# Dissonance in other-regarding preferences: preference changes and the act of choice

Master's thesis Behavioural Economics

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#### Abstract

This thesis examines whether other-regarding choices feed back into and modify other-regarding preferences. Chen and Risen's (2010) adaptation of the free-choice paradigm is used to identify preference changes specifically induced by the act of choice. People are presented choice between two monetary distributions between themselves and someone else; varying the timing of this decision between treatments controls for the information revealed by choice. Other-regarding preferences are conceptualized in terms of social value orientations (SVOs), being established using the SVO Slider Measure of Murphy, Ackermann, and Handgraaf (2011). Choice-induced preference changes seem to be present in other-regarding preferences, with individuals who face the difficult decision before the second elicitation of preferences being more likely to adjust their preferences than those who do so afterwards. Dissonance reduction appears to manifest differently than is commonly hypothesized for self-regarding preferences. In particular, individuals do not necessarily adjust their preferences consistent with their choice. Self-affirmation theory (Steele, 1988) best describes the findings, with decisions potentially threatening one's self-concept. Choices modify other-regarding preferences, although the psychological processes responsible for these preference changes remain to be explored.

#### 1. Introduction

Roughly eight decades ago, Samuelson (1938, 1948) first postulated that decisions reveal underlying preferences. This view has since then been widely accepted in economics, with preferences at least partially guiding choices. Choices however also appear to modify already existing preferences or attitudes, implying choice-induced preference changes (Alós-Ferrer & Shi, 2015). Exploring this seemingly synchronous relationship between preferences and choices is important for social psychology, judgement and decision-making, and microeconomics.

The process of cognitive dissonance reduction is commonly argued to cause these potential preference changes. Dissonance theory posits that people experience mental discomfort from holding two or more cognitions, such as beliefs and actions for instance, that are inconsistent with each other (Festinger, 1957, 1964). To illustrate, suppose that an individual is required to choose between two equally rated alternatives, dissonance may then be created by the desirable aