior: *global evaluations* and *dispositional evaluations*. In both, individuals use their observations of another's

behaviors or characteristics to form evaluations and direct future interactions. However, the two mechanisms differ in several significant aspects.

Corresponding to automatic/perceptual evaluations in social cognition literature, the proposal of global evaluations suggest that individuals may simply be evaluating the valence of another's behavior and responding in kind. Specifically, people help an individual who has previously helped others or themselves simply because this individual is perceived as positive in general and people are motivated to direct their positively valenced behavior toward positively valenced individuals. This mechanism can be considered *global evaluation* because it can be generated from a variety of behaviors and characteristics. For example, a prosocial individual and an attractive individual would be evaluated positively in the same sense. Therefore, if global evaluation is used, I would expect individuals' selectivity to be based on a variety of positive characteristics, including less relevant but positive characteristics such as attractiveness and prestige. Similar proposals have been made in comparative research. For example, one of the proximate mechanisms for animals' reciprocal cooperation under partner-choice processing might be partner-specific positive emotions or attitudes (Brosnan & de Waal, 2002; Schino & Aureli, 2017). Because this mechanism does not require special cognitive abilities, animal researchers believe it may have evolved under different social and ecological conditions (Schino & Aureli, 2017). Similarly, global evaluations should develop early in life and be more frequently used by young children.

In contrast, a dispositional evaluation involves observing and evaluating another person based specifically on his or her prosocial behaviors and characteristics. This can be considered a deliberate evaluation. For this mechanism to work, individuals must infer whether another is likely to be prosocial based *specifically* on their previous prosocial behaviors. The second core element of the dispositional account is that we hold *specific* expectations about the prosocial nature of the individual that is being evaluated. In this case, we help an individual who has previously helped others because s/he is dispositionally helpful and this individual is likely to help again in the future. Relatedly, the dispositional account predicts that we should not selectively help an individual who displays positive characteristics that are irrelevant to prosociality because they are not diagnostic of future prosocial tendencies. Thus, by using dispositional evaluations individuals who are attributed a prosocial disposition are preferred

because they are predicted to act prosocially in the future. Compared to children, adults may frequently use dispositional evaluations when engaging in selective prosocial behavior because adults are cognitively capable of doing and sufficiently socialized to do so. Dispositional evaluations are superior to global evaluations in many contexts since the former is more sophisticated, and consequently the subsequent prosocial behavior is less vulnerable to defection.

Importantly, these two mechanisms could be complementary rather than mutually exclusive, and would be differentially recruited across development and contexts. That means, first, if young children are unable to use dispositional evaluations, then global evaluations inevitably play a vital role at this age in almost all situations. If however, dispositional evaluations develop with age, we would expect a reduction in the use of global evaluations with age. Second, dispositional evaluation may be the main mechanism used by adults in selective prosocial behavior; however, individuals may also make global evaluation in some situations simply because it is faster, easier, and less cognitively demanding. In conclusion, possible mechanisms of selective prosocial behavior may range from a general preference for positively valenced individuals to a specific expectation of reciprocity towards individuals with prosocial dispositions.

1.6. Limits of available evidence

Based on the extant literature, it is clear that positively valenced characteristics can influence individuals' evaluations of and preferences for others, and that selectivity in prosocial behavior can be based on both others' prosocial acts as well as prosocially irrelevant characteristics. What we do not know, however, is the nature of the evaluative mechanisms underlying selectivity. Importantly, we cannot currently disentangle global evaluations and dispositional evaluations because the existing studies have not been designed to address this particular question. To date, the information on which individuals are basing their selectivity on is limited to behaviors and characteristics that are prosocial (e.g., past helpfulness or past sharing), which makes it difficult to identify to what extent these prosocial individuals are attributed a prosocial disposition, or just are perceived positive in a general sense. Thus, examining selectivity based only on past prosocial behavior is not sufficient to address questions regarding the specificity or breadth of the evaluative mechanisms that underlie selectivity. Instead, to address this issue we need to investigate how individuals selectively respond to

different types of characteristics from a variety of domains that vary in their prosocial relevance. Specifically, it is important to examine whether individuals selectively help another who demonstrates prosocial-irrelevant traits over than the one who does not; it is also of interest to explore whether or not individuals preferentially help another who exhibits prosocial traits over than the one who exhibits positive yet prosocial-irrelevant traits. Further research will enable us to draw a clear conclusion about these two possible evaluative mechanisms.

If global evaluations underlie selective prosociality, then other positive characteristics, both social relevant and social irrelevant, although not directly related to prosocial behavior, may still lead to selectivity in prosocial behavior through a general approach tendency (i.e., Halo Effect). Positively valenced characteristics deeply influence people's evaluation of and preference for others, and may result in individuals simply enjoying more positive social interactions in general. The most long-studied and known one of such characteristics is physical attractiveness. The often-used phrase of "What is beautiful is good" (Dion, Berscheid, & Walster, 1972) relates beauty to goodness and suggests that physically attractive people are believed to possess a variety of positive traits such as social competence and interpersonal ease (e.g., Dion, 1981; Bassili, 1981). Even newborns exhibit preference for individuals who are facially attractive (Langlois, Roggman, & Rieser-Danner, 1990). Moreover, several studies consistently demonstrate that higher facial attractiveness is related to increased donation (Landry, Lange, List, Price, & Rupp, 2006; Maestripieri, Henry, & Nickels, 2017; Raihani & Smith, 2015). Together, these results suggest that socially irrelevant, but positively evaluated facial attractiveness may be a characteristic that, though not directly related to prosocial behavior, may still influence individuals' partner choice. Another positive characteristic has received considerable study is prestige. Prestige is defined as social status granted to individuals who are recognized and respected for their skills, success, or knowledge (Henrich & Gil-White, 2001). The line of research on prestige shows that prestigious individuals are popular and people preferentially interact with them (e.g., Cheng, Tracy, & Henrich, 2010; Henrich & Gil-White, 2001). In conclusion, these positive, yet prosocial-irrelevant, characteristics deeply influence people's evaluation of and preference for others. Further experimental paradigms may consider examining whether people engage in selective prosocial behavior towards individuals who demonstrate these (and other) positive characteristics, which we have not known yet critical.

1.7. Current study

The present study aimed to address two questions: 1) What evaluative mechanisms underlie individual's selection of prosocial partners; and 2) How do these evaluations change with age? In order to answer these questions, different types of characteristics influence children and adults' selective prosocial and social interaction were examined

Specifically, through a series of three studies how characteristics from three different domains (i.e., Prosocial, Social, and Non-social) affect individuals' partner choice behavior was investigated. Study 1 aimed to test valence of each of the target characteristics and create stimuli to be used in Study 2. Study 2 assessed how adults' selectivity across three types of situation (prosocial, social, and nonsocial) varies depending on the domain of characteristics described (prosocial, social, and general). Finally, Study 3 examined the developmental trajectory of the mechanisms underlying selectivity.

In general, it was hypothesized that 1) when prosocial-relevant characteristics are available, both children and adults would selectively help prosocial characters over than non-prosocial ones; 2) when prosocial-irrelevant characteristics are available, children, but not adults, would preferentially help those with positive characteristics; and 3) with development the evaluative mechanisms will become more sophisticated, moving from global evaluations to dispositional evaluations. Specifically, children would depend more on global evaluations, whereas adults would flexibly make either global evaluations or dispositional evaluations depending on context. By systematically examining whether and when these two types of evaluative mechanisms lead to selective prosocial behavior, this study deepened our understanding of evaluative mechanisms underlying selectivity in prosocial behavior.

Chapter 2. Study 1: Norming test

Two distinct evaluative mechanisms, global evaluations and dispositional evaluations, may underlie selective prosocial behavior. Global evaluations posit that individuals make their prosocial decisions based on a valence match between the observed behaviors or characteristics of the individual they are evaluating and the interaction they are considering engaging in. That means people would prefer to help individuals who demonstrate any positive characteristic, regardless of whether it is relevant or irrelevant to prosocial behavior. In other words, people would be more likely to help a helpful person rather than an unhelpful person, people would also be more likely to help a polite person rather than a rude person because being helpful and being polite are both positive while being unhelpful and being rude are both negative. In contrast, dispositional evaluations predict that people engage in selective prosocial behavior based on the specific expectation of reciprocity in future interactions. As a result, people should have a clear preference for helping individuals who have a history of acting prosocially, and that does not generalize to other equally positive but prosocially irrelevant characteristics.

Importantly, because one of the proposed mechanisms relies on the valence of the characteristic (global evaluation) and the other relies on the nature of the characteristic (dispositional evaluation), it is essential to try to equate the different characteristics in terms of their positivity or negativity. For example, though common sense tells us that both helpfulness and politeness are positive characteristics, it is unclear if they are equally positive. Because characteristics vary in both their relevance to prosociality and their valence, to accurately determine whether individuals are basing their preferences on the relevance of the characteristics, it is necessary to know how positive each of the characteristics is.

Given that there were no existing stimuli to adopt, it was necessary to create stimuli that were drawn from the appropriate domains and similar in terms of valence. The two critical steps were 1) to carefully choose characteristics that can be manipulated to trigger social evaluation and 2) to assess the valence of each of the candidate characteristics. The ultimate goal was to achieve characteristics and items that share identical or similar valence in terms of positivity or negativity.

The characteristics to be tested were categorized based on the domain and relevance to prosocial behavior. Prosocial characteristics, including Helpful (e.g., always lend a hand) and

Generous (e.g., shares a lot), are the most relevant. Social characteristics, consisting of Considerate (e.g., patient with others) and Prestigious (e.g., respected by others), are less relevant. Finally, Non-social characteristics, Attractive (e.g., gets compliments on the appearance) and Intelligent (e.g., solves problems easily), are not related to prosocial behavior at all. Regarding the valence, the only certainty is that previous research has found that the presence of these characteristics is viewed positively and the absence of these characteristics are viewed negatively (Cheng et al., 2001; Dion et al., 1972; Jacobsen, 1983). This study would lay the foundation to make further exploration of evaluative mechanisms.

The purpose of Study 1 was to create a set of items that were drawn from different evaluative domains but were similar in terms of valence to be used in Study 2. To compare individuals' responses towards different types of characteristic, and to disentangle the involvement of global evaluations and dispositional evaluations in selective prosociality, stimuli reflecting characteristics of interest that were ideally identical but practically similar in terms of valence were developed. In the present study, a relatively larger pool of items was tested, and a smaller portion of these items were finally employed in Study 2.

Method

Participants

Sixty-four undergraduates (32 females and 32 males; aged 18-25 years) at University of Maryland, College Park, participated in this study. One participant took extremely long time (i.e., greater than 3 SDs) to complete the study so these data was excluded from the analyses. All participants were compensated with course credits.

Materials

A questionnaire of 72 items was used in the present study. These 72 items described two types in three domains of characteristic: prosocial (Helpful and Generous), social (Considerate and Prestigious), and non-social (Attractive and Intelligent). Half items described the positive characteristics (e.g., helpful, considerate, attractive), and half the corresponding negative characteristics (e.g., unhelpful, inconsiderate, unattractive). Therefore, for each characteristic there were six positive items and six negative items (see Appendix A for the full list of items). Half of the characters depicted in the items were males. Pairs of characters were gender matched.

Participants were asked to rate the valence of each item on a 7-point scale (i.e., “How positive or negative is the characteristic described here?”) from “very negative” to “very positive”, and 4 means “neutral”.

Procedure

Participants registered for participation, and completed the study online, independently. The consent form was signed before participation in the study. Participants read each of the vignettes, and then rated the valence of the described characteristic. Participants were completely debriefed after completing the study. It took about 15-18 minutes to complete study.

Results

Part 1. Analyses on original 6-item pool

Omnibus ANOVA. In order to determine whether participants varied in their evaluation of the characteristics, a 6 (Characteristic: Helpful, Generous, Prestigious, Considerate, Intelligent, Attractive) by 2 (Valence: Positive, Negative), by 2 (Gender: Male, Female), mixed-model analysis of variance (ANOVA) was conducted. Significant main effects were found for Characteristic, $F(5,305) = 8.50, p < .001, \eta_p^2 = .12$, and Valence, $F(1,61) = 982, p < .001, \eta_p^2 = .94$. These main effects were qualified by an interaction, $F(5,305) = 38.95, p < .001, \eta_p^2 = .45$. Overall, participants rated Helpful, Generous, and Considerate characteristics similarly and more *positively* than Prestigious, Attractive, and Intelligent. Conversely, they rated Unhelpful, Stingy, and Inconsiderate similarly and more *negatively* than Non-prestigious, Unattractive, and Unintelligent. Participants rated positive characteristics more positively ($M = 5.66, SD = .43$) than negative characteristics ($M = 2.40, SD = .48$). There was also a main effect of Gender, $F(1,61) = 10.04, p = .002, \eta_p^2 = .14$, and an additional interaction between Valence and Gender, $F(1,61) = 8.32, p = .005, \eta_p^2 = .12$. Specifically, males rated characteristics more positively ($M = 4.10, SD = .18$) than females did ($M = 3.96, SD = .18$). When examining the interaction between Valence and Gender, the overall pattern of results was similar with females rating positive characteristics more positive and negative characteristics more negative than males. Because this result was not predicted and is not core to the research question, it will not be examined further.

Analyses of items. Because the omnibus ANOVA indicated that there was a significant difference between the valence of the six characteristics, I analyzed each of the individual items

to see if it was possible to select a subset of items within each characteristic that would alleviate this concern. Specifically, a series of repeated-measure ANOVAs was run to determine if any differences exist between six items within each characteristic. In order to identify the most appropriate items for Study 2, I ran the analysis for each characteristic one by one, with positive items and negative items separately.

First of all, a one-sample *t*-test was conducted to compare the valence of each item to chance value 4 (i.e., neutral) to ensure that each of the items elicited a valenced response from participants. All the positive items were rated significantly higher than neutral ($ps < .001$), and all the negative items were rated significantly lower than neutral ($ps < .001$). See Table 1 for descriptive and *t*-statistics.

Table 1.

Average valence of the six items within each of the six characteristics and the one sample t-statistic comparing each characteristic against a chance value of 4, in Study 1.

Characteristic	Positive version			Negative version		
	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Helpful	5.99	.53	29.78*	2.00	.57	-27.97*
Generous	6.04	.62	25.97*	2.16	.57	-25.75*
Considerate	5.88	.55	27.19*	1.91	.55	-30.33*
Prestigious	5.43	.50	22.62*	2.65	.76	-14.19*
Intelligent	5.44	.62	18.56*	2.81	.75	-12.57*
Attractive	5.18	.82	11.35*	2.88	.89	-10.02*

Note. * $p < .001$.

For Helpful items, there was a significant main effect, $F(5,310) = 3.16, p = .009, \eta_p^2 = .05$. However, post-hoc pairwise comparisons showed no significant difference between items. For Unhelpful items, there was also a significant difference, $F(5,310) = 6.93, p < .001, \eta_p^2 = .10$. The item “never volunteers in the community” was rated the highest ($M = 2.38$) and significantly different from four other items.

For Generous items, there was a significant difference between items, $F(5,310) = 2.79, p = .018, \eta_p^2 = .04$. The item “donates money frequently” ($M = 6.27$) was rated the highest and

significantly higher than two other items. For Stingy items, there was also a significant difference, $F(5,310) = 11.44, p < .001, \eta_p^2 = .16$. The items “only gives away items that s/he does not want” ($M = 2.71$) and “never donates money” ($M = 2.38$) were rated the highest and significantly different from other items.

For Considerate items, there was a significant difference, $F(5,310) = 3.76, p = .003, \eta_p^2 = .06$. The item “always keeps her promises” ($M = 6.21$) was rated the highest and significantly higher than three other items. For Inconsiderate items, there was also a significant difference, $F(5,310) = 6.69, p < .001, \eta_p^2 = .10$. The item “never apologizes when it is appropriate” ($M = 1.59$) were rated the lowest and significantly different from three other items; the item “never keeps her promises” ($M = 1.76$) was rated the second lowest and significantly different from one other item.

For Prestigious items, there was a significant difference, $F(5,310) = 3.16, p < .01, \eta_p^2 = .05$. The item “has many follower” ($M = 5.11$) was rated the lowest and significantly different from three other items. For Non-prestigious items, there was also a significant difference, $F(5,310) = 6.93, p < .001, \eta_p^2 = .10$. The items “has no followers” ($M = 2.87$) and “never influences others” ($M = 2.78$) were rated the highest and significantly different from one other item.

For Attractive items, there was a significant difference, $F(5,310) = 10.09, p < .001, \eta_p^2 = .14$. The item “looks stunning even without any makeup” was rated the highest ($M = 5.65$) and significantly higher than other items. For Unattractive items, there was no significant difference, $F(5,310) = 1.19, p = .314, \eta_p^2 = .02$.

For Intelligent items, there was a significant difference, $F(5,310) = 3.35, p = .006, \eta_p^2 = .05$. The item “often wins quiz games” was rated the lowest ($M = 5.24$) and significantly different from two other items. For Unintelligent items, there was no significant difference, $F(5,310) = 2.21, p = .053, \eta_p^2 = .03$.

Based on these results, I selected a subset of items that would mitigate valence differences across characteristics. The rules I followed were: 1) same number of items are kept in each characteristic; 2) positive and negative items should be paired, (e.g., if positive item “always lend a hand” is kept, then the paired negative item “never lend a hand” is also kept); 3)

Remove the two most extreme items if the average valence of the characteristic was more extreme than the other characteristics (e.g., Helpful); 4) Remove the two least extreme items if the average valence of the characteristic was less extreme than the other characteristics (e.g., Attractive). Consequently, I removed items “always/never responds to others’ needs” and “(never) willing to lend a hand” from Helpful, “frequently/never donates money” and “(never) gives away items to those in need” from Generous, “always/never keeps her promises” and “(never) apologizes when it is appropriate” from Considerate, “has many/no followers” and “often/never influences others” from Prestigious, “looks stunning even without any makeup/ never looks stunning even with a lot of makeup” and “people often/never like her selfies on Facebook” from Attractive, as well as “often/never wins quiz games” and “often/rarely gets confused” from Intelligent.

Part 2. Analyses on selected 4-item pool

Based on the results from the complete item pool, two items from each characteristic were eventually dropped and four items were kept in the finalized stimuli pool. Given that item analyses aiming to select a subset of items was already done in Part 1, and I am just interested in the valence of each characteristic at this time, I only report the variance analysis of Characteristic and one-sample *t*-test comparing valence of each characteristic against chance.

Omnibus ANOVA. In order to determine whether the valence of the final stimuli set was equated across characteristics, I conducted a 6 (Characteristic: Helpful, Generous, Prestigious, Considerate, Intelligent, Attractive) by 2 (Valence: Positive, Negative), repeated-measure ANOVA on the four-item pool. Significant main effects were again found for Characteristic, $F(5,310) = 4.79, p < .001, \eta_p^2 = .07$, and Valence, $F(1,62) = 949, p < .001, \eta_p^2 = .94$. These main effects were qualified by an interaction, $F(5,310) = 29.04, p < .001, \eta_p^2 = .32$. Overall, participants rated Helpful, Generous, and Considerate similarly and more positively than Prestigious, Attractive, and Intelligent. Conversely, they rated Unhelpful, Stingy, and Inconsiderate similarly and more negatively than Non-prestigious, Unattractive, and Unintelligent. Overall, Participants rated positive characteristics more positively ($M = 5.67$) than negative characteristics ($M = 2.40$).

Finally, because the main research question relates to the domain from which the characteristic is drawn and not the specific characteristic described, I conducted one final

analysis of variance. Specifically, a 3 (Domain of characteristic: Prosocial, Social, Non-social) by 2 (Valence: Positive, Negative), repeated-measure ANOVA found a significant main effect of Domain of characteristic, $F(2,124) = 7.20, p = .001, \eta_p^2 = .10$, and Valence, $F(1,62) = 949, p < .001, \eta_p^2 = .94$. These main effects were qualified by an interaction, $F(2,124) = 44.22, p < .001, \eta_p^2 = .42$. (See Figure 1). Overall, participants rated prosocial characteristics higher ($M = 5.94$) than positive social characteristics ($M = 5.67$), which in turn were rated higher than positive non-social characteristics ($M = 5.40$). Conversely, participants rated non-prosocial characteristics lower ($M = 2.09$) than negative social characteristics ($M = 2.29$), which in turn were rated lower than negative non-social characteristics ($M = 2.80$). Participants also rated positive characteristics more positively ($M = 5.67$) than negative characteristics ($M = 2.40$).

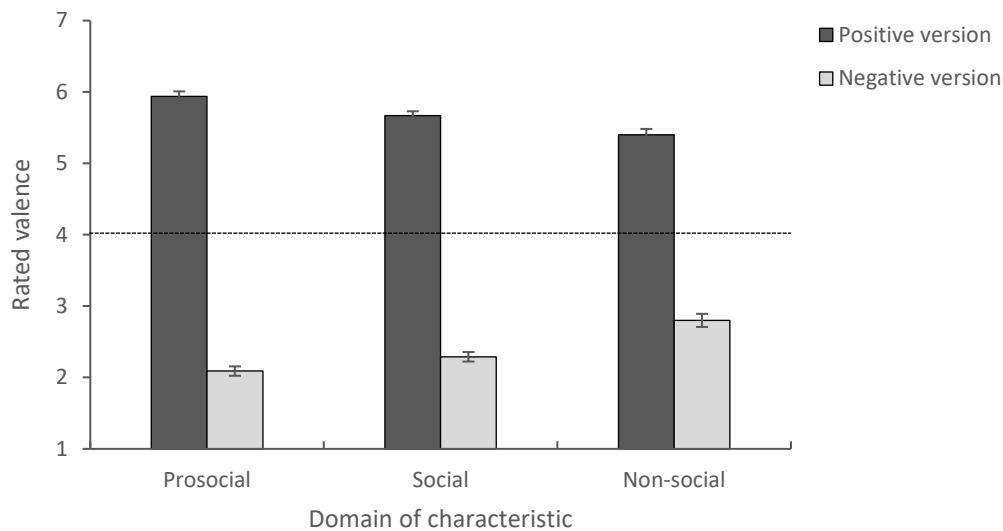


Figure 1. Mean rated valence for prosocial, social, and non-social characteristics, in Study 1. The error bars represent +/- 1 standard error.

Finally, because the most extreme items were removed from some of the characteristics, I ran a final series of one-sample *t*-tests to ensure that the valence of each characteristic was still significantly different from chance (i.e., neutral) (See Table 2). All the positive characteristics were rated significantly higher than neutral ($ps < .001$), and all the negative characteristics were rated significantly lower than neutral ($ps < .001$).

Table 2.

Average valence of the four items within each of the six characteristics and the one sample t-statistic comparing each characteristic against a chance value of 4, in Study 1.

Characteristic	Positive version			Negative version		
	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Helpful	5.92	.57	26.62*	2.05	.61	-25.18*
Generous	5.96	.66	23.39*	2.14	.57	-26.08*
Considerate	5.81	.62	23.04*	2.02	.57	-27.30*
Prestigious	5.53	.50	24.17*	2.56	.79	-14.68*
Intelligent	5.51	.64	18.65*	2.79	.77	-12.66*
Attractive	5.29	.82	12.42*	2.83	.92	-10.05*

Note. * $p < .001$.

Discussion

The purpose of this study was to obtain a pool of items with similar/identical valence by assessing the valence of each characteristic as well as that of each item. Tested characteristics were categorized into three domains: prosocial, social, and non-social. There were two specific characteristics within each domain: Helpful and Generous within prosocial characteristic, Considerate and Prestigious within social characteristic, as well as Intelligent and Attractive within non-social characteristic. Each characteristic contains six positive and six negative items.

First, the positive characteristics were evaluated as significantly positive and the negative characteristics were evaluated as negative. This meets the most basic criterion in terms of ensuring that participants viewed the positive versions of the characteristics positively and the negative versions of the characteristics negatively. When further looking at the details, the basic pattern derived from analyses was as follows: Helpful, Generous, and Considerate were the most positive, Prestigious and Intelligent were less positive, and Attractive was the least positive. With regard to the negative items, Unhelpful, Stingy, and Inconsiderate were evaluated as more negative than Non-prestigious, Unintelligent, and Unattractive. Although I tried the best to choose characteristics for the study that were as similar as possible in terms of valence, it was unlikely to create items with identical valence across domains. This might be because that

Helpful, Generous, and Considerate are perceived as others-oriented and subject to an individual's intention, so to be more valuable and desirable, and the lack of these traits are viewed as more unacceptable; whereas Prestigious, Attractive, and Intelligent are not subject to individuals' intention, so to be less valuable, and the absence of these traits are relatively more acceptable.

In order to get a more detailed understanding on the valence of each characteristic, I also analyzed the valence of each item. Valence varied across items within each characteristic. This result is reasonable given that each item describes one aspect of that characteristic with some descriptions being more specific and others being more general. The ultimate goal of these analyses was to decide which items would be used in the subsequent studies. I identified two items to drop from each characteristic by comparing the valence of positive items and that of negative items. Specifically, I dropped the most positive/negative two items from characteristics of Helpful, Generous, and Considerate, and the least positive/negative two items from characteristics of Prestigious, Attractive, and Intelligent. The finalized items pool consists of eight items for each characteristic, four positive and four negative, so to be 48 items in total, with very similar valence, making it possible to examine global evaluations and dispositional evaluations involved in selective social interactions.

Chapter 3. Study 2: Evaluative mechanisms underlying social preferences in adults

Study 2 aimed to investigate how adults use different information regarding another's characteristics to direct their selective prosocial and social behaviors. Specifically, I was interested in whether characteristics from three different domains influence people's prosocial behavior in different ways, allowing us to better understand evaluative mechanisms underlying selective prosocial behavior.

Two possible evaluative mechanisms may underlie selective prosocial behavior: global evaluations and dispositional evaluations. The current study examined effects of three domains of characteristic, prosocial (i.e., Helpful and Generous), social (i.e., Considerate and Prestigious), and non-social (i.e., Attractive and Intelligent), on individuals' social behavior. Further, to clarify the relation between the recipient's characteristic and the actor's behavior, the study also asked three types of question: prosocial question (i.e., who to help), social question (i.e., who to interact with), and general question (i.e., who will win a lottery). The prosocial question is of the central interest; the social question will help to identify whether the same characteristics influence prosocial behavior and purely social behavior in different ways; and finally, the general question will serve as a control measure that will help to ensure participants are engaged during the study and will help identify the boundaries of valence matching if participants use a global evaluation.

Because the study is theoretically derived from partner-choice models, which predict that individuals must choose their social partner from a pool of potential candidates necessarily making comparisons between individuals, I attempted to address the research question primarily through forced-choice tasks. That is, participants were presented two characters that differ on a specific characteristic, and then asked to choose one to help or interact with. Importantly, in forced-choice situations individuals *have to* make a choice on the basis of information given even if they perceive the information to be irrelevant, which may result in an overall tendency to choose the positive character regardless of whether or not the positive characteristic described is relevant to the question asked. Therefore, individuals were also asked to rate their confidence in their decision following their forced-choice selection. Higher confidence would mean that the participant believes their choice is based on relevant information, and lower confidence means that the participant believes their choice is based on less relevant information and they

acknowledge that their choice is not well founded. These two closely-related test questions will help to clarify the kind(s) of social evaluations that are being made in the various contexts.

In the present study, I predicted that: 1) If only global evaluations are used, individuals would always prefer to help the positive characters over than the negative ones regardless of the domain of characteristic. Furthermore, they would show similarly high confidence in their choices across characteristics. Also, participants would preferentially interact with the positive characters no matter what characteristic is present, accompanying with same/similar confidence across characteristics. 2) If only dispositional evaluations are made, individuals would selectively help prosocial characters over non-prosocial ones, with higher confidence in the choice. Individuals may also show a preference, albeit a smaller one, for positive characters when social and non-social characteristics are present, but they would show lower confidence in the choice, because these characteristics are less relevant to prosociality. Regarding the social question, individuals would select the positive characters but not the negative ones with higher confidence when prosocial and social characteristics are present. They would also prefer to interact with the characters demonstrating positive non-social characteristics, but less likely compared to prosocial and social characteristics, with lower confidence. 3) If both global and dispositional evaluations are involved, individuals would prefer to help the positive characters over than the negative ones in general. However, their confidence would be higher for prosocial characteristics and lower for social and non-social characteristics. Individuals would also selectively interact with positive characters and showing different confidence across characteristics. 4) Given that the general question (i.e., Who will win a lottery?) essentially serves as a manipulation check, individuals would always select the positive characters regardless of characteristic, no matter what kind of evaluation is made; or they simply perform at chance. The confidence would be always low because the outcome is random.

Methods

Participants

Study 2 was conducted at two locations, Concordia University in Montréal, Canada, and University of Maryland (UMD), College Park, U.S.A., utilizing the same materials and procedure. The purposes of conducting this study in two locations were twofold: to diversify the sample, and to compare the response patterns between locations. The participants were recruited

through the University-based SONA system from Concordia University and UMD. All the participants were undergraduates, aged between 18-25 years old. Seventy-eight participants (69 females) were recruited from Concordia University and 411 (273 females) from UMD. The participants were granted course credits for their participation.

Materials

The complete stimuli consisted of 72 items, 24 describing prosocial characteristics (12 on Helpful, 12 on Generous), 24 social characteristics (12 on Prestigious, 12 on Considerate), and 24 non-social characteristics (12 on Attractive, 12 on Intelligent). Within each characteristic, the 12 items were the exhaustive combinations of four positive stems and four negative stems (derived from Study 1) in a way that each positive stem is matched with each other three negative stems, and vice versa. Each item described two characters that vary on a specific characteristic (e.g., Imagine two men, named John and Steward. John is helpful and glad to assist others. Steward is unhelpful and always indifferent to others' needs). Amongst all 72 items, half described female characters and half male characters in order to control for any possible gender effects on participants' response. The order of either positive stem going first or negative stem first was systematically randomized.

Each item was followed by two test questions, first a forced-choice between characters in either prosocial (i.e., Suppose both X and Y are each working on different projects for class. You know a great time-saving technique, but only one person can use it. Who would you tell?), social (i.e., Suppose both X and Y are traveling separately on a long train ride. There is an open seat next to each one. Who would you prefer to sit beside?), or general (i.e., Suppose both X and Y have entered a lottery that you are running. You are blindfolded and reach into the bowl to pull out a name. Whose name are you more likely to draw?) scenario. Next, participants rated their confidence on a Likert-scale question (i.e., How confident are you in that choice?) on a 5-point scale from "Not confident at all" to "Very confident". The three forced-choice questions were distributed in a way such that each positive stem and each negative stem received all three questions across items.

Procedure

Participants completed this online study independently. They were asked to sign the online consent form before proceeding to the study. Participants were asked to carefully read each of the items, and then answer the two test questions in order. Upon completion, participants were debriefed about the nature and purpose of this study. Participants were also given the right to determine if they would like their responses included in the data analysis. It generally took 18-20 minutes to complete.

Results

Coding. For each of the three forced-choice questions, choosing the positive character was coded as 1 and choosing the negative character was coded as 0. Responses on confidence-rating questions were coded following the 5-point Likert-scale.

Part 1: Analyses of Forced-choice question

Repeated-measure ANOVAs. A preliminary analysis of variance (ANOVA) was conducted to determine the possibility of choosing the positive character, with Location (UMD and Concordia) and Gender as between-subjects factors, and Type of Question (prosocial, social, and general) and Characteristic (Helpful, Generous, Considerate, Prestigious, Attractive, and Intelligence) as the within-subjects factors. Gender did not show either a main effect ($F = .331, p = .718$) or any interactions with other factors ($ps > .05$). There was no main effect of Location, $F(1,484) = .017, p = .896$. However, there was a very small interaction between Location with Characteristic, $F(5, 2420) = 5.53, p < .001, \eta_p^2 = .011$. Due to the similarity in responding across the two locations, the data was collapsed and all the subsequent analyses were based on the collapsed data.

An omnibus ANOVA was run to test the effects of Type of Question (prosocial, social, and general) and Characteristic (Helpful, Generous, Considerate, Prestigious, Attractive, and Intelligent). First, there was a significant main effect of Question, $F(2, 976) = 191, p < .001, \eta_p^2 = .282$. Participants chose the positive characters most frequently on the social question ($M = .848$), followed by the prosocial question ($M = .716$), and least frequently on the general question ($M = .682$). The main effect of Characteristic was also significant, $F(5, 2440) = 250, p < .001, \eta_p^2 = .339$. Pairwise comparisons showed that participants were equally, and more likely to select the positive characters when given the characteristics of Helpful ($M = .856$), Generous

($M = .856$), and Considerate ($M = .854$), than Prestigious ($M = .693$), followed by Intelligent ($M = .647$), and then Attractive ($M = .587$). Finally, the interaction between Type of Question and Characteristic was significant, $F(10, 4880) = 113, p < .001, \eta_p^2 = .189$. Specifically, participants showed same patterns on Helpful, Generous, and Considerate across the three types of question such that the possibilities of choosing the positive characters were equal on prosocial and social questions but much lower than that on general question. In contrast, the responding patterns greatly varied for Prestigious, Attractive, and Intelligent; specifically, participants appeared to be more likely to choose positive characters on social and non-social questions than on prosocial question. See Figure 2 for the interaction.

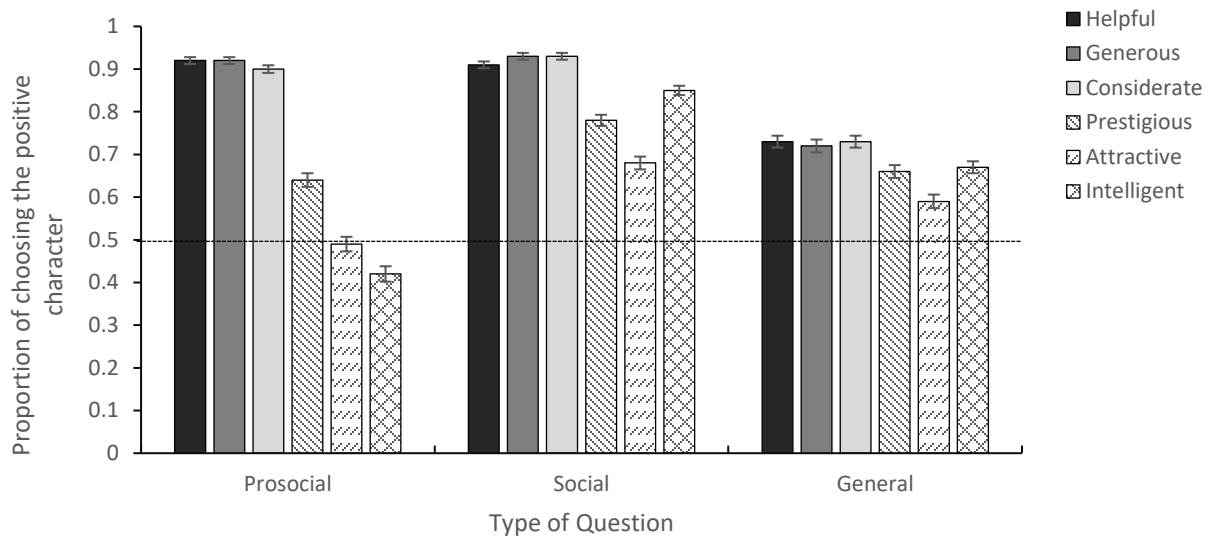


Figure 2. Mean proportion of choosing the positive character as a function of Type of question and Characteristic, in Study 2. The error bars represent +/- 1 standard error.

Who to help? A repeated-measure ANOVA was run to examine the effect of Characteristic on the prosocial question. There was a significant effect of characteristic on the participants' choice, $F(5, 2440) = 354, p < .001, \eta_p^2 = .421$. Participants were equally, and more likely to choose the positive character to help when given information about an individual's Helpful ($M = .921$), Generous ($M = .924$), and Considerate ($M = .902$) characteristics, than when the individual was Prestigious ($M = .638$), which in turn was preferred to individuals described as Attractive ($M = .489$), followed by individuals who were Intelligent ($M = .424$).

Who to socially interact with? The repeated-measure ANOVA revealed that Characteristic significantly affects participants' decision about who to socialize with, $F(5, 2440) = 121, p < .001, \eta_p^2 = .199$. Participants were equally, and more likely to choose the positive character to interact with when given information about an individual's Helpful ($M = .914$), Generous ($M = .926$), and Considerate ($M = .928$) characteristics, than when the individual was intelligent ($M = .852$), which in turn was preferred to individuals described as Prestigious ($M = .784$). Participants were the least likely to choose individuals described as Attractive ($M = .681$).

Who will win a lottery? The repeated-measure ANOVA revealed that Characteristic significantly affects participants' choice of who will win a lottery, $F(5, 2440) = 23.05, p < .001, \eta_p^2 = .045$. Participants were equally, and more likely to choose the positive character when the characteristics of Helpful ($M = .733$), Generous ($M = .717$), and Considerate ($M = .733$) were present, than when individuals were Intelligent ($M = .665$) and Prestigious ($M = .656$), which in turn was preferred to individuals described as Attractive ($M = .592$).

One-sample t-test. I conducted a one-sample *t*-test comparing the mean probability of choosing the positive character on each characteristic with chance of .5 (i.e., mid-point, meaning no preference for either positive or negative character). The mean probability of choosing the positive character on prosocial questions was significantly below chance for Intelligence, and was at chance for Attractiveness; all other means were significantly higher than chance. See Table 3 for descriptive and *t*-statistics.

Part 2: Analyses of Confidence-rating questions.

Repeated-measure ANOVAs. A preliminary ANOVA was conducted to analyze confidence, with Location (UMD and Concordia) and Gender as between-subjects factors, and Type of Question (prosocial, social, and general) and Characteristic (Helpful, Generous, Considerate, Prestigious, Attractive, and Intelligence) as the within-subjects factors. No main effects were found for Gender, $F(2, 484) = .488, p = .614, \eta_p^2 = .002$, or Location, $F(1, 484) = .138, p = .711, \eta_p^2 = 0$. There was a very small significant interaction between Location with Characteristic, $F(5, 2420) = 2.66, p = .021, \eta_p^2 = .005$, and another small interaction between Gender and Characteristic, $F(10, 2420) = 1.91, p = .04, \eta_p^2 = .008$. Due to the similarity in responding across the two locations, the data was collapsed and all the subsequent analyses were

Table 3.

Mean proportion of choosing the positive character on different questions for different characteristics and one-sample t-statistics comparing each score against chance value of .5, in Study 2.

Characteristic	Prosocial question			Social question			General question		
	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Helpful	.92	.19	49.59**	.91	.18	50.55**	.73	.30	16.99**
Generous	.92	.19	50.63**	.93	.18	53.71**	.72	.33	14.71**
Considerate	.90	.20	43.65**	.93	.18	53.82**	.73	.30	16.87**
Prestigious	.64	.36	8.54**	.78	.29	21.37**	.66	.33	10.51**
Attractive	.49	.38	-.65	.68	.33	12.03**	.59	.36	5.65**
Intelligent	.42	.40	-4.14**	.85	.25	31.37**	.66	.31	11.76**

Note. ** $p < .01$.

based on the collapsed data.

An omnibus ANOVA was run to test the effects of Type of Question (prosocial, social, an general) and Characteristic (Helpful, Generous, Considerate, Prestigious, Attractive, and Intelligent) on participants' confidence in their previous choice. Overall, the pattern of results was highly consistent with that of Forced-choice questions. First, the main effect of Type of Question was significant, $F(2, 976) = 1108, p < .001, \eta_p^2 = .694$, such that the participants showed equal, and significantly higher confidence on prosocial ($M = 3.93$) and social questions ($M = .394$), than on general question ($M = 2.14$). The factor of Characteristic also had a significant main effect on participants' confidence, $F(5, 2440) = 267, p < .001, \eta_p^2 = .354$. That is, confidence was the highest for the characteristics of Helpful ($M = 3.53$), Generous ($M = 3.54$), and Considerate ($M = 3.54$), followed by Intelligent ($M = 3.21$) and Prestigious ($M = 3.19$), and the lowest for Attractive ($M = 3.02$). There was also a significant interaction between factors, $F(10, 4880) = 79.49, p < .001, \eta_p^2 = .14$. Specifically, participants were not confident in their choice on general questions for all six characteristics. On prosocial and social questions, the

patterns were identical for Considerate, Prestigious, and Attractive, such that the confidence was higher for social questions than for prosocial questions. However, for the characteristics of Helpful, Generous, and Intelligent, the confidence was higher for prosocial questions than for social questions. See Figure 3 for this interaction.

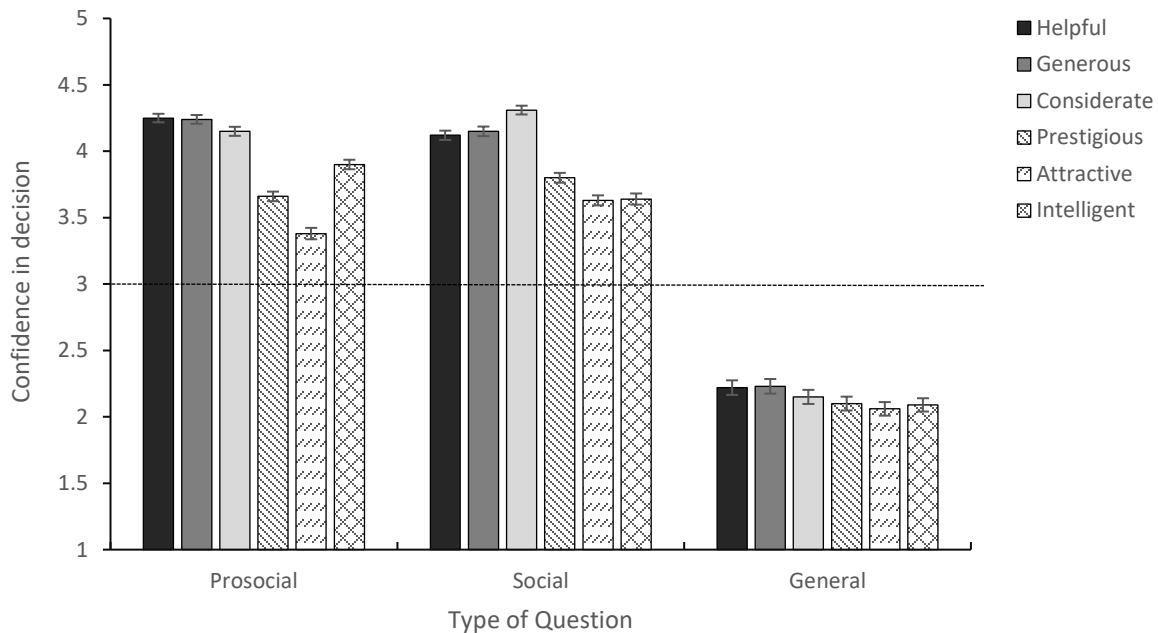


Figure 3. Participants' confidence in their choice as a function of Type of question and Characteristic, in Study 2. The error bars represent +/- 1 standard error.

Who to help? A repeated-measure ANOVA was run to examine the effect of Characteristic on confidence pertaining to prosocial question. Characteristic revealed a significant effect on participants' confidence, $F(5, 2440) = 229, p < .001, \eta_p^2 = .319$. They were equally, and significantly more confident in their choice when given the characteristics of Helpful ($M = 4.25$) and Generous ($M = 4.24$) than Considerate ($M = 4.15$). Participants were even less confident when an individual was described as Intelligent ($M = 3.90$), followed by Prestigious ($M = 3.66$). The confidence was the lowest for the characteristic of Attractive ($M = 3.38$).

Who to socially interact with? A repeated-measure ANOVA revealed that Characteristic significantly affects participants' confidence in the decision about who to socialize, $F(5, 2440) = 165, p < .001, \eta_p^2 = .252$. Participants were significantly more confident in their choice when

given information about an individual's Considerate ($M = 4.31$) than Helpful ($M = 4.12$) and Generous ($M = 4.15$). They were even less confident when an individual was described as Prestigious ($M = 3.70$). The confidence was the lowest for Attractive ($M = 3.63$) and Intelligent ($M = 3.64$).

Who will win a lottery? A repeated-measure ANOVA showed that Characteristic significantly influences participants' confidence in their choice of who will win a lottery, $F(5, 2440) = 18.19, p < .001, \eta_p^2 = .036$. They were equally, and more confident when given the characteristics of Helpful ($M = 2.22$) and Generous ($M = 2.23$) than when given the characteristics of Considerate ($M = 2.15$) and Prestigious ($M = 2.10$). The confidence was the lowest for Intelligent ($M = 2.09$) and Attractive ($M = 2.06$).

One-sample t-test. A one-sample t -test was conducted to examine if the confidence on each of these characteristics differs from chance of 3 (i.e., neither confident nor unconfident). The average confidence on the general question was lower than chance for all six characteristics. Beyond that, the confidence on the prosocial and social questions were significantly higher than chance. See Table 4 for the descriptive and t -statistics.

Table 4.

Participants' confidence on different questions for different characteristics and the one-sample t -statistics comparing each score against chance value of 3, in Study 2.

Characteristic	Prosocial question			Social question			General question		
	M	SD	t	M	SD	t	M	SD	t
Helpful	4.25	.71	38.63**	4.12	.77	32.23**	2.22	1.21	-14.28**
Generous	4.24	.74	37.78**	4.15	.79	32.20**	2.23	1.21	-14.09**
Considerate	4.15	.75	33.86**	4.31	.74	39.16**	2.15	1.17	-16.14**
Prestigious	3.66	.81	18.12**	3.80	.81	21.71**	2.10	1.14	-17.37**
Attractive	3.38	.96	8.79**	3.62	.83	16.58**	2.06	1.12	-18.64**
Intelligent	3.90	.79	25.30**	3.64	.94	15.14**	2.09	1.11	-18.13**

Note. ** $p < .01$.

Discussion

The purpose of Study 2 was to assess how adults use different information regarding an individual's characteristics to guide their selective prosocial behavior and selective social interactions. I proposed that two possible evaluative mechanisms could be involved: global evaluations and dispositional evaluations. If global evaluations are used, I predict that any positive characteristic, including prosocial, positive social, positive non-social characteristics, would result in selective prosocial behavior and selective social interaction. In other words, people would prefer to help as well as to socially interact with the helpful, the generous, the considerate, the prestigious, the attractive, and the intelligent individuals rather than the individuals who displayed the negative version of these traits. The use of global evaluations would be further supported by participants' high confidence in their decision, regardless of what characteristic they used to make their decision. In contrast, if dispositional evaluations are made, then only the characteristics relevant to prosociality and those relevant to social interaction lead to selectivity. That is, people would be more likely to help those who demonstrate prosocial characteristics due to its relevance, but less likely to help those demonstrating positive characteristics irrelevant to prosociality. Dispositional evaluations would result in selective social interactions directing toward individuals with prosocial and positive social characteristics more frequently than those with positive non-social characteristics. The confidence on their choice would be high when relevant characteristics are present. It may not be a case of simply using either global evaluations *or* dispositional evaluations, people may show the combined use of both evaluations, such that they selectively help and interact with the positive characters with equal likelihood across characteristics in forced-choice situations, then show different confidence in their choice depending on the relevance of that characteristic to the target behavior. Finally on the general question, no matter what social evaluations are used, participants may display no preference for either character because the outcome is simply random; or, they may choose the positive characters across characteristics due to a general approach tendency toward positive characters. The confidence would be very low in the choice on the general question.

The results are more consistent with the hypothesis of using dispositional evaluations. First on forced-choice question, the participants' willingness to choose the positive characters varied depending on characteristic and question. Specifically, participants were more likely to

help characters who are helpful, generous, and considerate, but relatively less likely to help characters who are prestigious. One possibility is that this distinction may be explained by the valence difference between Helpful, Generous, Considerate, and Prestigious. However, the difference in possibilities of choosing the positive character was much larger than the difference in valence between these characteristics, suggesting that valence is not the only factor involved. Moreover, participants did not help attractive and intelligent characters at all although these two characteristics were judged as positive in Study 1. This also suggests that other factors beyond valence, such as irrelevance and empathy, were taking effect. Regarding the social question (i.e., who to interact with?), participants preferentially interacted with positive characters across characteristics in general, but the possibilities of choosing the positive character were different. When looking at prosocial and social questions together, it appears that participants' choices were more differentiated across characteristics when determining who to help than when determining who to interact with, suggesting that prosocial decisions were made more cautiously and selectively.

Further evidence in support of the use of dispositional evaluations came from the finding that participants exhibited different confidence in their choice depending on the question asked and the characteristic involved. Specifically, participants were more confident in their choice on prosocial question when given prosocial characteristics than when given social characteristics even though they chose the positive characters in both contexts. It suggests that participants actually realized that social characteristics are less relevant to prosocial behavior, despite choosing the positive characters in forced-choice situations. Similarly, participants showed higher confidence in their choice on social question when given prosocial and social characteristics than when given non-social characteristics, suggesting that they recognized that non-social characteristics are less relevant to social interactions. Notably, participants were not confident in the choice on general question at all, indicating that they were aware of that the prediction on a random question is unreliable.

To conclude, adults took the specificity of characteristic and context into account when making decisions pertaining to selective prosocial behavior and selective social interactions, suggesting that dispositional evaluations were used. Especially for selective prosociality, adults exhibited differentiations based on not only domain of characteristic but also its relevance.

Chapter 4. Study 3: Evaluative mechanisms in children

This study was an extension of Study 2 from adults to young children. It aimed to investigate the developmental trajectory of evaluative mechanisms by looking at how children respond to different information about an individual's characteristics. Given that young children are still cognitively developing and less socially experienced compared to adults, they could be more likely to use global evaluations to guide their selective prosocial behavior, that is, not only prosocial characteristics but also other positive characteristics will influence their selectivity. In other words, children tend to be driven by positively valenced characteristics when choosing their social partners.

Making dispositional evaluations could be a challenge to young children. Dispositional evaluations require dispositional attribution and behavioral prediction from an individual's previous behaviors; however, children are incapable of doing these until mid-childhood (e.g., Kalish, 2002; Rholes & Ruble, 1984). Moreover, young children easily generalize the behavior from one domain to another (Cain et al., 1997), demonstrating a global thinking. On the other hand, some research suggests that trait labels facilitate behavioral prediction even for very young children (Fitneva & Dunfield; Heyman & Gelman, 1999; Liu et al., 2007). In view of this, the current study provided both trait labels and trait-relevant behaviors to the children, which was supposed to enhance children's understanding on described characteristics. Yet, it is still doubtful whether children make dispositional evaluations because the study did not explicitly ask children to predict characters' future behavior.

Similar to Study 2, the present study looked at how different characteristics (i.e., prosocial characteristic "Helpful", social characteristic "Polite", and non-social characteristic "Attractive") influence children's selective partner choice. I chose to use three characteristics instead of six in order to simplify the testing procedure and shorten the testing time to make it more appropriate and manageable for young children. The four test questions assessed who the children preferred to help, play with, and assign a preferred/non-preferred food to. The two food assignment questions served as a control measure corresponding to the general question in adult study, ensuring that the participants were attending to the characteristics and questions.

With the hypothesis that global evaluations would be mainly used in children's partner choice behavior, I predicted that children would selectively help and interact with the positive

characters regardless of characteristic. In contrast, if children make dispositional evaluations, their preference for the positive character would differ depending on characteristic involved. Specifically, participants would be more likely to help the helpful character than to help the polite and the attractive characters. They would also prefer to play with the helpful and the polite characters more likely than attractive ones. On food-assignment questions, I predicted that participants would assign preferred food to the positive characters and non-preferred food to the negative characters irrespective of characteristic involved.

Method

Participants

Twenty-six children (12 girls and 14 boys) participated in this study. The ages ranged from 3.5 to 4.4 years with a mean age of 4 ($SD = .27$). Participants were recruited from the Concordia University Developmental database and resided in the Montréal area. Participants' cultural and language backgrounds are diverse but all children understand and speak English as first or second language. Two participants were eventually excluded from data analysis due to experimenter error. The final sample size therefore was 24.

Materials

Children viewed six pairs of color drawing (see Appendix B for examples), each depicting two children who differ on a single specific characteristic. Each of the three characteristics, namely Helpfulness, Politeness, and Attractiveness, appeared in two pairs of picture with different characters and context. In all cases the gender of two paired children was kept constant and match the gender of the participants. All characters had unique appearances (i.e., hair color, clothing color) and names.

Procedure

The experimenter introduced the participant and the parent/s to the waiting room. The participant had an opportunity to get familiar with the environment by either playing toys or exploring the testing room, meanwhile the parent was given a brief introduction to the study and signed the consent form. Subsequently, the experimenter led the child to the testing room leaving the parent/s in the waiting room where they could watch their child through the one-way mirrors.

In very few cases, the parent was allowed to be in the testing room accompanying the child if the child requested. However, the parent sat behind the child and there was no physical contact between them; the parent also was asked to keep silent during the experiment to avoid any forms of possible intervention.

The experimenter and the participant sat on opposite sides of the desk facing each other. The experiment started with an introduction. Each trial consisted of three phases as follow.

Familiarization phase. The experimenter presented the paired pictures on the desk, one on the left and the other on the right, separately, leaving space between them. Meanwhile, the experimenter orally described the characters to the participants as “This is X, X is very helpful. Look, here she is picking up this toy. This is Y, Y is not very helpful. Look, here she is ignoring this toy.” The order of picture presentation was counterbalanced across participants.

Testing phase. Following familiarization phase, participants were tested on four questions. These four test questions reflected three different scenarios: prosocial scenario (i.e., Imagine X and Y are completing a puzzle, and they need your help to complete it. Who would you like to help? X or Y?), social scenario (Let’s pretend we are in the playground. Who would you like to play with? X or Y?), and general scenario (i.e., Imagine you have one cookie and one piece of broccoli. Who would you like to give the cookie to? X or Y? Who would you like to give the broccoli to? X or Y?).

When asking the question, the corresponding picture (see Appendix B for examples) was also presented to the child so that the child could completely understand the scenario and question. The order of the testing questions was randomized across trials.

Memory check phase. Following the four test questions, the child received memory check questions (i.e., “Who was helpful/ polite/ pretty (handsome)? Who was not helpful/ polite/ pretty (handsome)?”).

After completing the six trials, one final question asked “What do you prefer? Cookie or broccoli?”. This question was designed to make clear of the participant’s personal food preference which would affect their responding on the two food assignment questions.

The entire experiment took 10-12 minutes on average. The child received a certificate and a small toy as compensations.

Results

Coding. For each of the four test questions, choosing the positive character was coded as 1 and choosing the negative one was coded as 0. The food-assigning questions were coded based on individual preference as “preferred food question” and “non-preferred food question”. There are two trials for each specific characteristic so participants answered two prosocial questions, two social questions, two preferred-food questions, and two non-preferred questions for each characteristic. The scores were averaged across two trials, so the final score of each question for each characteristic was between 0 and 1, representing the proportion of the participants’ positive character choices.

Preliminary analysis. Twenty-three participants correctly answered the memory check questions, suggesting that the participants understood the paradigm and remembered the character’s descriptions. One child failed memory check and was excluded from the following data analysis. Regarding food preference, 20 out of 23 participants preferred cookie, and the remaining 3 children preferred both cookie and broccoli but switched to cookie after being forced to choose one.

Omnibus ANOVA. I conducted a mixed model ANOVA to examine the effects of Question (4 levels: prosocial, social, preferred-food assigning, and non-preferred food assigning questions), Characteristic (3 levels: Helpful, Polite, and Attractive), and Gender on children’s choice between two characters. There was no main effect for Gender, $F(1, 21) = .559, p = .463$. There was no interaction between Gender and other factors either ($ps > .05$). I report the results based on a simpler ANOVA with Characteristic (Helpful, Polite, and Attractive) and Question (prosocial, social, preferred food assigning, and non-preferred food assigning) as within-subjects factors.

There was a main effect of question, $F(3, 66) = 15.95, p < .001, \eta_p^2 = .42$. Pairwise comparisons showed that participants were equally likely to choose the positive character on prosocial ($M = .775, SD = .197$), social ($M = .783, SD = .273$), and preferred food questions ($M = .725, SD = .187$), but much less likely to do so on non-preferred food questions ($M = .391, SD$

= .259). This effect can be seen in Figure 4. No main effect of Characteristic was found, $F(2, 44) = .112, p = .894$, suggesting that participants did not distinguish between the specific positive characteristics; rather, they treated prosocial, social, and non-social general characteristics equally. Furthermore, there was no interaction between these two factors, $F(6, 132) = 1.28, p = .271$. In conclusion, children varied their choice only based on Type of Question, choosing the positive characters on the positive-oriented questions (i.e., who to help, who to play with, and who to give the preferred food) and the negative characters on the negative-oriented question (i.e., who to give the non-preferred food).

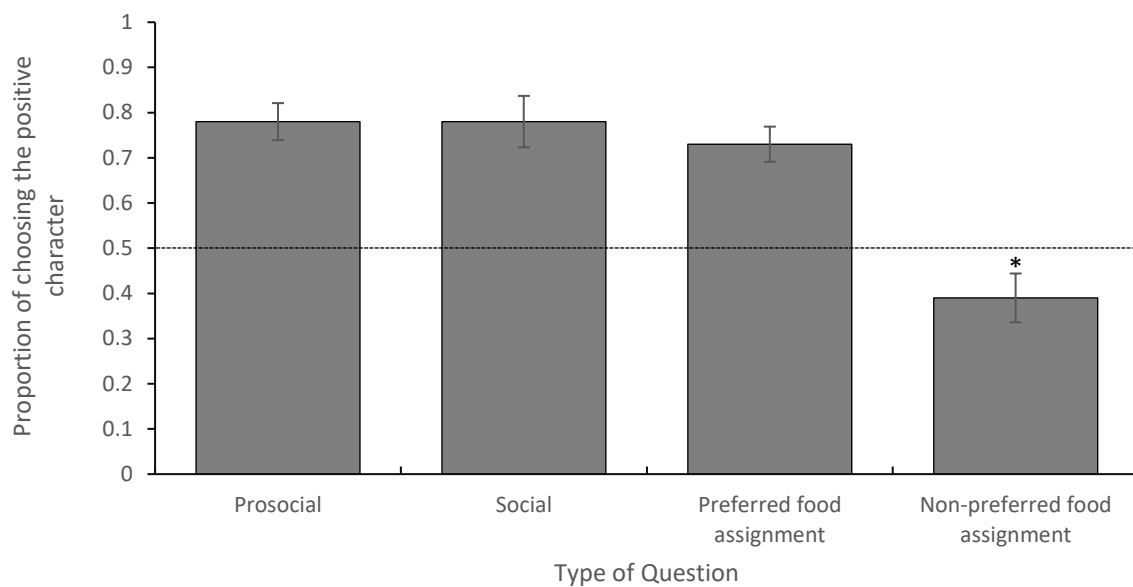


Figure 4. Mean proportion of positive character choices on each type of question, in Study 3.

The error bars represent +/- 1 standard error.

To determine how willing participants were to choose the positive character as a function of Question asked and Characteristic described, I also conducted a one-sample *t*-test to compare each score with chance value of .5 (See Table 5). Children's assignment of preferred food and non-preferred food between helpful and unhelpful characters was random and did not differ from chance. Except for that, children showed a significant preference for the positive character.

Table 5

Mean possibility of choosing the positive character on different questions for different characteristics and the one-sample t-statistic comparing each score against chance value of .5, in Study 3.

Question	Characteristic	<i>M</i>	<i>SD</i>	<i>t</i>
Prosocial	Helpful	.70	.36	2.60 *
	Polite	.78	.29	4.60 **
	Attractive	.85	.28	5.97 **
Social	Helpful	.78	.36	3.73 **
	Polite	.80	.25	5.85 **
	Attractive	.76	.40	3.17 **
Preferred food sharing	Helpful	.65	.41	1.78
	Polite	.76	.26	4.90 **
	Attractive	.76	.33	3.76 **
Non-preferred food sharing	Helpful	.50	.43	0
	Polite	.35	.41	-1.78
	Attractive	.33	.36	-2.34 *

Note. * $p < .05$. ** $p < .01$.

Discussion

I predicted that children tend to engage in global evaluations, selectively helping and playing with another by matching the valence between the known characteristics of the recipient and the valence of the target behavior. Specifically, children would prefer to help individuals who exhibit any form of positive characteristic/behavior, including prosocial, positive social, and positive non-social. The results were consistent with my expectations, such that participants made their choice by matching the valences between the recipient and the behavior: choosing the positive individuals to help, to play with, and to give the preferred food to; whereas, choosing the negative individuals to give the non-preferred food to. This clearly demonstrates the Halo effect of positive social and non-social general characteristics (i.e., politeness and attractiveness) on children's selective prosocial behavior.

One reason for children of 4 years old making global evaluations is that they have not been equipped with necessary cognitive capacity to make dispositional evaluations. I reason that global evaluations involve automatic and perceptual cognitive processing (Greenwald & Banaji, 1995), which is early emerging so can be easily performed even by young children. Dispositional evaluations, however, require deliberate and reflective cognitive processing, which is more advanced and developed later in ontogeny. Therefore, it is possible that young children are only capable of making evaluations along a good-bad dimension, and the valence they assigned to a specific characteristic fully control their selective partner choice.

A second related, plausible reason that children use global evaluations is the difficulty that preschoolers experience making behavioral predictions from past behavior and trait labels. Previous experimental studies demonstrated that not until middle childhood do children begin to make consistent behavioral predictions from traits (Kalish, 2002; Miller & Aloise, 1989; Rholes & Ruble, 1984; Rholes, Newman, & Ruble, 1990; Ruble & Dweck, 1995; Yuill, 1992). In the study of Rholes and Ruble (1984), kindergartners and fourth-graders were presented with videos of child actors engaging in trait-relevant behavior (e.g., a child is sharing the lunch with another who has nothing to eat). Then the children were asked to predict what behavior the child actors would perform in the future (e.g., helping or not helping with yard work). Only the older children correctly predicted that the actor's behavior in the future would be consistent with the previously observed behavior, suggesting that younger children do not regard traits as stable, abiding dispositions. In the absence of traits understanding and behavioral predictions, children rely on positive or negative valence of characteristics to guide their partner choice behavior. Indeed, Cain, Heyman, and Walker (1997) showed that 4- and 5-year-olds generalize behavior in one domain to make predictions in other domains (e.g., a morally good person would be smarter and more athletic than a morally bad person), demonstrating global evaluative thinking. Similarly, the children in the present study might think that a polite person and an attractive person would be helpful as well. In summary, children's use of global evaluations to guide their selective social behavior are shaped partly by their poor trait reasoning.

Taken together, children showed evidence of global evaluations by which the valence of described characteristics and behaviors fully drove their selective prosocial and social

interactions. This tendency can be explained partly by limited cognitive capacity and less social cognitive skills.

Chapter 5. General discussion

The current research sought to investigate the proximate mechanisms that underlie human's selective prosocial behavior. Previous research has consistently found that both adults and children preferentially help individuals with a history of helping (e.g., Barclay & Willer, 2007; Dunfield & Kuhlmeier, 2010; Kenward & Dahl, 2011). Selective prosocial behavior can be advantageous to an individual's survival because it reduces the risk of exploitation by free-riders, allowing prosociality between unrelated individuals to be maintained (Aktipis, 2004). The question of interest is: what cognitive mechanisms underlie the ability to engage in selective prosocial behavior? With regard of the proximate mechanisms, social evaluation plays a critical role because it helps trigger adaptive responses appropriate to the costs and benefits of the situation. It is necessary to distinguish positive from negative interactions, identify good and bad social partners, and predict future interactions. Based on social evaluations, individuals generally direct their prosocial acts to the one who has demonstrated prosocial behavior over than the one who has not (e.g., Dunfield & Kuhlmeier, 2011). The present research examined two potential mechanisms - global evaluations, and dispositional evaluations - that could serve as a foundation upon which strategic social behavior could be built upon.

As the first attempt of addressing this issue, the current study aimed to investigate what kind of social evaluation, namely, global evaluations or dispositional evaluation, is adopted in various social situations and how these evaluations develop with age. To that end, three experiments were carried out on adults and children, respectively. Based on the results, I argue that adults are capable of flexibly using dispositional evaluations to guide their selective prosocial behavior. In contrast, children of 4-year-old use global evaluations to guide selective prosocial behavior. The distinction between adults and children tells a story that how these two social evaluations are used depending on contexts and how they develop.

5.1. Current findings and relation to past studies

5.1.1. Valence of characteristics

As the foundation of this series of studies, Study 1 examined valence of various characteristics. Characteristics of test included prosocial (i.e., Helpful and Generous), social (i.e., Considerate and Prestigious), and non-social (i.e., Attractive and Intelligent). In general, the

valence test showed that all six characteristics were evaluated as positive, and the negative versions of these characteristics were negative. Through careful comparison and screening, I eventually kept four items within each characteristic, each item describing one specific aspect of that characteristic, with very similar valence across items and characteristics.

Although I categorized the characteristics into three types based on domain and the relevance to prosociality, it appeared that these characteristics fall into two distinct groups based on rated valence. Helpful, Generous, and Considerate were evaluated more positive than Prestigious, Attractive, and Intelligent. Unhelpful, Stingy, and Inconsiderate were judged as more negative than Non-prestigious, Unattractive, and Unintelligent. It is not surprising that two prosocial characteristics were rated more positive (and more negative for the negative version) because prosociality benefits others at the cost to the self (Eisenberg, 1986). The two characteristics within social domain, Considerate and Prestigious, were differentiated such that Considerate was rated as positively as the prosocial characteristics yet Prestigious was rated less positively and more similar to the non-social characteristics.

One possible reason for Considerate being rated as positive as Helpful and Generous is that they are all others-regarding. A considerate person thinks of how her/his behavior affect others and behave accordingly. Being considerate is beneficial to interpersonal relationship and social interaction in general. Some theorists (e.g., Jacobsen, 1983; Schwartz, 1968) include considerateness within the category of prosocial behavior. One study demonstrated that being considerate is beneficial to interpersonal cooperation and is greatly valued by group members (Ruvalcaba et al., 2015). In this way, Considerateness may be more like a prosocial trait than other, more purely social characteristics. Importantly, I did not put Considerateness into the prosocial domain because I used a narrower, more specific definition of prosocial behavior where one individual is responding to a perceived need in another (Dunfield, 2015). Unlike other forms of prosocial behaviors, considerateness involves enacting social rules based on context without necessarily responding to a need or incurring a cost (e.g., not leaving a mess after dinner).

Prestige, which has been widely studied in the literate of culture transmission and social learning (Henrich & Gil-White, 2001), is clearly a favorable characteristic within a society yet was not rated as positively as Considerateness. One reason might be that Considerateness is close

to prosocial characteristic in nature but Prestige is not, and prosocial characteristics are just incontrovertibly more positive than other traits. Also, prestigious individuals are often influential and ranked higher in social class, which is arguably related to dominance, coercion, and aggressiveness (Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013).

Last, non-social characteristics were rated even less positive. I reason that this is because Attractive and Intelligent are both intra-personal characteristics, simply existing on an individual and being displayed even without any other person. Therefore, they are not that important to others like prosocial and social characteristics. Taken together, the pattern suggests that people endow valence to a characteristic largely depending on how much this characteristic influences others and social interactions in a positive way. It will be useful to further examine this conclusion through looking at more other characteristics.

5.1.2. Adults' selective partner choice based on different characteristics

In general, adults in the current study exhibited a tendency to make dispositional evaluations. Participants' choice between positive and negative characters, as well as confidence in their choice, varied depending on both the characteristic being evaluated and decision being made, suggesting that they were sensitive to various information and the relevance of the information to the choice being made.

Who to help? Adults' decisions about whom to help were strongly influenced by others' prosocial characteristics such that they preferred to help individuals demonstrating these characteristics to those who do not. The selectivity was also affected, but less so, by social characteristics, that is, adults tend to help individuals possessing positive social traits. Adults appeared to acknowledge that prosocial characteristics are more relevant than social characteristics to prosocial choices, which is further supported by nuanced confidence in their selections. Importantly, it is somewhat unexpected that the difference in the probability of choosing positive characters between Considerate and Prestigious is larger than valence difference between them, suggesting that valence is not the only factor influencing selectivity.

Unexpectedly, adults preferentially helped the unintelligent (i.e., not smart) targets over intelligent ones. I argue this occurred because the prosocial task requires information sharing and unintelligent people appear to be more in need of this. I chose to word the prosocial question this

way because prosocial characteristics in test included Helpful and Generous and a question being framed out of instrumental helping and material sharing would reduce bias. However, it may be possible that this wording elicited empathy in participants toward unintelligent characters. Empathic motive to helping blends in and played a critical role in participants' choice. I expect that there will be a difference in a prosocial scenario without intelligence involved.

Last, selective helping seemed not to be driven by Attractiveness such that the participants showed no preference for either attractive or unattractive character. They were however less confident in this choice. This is interesting given that attractiveness has been a universally accepted positive characteristic and was also rated positively by our participants in Study 1 so it is unexpected that subjects in the Study 2 showed no discrimination between attractive and unattractive individuals. This may be caused by the realization that attractiveness is simply not a relevant factor of selective prosocial behavior. More likely, this may result from an interactive effect between the stereotypical preference for attractive individuals and empathy elicited by unattractive ones at the same time, because the pattern of no preference cannot be explained by either single factor. In support of this interpretation, Fisher and Ma (2014) found that attractive children elicited less empathy and helping from unrelated adults although these attractive children were attributed many positive traits like "sociable, intelligent, and helpful". They argued that attractive children are considered less needy than their less attractive counterparts because they are stereotypically advantageous on social competence. Furthermore, lower confidence means that participants were less certain about their choice and they recognized that the information available was less relevant to making a prosocial decision.

Who to interact with? Adults' selective social behavior turned out to be based on valence across characteristics such that they always preferred positive individuals to negative ones to interact with, although some nuances existed. Specifically, like in selective prosocial behavior, they were the most likely to interact with prosocial and considerate individuals, than intelligent, prestigious, and attractive individuals. Participants were also very confident in their choice. Another important finding emerges when looking at selectivity and valence together. Participants' selective social interaction appears, by eyeballing, to be positively related to the valence attributed to that characteristic, meaning that the possibility of choosing the positive character is higher when valence of that particular trait is higher, and lower when valence of that trait is

lower. This suggests that people are willing to socially interact with positive individuals over negative ones regardless of characteristics; people's willingness also depends on how positive that characteristic is. In conclusion, adults' selective social interaction are largely valence-driven, indicating the use of global evaluations.

Who will win a lottery? The final question described a random scenario, which serves as a control measure to prevent participants from perseveration. This question also ensures that participants were paying attention and sensitive to the various manipulations. It appeared to be effective as participants' responding differed greatly from the two previous scenarios. Specifically, participants still tended to choose positive characters across all characteristics, while the possibilities decreased compared with prosocial and social questions. More important, the confidence decreased falling below chance, meaning that they were not confident in their choices at all. This pattern indicates that although adults somehow predicted that positive individuals will win the lottery in a forced-choice situation, they were aware of that the outcome is random and independent of any other factors and that positive characteristic does not guarantee winning everything.

5.1.3. Children' selective partner choice based on different characteristics

As an extension of Study 2, Study 3 aimed to explore the same theoretical question in young children, that is, how children respond to different types of characteristic in various social situations. Characteristics of interest included Helpfulness (prosocial domain), Politeness (social domain), and Attractiveness (non-social domain). Participants were asked to select one between positive and negative characters to help, play with, assign preferred food, or assign non-preferred food. The results support the use of global evaluations by children in selective partner choice.

Who to help? First, regarding selective prosocial behavior, i.e., whom to help complete a puzzle, children exhibited an equally strong preference for positive characters over than negative ones, regardless of characteristics. Notably, children displayed a strong preference for attractive characters. It is inconsistent with adults' responding where they showed no preference to attractive individuals at all. Children's prosocial preference is consistent with much previous research demonstrating that people hold prosocial bias and act prosocially toward attractive individuals in many situations (Landry et al., 2006; Maestripieri et al., 2017; Raihani & Smith, 2015)

Who to play with? Children's selective social interaction also depends largely on valence of the exhibited characteristic. Specifically, children are willing to interact with helpful, polite, and attractive individuals, but not the individuals demonstrating the negative version of these traits. Again, like in selective helping, children showed equal preference toward positive characters regardless of specific characteristic. Valence appeared to be the only factor affecting children's selective social interaction. This is consistent with the pattern shown by adults; both were using global evaluations to determine who to socially interact with.

Who to assign the food to? The food assigning scenario included two questions: who to give the preferred food to, and who to give the non-preferred food to. First, children varied their choice on these two questions suggesting that they differentiated them. Second, children tended to give the preferred food to the positive characters and the non-preferred food to the negative characters, meaning that they were matching the valence of their behavior and the characteristic, a clear demonstration of global evaluations being used.

The finding from the current study that both adults and children favor prosocial individuals than non-prosocial ones is consistent with many studies in the literature (e.g., Dunfield & Kuhlmeier, 2010; Milinski, Semmann, & Krambeck, 2002; Nowak & Sigmund, 2005; Warneken & Tomasello, 2013). It is no doubt that selective prosociality based on other people's prosocial history is beneficial to an individual's fitness of survival because this strategy helps avoid free-riders in cooperative interactions. The employment of dispositional evaluation is efficient in maintaining the reciprocity systems in social interactions through its facilitating impact on choosing a good social partner (e.g., Baumard et al., 2013). By using different methodology, the current study provided one further piece of evidence for human's selective prosocial behavior.

In summary, the current findings are consistent with much previous work on selective prosocial behavior, trait understanding, and social evaluation. The present research, along with the related literature, provide the first piece of empirical evidence that two evaluative mechanisms, namely global evaluations and dispositional evaluations, are involved in human's selective prosocial behavior. While adults are able to flexibly using dispositional evaluations which take nuanced information and contexts into account, young children seem to make global

evaluations in general. This distinction may be resulted from a combined effect of cognition and social cognition.

5.2. Development of social evaluations

The present study provides evidence that adults are able to flexibly engage in dispositional evaluations by differentially using the information in hand whereas young children appear to make global evaluations. Various factors may contribute to this distinction; I provide explanation from cognition and social cognition theories. With the cognitive aspect, the global evaluation requires minimal cognitive skills because it simply assigns valence toward characteristic. However, the dispositional evaluation entails higher order cognition such as reasoning and planning, e.g., to predict whether the individual will be helping in return in future interaction. More supportive evidence for this distinction is from the work on neuroscience of evaluation. The prefrontal cortex is involved in more deliberative and reflective evaluation (e.g., Duncan & Owen, 2000; Johnson & Reeder, 1997; Stuss & Benson, 1984). Therefore, it poses a challenge for young children to make dispositional evaluations because prefrontal cortex has not fully developed (Fuster, 2001).

With regard to social cognition, as previously reviewed, even preverbal infants appear to make social evaluations in terms of positivity and negativity of the stimuli, which suggests that the ability to make global evaluations is obtained early in life (Hamlin et al., 2007). The dispositional evaluation, on the other hand, requires complex and advanced social cognition such as understanding the nuances between social stimuli, incorporating past experiences into current situations, and generating appropriate behavioral response depending on specific contexts. Considering that one critical component of dispositional evaluations involves an expectation of reciprocity, dispositional evaluation requires the mental capability of making behavioral predictions from the inferred/known trait of others. Adults readily evaluate and form impressions of others based on even slice of trait-relevant information (Ambady & Rosenthal, 1992; Carlston & Skowronski, 1994; Winter & Uleman, 1984). Adults are also extremely adept at predicting behaviors from characteristics (Ajzen, 1981; Liu et al., 2007). Young children, on the other hand, have been demonstrated in many studies that not until mid-childhood that they well understand the relation between past behaviors, traits, and future behaviors (Alvarez et al., 2001, Boseovski

& Lee, 2006; Boseovski et al., 2013; Cain et al., 1997; Liu et al., 2007). Therefore, dispositional evaluations have not been at play during early childhood.

5.3. Limitations and future directions

The current study had limitations that deserve further discussion. One limit of the present study is that there were two different groups of participants rating valence of characteristic and engaging in selective prosocial behavior, which makes it difficult to explain the discrepancy between valence difference and selectivity difference among characteristics. Current studies did not test both valence and selectivity on the same group of participants because this would be a long study containing lots of items with high similarity, easily making participants bored and less focused. Future research could ask about valence and selectivity on same individuals, allowing statistical control.

Another issue involves the relation between the dispositional evaluation made by adults and the expectation of reciprocity. The current study suggests that adults' selective prosociality are based on both valence and relevance of the characteristics, but this does not directly reflect an expectation of reciprocity in the future, especially when considering that participants in the study were clearly aware of that there is no opportunity for future interaction. Although this is seemingly true, I argue against this for two reasons. First, the expected reciprocity is not necessarily directed towards the participants or the actors themselves, but also may be directed to a third party. Because the character has been attributed a helpful disposition, it is logical to predict that a helpful person will help again in the future. Second, the expectation of reciprocity can be implicit as opposed to explicit, which means the mental processing involved is automatic and unintentional. However, this possible issue could be easily fixed by asking a flipped question such as "Imagine a situation where you need help. Who do you think would help you?".

Further, some may argue that the experiment designed for children should include a continuous responding option that allows children to make more sophisticated decisions given that the current study involves only forced-choice tasks. The responding under the forced-choice situation may not exclusively demonstrate global evaluations because they were not given the opportunity to make a more sophisticated response. I consider this less plausible because even in the forced-choice situation it would be observed if any difference in selectivity exists across characteristics. Another related issue comes from adult study, where a forced-choice task

followed by confidence rating which inevitably produces bias; a solution to this issue could be only asking about selectivity on a continuous scale.

One interesting further direction along with the issue is to carry out studies in school-age children in order to identify when the change in evaluative systems happens. The shift from global evaluations to dispositional evaluations probably occurs in mid-childhood because by then children begin to frequently apply psychological as opposed to physical characteristics to their social partners (Craig & Boyele, 1979), suggesting that they can better understand the nature of characteristics. Also around that age children are adept at establishing relation between behaviors and traits (e.g., Cain et al., 1997; Liu et al., 2007), so that they would be able to correctly assign a prosocial disposition to individuals who have been previously prosocial and reliably predict prosocial behavior from relevant traits. It is of importance to investigate social evaluative mechanism underlying prosocial behavior and its ontogeny.

Another further research step deserving taking is to introduce implicit cognitive measurement, such as eye tracking and reaction time, accompanying behavioral measurement, which would provide us deeper insights to social evaluative mechanisms when deciding selective prosocial behavior. The technique of eye tracking would help probe underlying cognitive processes during decision making. For example, we would see an increased pupil dilation if individuals are making dispositional evaluations when given irrelevant information because larger pupil size may reflect uncertainty during decision processes (Aston-Jones and Cohen, 2005; Yu & Dayan, 2005). Another implicit measure is reaction time. Specifically, we would expect that adults make decisions rapidly when given relevant information more than when given irrelevant information within the framework of the current study, which may reflect that dispositional evaluation is engaged. However, children's reaction time may not differ no matter they are given relevant or irrelevant information because they are making global evaluations anyway.

5.4. Conclusions

Humans are often selective in prosocial behavior to mitigate the risk of being exploited by free-riders. The underlying cognitive mechanism may include two distinct social evaluations: global evaluations, which simply match the valence of observed characteristic and prosocial acts, and dispositional evaluations, which assign a prosocial disposition to the individual and expect

future reciprocity. The current study tried to distinguish between these two evaluative mechanisms by conducting experiments on adults and children. The results revealed that adults tend to make dispositional evaluations, whereby carefully thinking about different information available to make partner choice decisions. In contrast, young children make global evaluations, preferentially helping any positive individuals regardless of characteristic involved. This developmental distinction tells us these two social evaluations are used at different age; however, we do not know at what age dispositional evaluations emerge. To better understand the ontogeny of social evaluation, future research may be interested in to explore this question on slightly older children. The current study contributes to the literature on selective prosocial behavior and social evaluative mechanisms by systematically examining the effect of various characteristics within different domain on individuals' selective partner choice. The current study also provides the first piece of empirical evidence for the differential use of global evaluations and dispositional evaluations.

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Appendix A. Stimuli Pool in Study 1

Items on Helpful:

Imagine a man named John. John is helpful and glad to assist others.

Imagine a woman named Marina. Marina is helpful and never indifferent to others' needs.

Imagine a woman named Teresa. Teresa is helpful and often volunteers in the community.

Imagine a man named Sheldon. Sheldon is helpful and never ignores others' needs.

Imagine a woman named Jasmine. Jasmine is helpful and willing to lend a hand.

Imagine a man named Evan. Evan is helpful and always responds to others' needs.

Items on Unhelpful:

Imagine a man named Tom. Tom is unhelpful and never assists others.

Imagine a woman named Cathy. Cathy is unhelpful and always indifferent to others' needs.

Imagine a woman named Kim. Kim is unhelpful and never volunteers in the community.

Imagine a man named Scott. Scott is unhelpful and always ignores others' needs.

Imagine a woman named Lily. Lily is unhelpful and never willing to lend a hand.

Imagine a man named Stewart. Stewart is unhelpful and never responds to others' needs.

Items on Generous:

Imagine a woman named Emma. Emma is generous and shares often.

Imagine a man named Mike. Mike is generous and distributes resources fairly.

Imagine a woman named Kate. Kate is generous and gives more than she takes.

Imagine a man named Mark. Mark is generous and gives away items that he really likes.

Imagine a man named Toby. Toby is generous and donates money frequently.

Imagine a woman named Maggie. Maggie is generous and gives away items to those in need.

Items on Stingy:

Imagine a woman named Lisa. Lisa is stingy and never shares.

Imagine a man named Bob. Bob is stingy and distributes resources selfishly.

Imagine a woman named Sienna. Sienna is stingy and takes more than she gives.

Imagine a man named Jason. Jason is stingy and only gives away items that he does not want.

Imagine a man named Norman. Norman is stingy and never donates money.

Imagine a woman named Chelsea. Chelsea is stingy and never gives away items to those in need.

Items on Admired:

Imagine a woman named Sally. Sally is admired and people often hang around her.

Imagine a man named Richard. Richard is admired and respected by others.

Imagine a woman named Diane. Diane is admired and her opinions carry weight with others.

Imagine a man named Harry. Harry is admired and people always ask him for advice.

Imagine a man named Justin. Justin is admired and has many followers.

Imagine a woman named Jessie. Jessie is admired and often influences others.

Items on Not-admired:

Imagine a woman named Debby. Debby is not admired and people never hang around her.

Imagine a man named William. William is not admired and not respected by others.

Imagine a woman named Vera. Vera is not admired and her opinions never carry weight with others.

Imagine a man named Frank. Frank is not admired and people never ask him for advice.

Imagine a man named Leo. Leo is not admired and has no followers.

Imagine a woman named Sasha. Sasha is not admired and never influences others.

Items on Considerate:

Imagine a man named Leo. Leo is considerate and always uses his manners.

Imagine a woman named Sasha. Sasha is considerate and never leaves a mess.

Imagine a man named William. William is considerate and never interrupts conversations.

Imagine a woman named Lucy. Lucy is considerate and always patient with other people.

Imagine a man named Adrian. Adrian is considerate and apologizes when it is appropriate.

Imagine a woman named Samantha. Samantha is considerate and always keeps her promises.

Items on Inconsiderate:

Imagine a man named Ryan. Ryan is inconsiderate and never uses his manners.

Imagine a woman named Ellen. Ellen is inconsiderate and often leaves a mess.

Imagine a man named Steve. Steve is inconsiderate and frequently interrupts conversations.

Imagine a woman named Rosie. Rosie is inconsiderate and never patient with other people.

Imagine a man named Spencer. Spencer is inconsiderate and never apologizes when it is appropriate.

Imagine a woman named Dorothy. Dorothy is inconsiderate and never keeps her promises.

Items on Attractive:

Imagine a man named Tony. Tony is attractive and is often asked on dates.

Imagine a woman named Helen. Helen is attractive and frequently gets smiles from strangers.

Imagine a man named Matt. Matt is attractive and always catches others' attention.

Imagine a man named Brad. Brad is attractive and often gets compliments on his appearance.

Imagine a woman named Rachel. Rachel is attractive and people often like her selfies on Facebook.

Imagine a woman named Jessica. Jessica is attractive and looks stunning even without any makeup.

Items on Unattractive:

Imagine a man named Edward. Edward is unattractive and is seldom asked on dates.

Imagine a woman named Anna. Anna is unattractive and never gets smiles from strangers.

Imagine a man named Andy. Andy is unattractive and never catches others' attention.

Imagine a man named Sean. Sean is unattractive and never gets compliments on his appearance.

Imagine a woman named Amanda. Amanda is unattractive and people never like her selfies on Facebook.

Imagine a woman named Lindsay. Lindsay is unattractive and never looks stunning even with a lot of makeup.

Items on Intelligent:

Imagine a woman named Kelly. Kelly is intelligent and enjoys reading.

Imagine a man named Eric. Eric is intelligent and remembers things easily.

Imagine a woman named Julia. Julia is intelligent and learns new skills quickly.

Imagine a man named Colin. Colin is intelligent and solves problems easily.

Imagine a woman named Judy. Judy is intelligent and often wins quiz games.

Imagine a man named Robert. Robert is intelligent and rarely gets confused.

Items on Unintelligent:

Imagine a woman named Nancy. Nancy is unintelligent and does not enjoy reading.

Imagine a man named Trevor. Trevor is unintelligent and never remembers things easily.

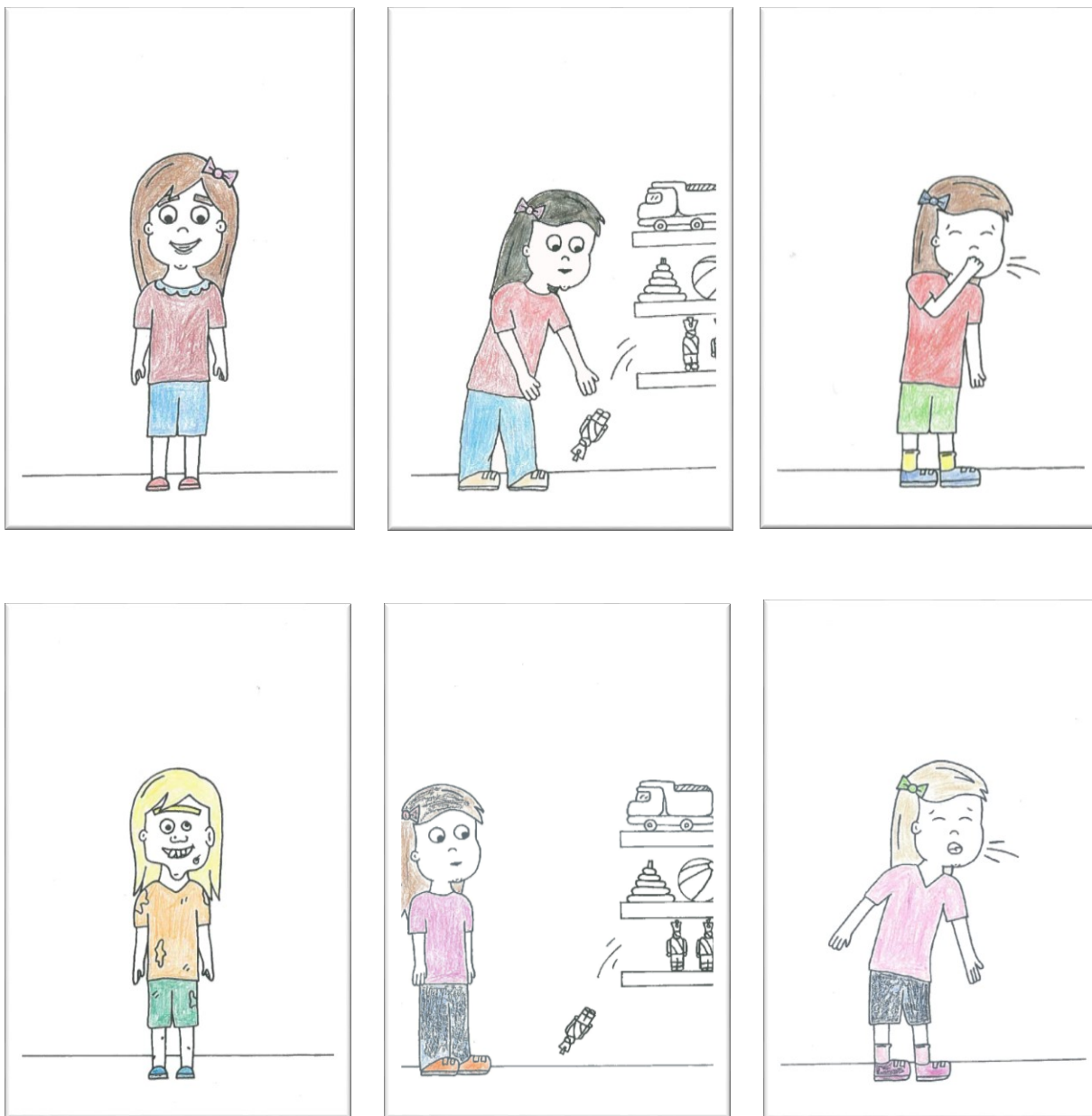
Imagine a woman named Megan. Megan is unintelligent and never learns new skills quickly.

Imagine a man named Kevin. Kevin is unintelligent and solves problems with difficulty.

Imagine a woman named Vanessa. Vanessa is unintelligent and never wins quiz games.

Imagine a man named Ethan. Ethan is unintelligent and often gets confused.

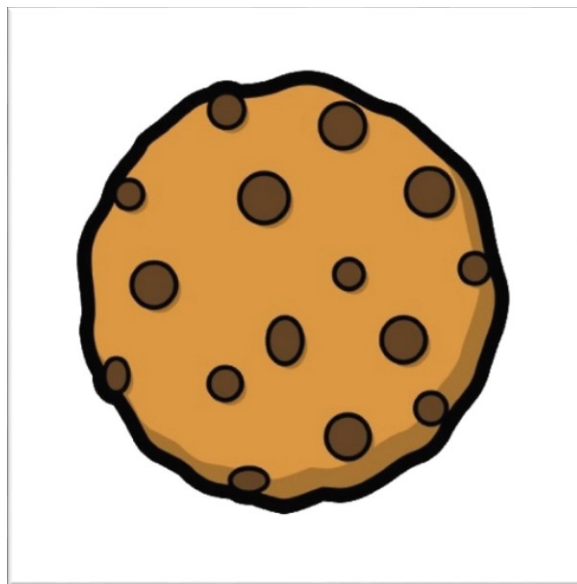
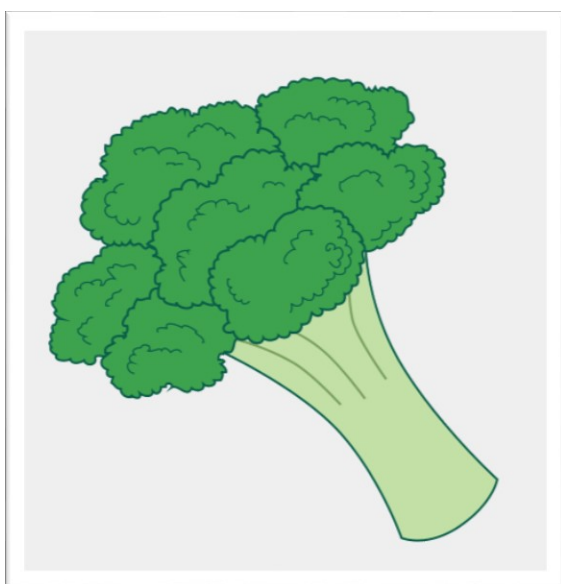
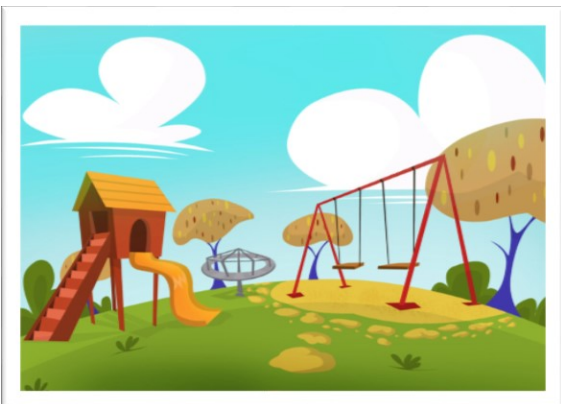
Appendix B. Example stimuli in Study 3



Top: Attractive, helpful, and polite characters.

Bottom: Unattractive, unhelpful, and unpolite characters.

Appendix C. Example pictures for test question in Study 3



Top: playground for social question; puzzle for prosocial question

Bottom: Broccoli and cookie for food-assignment question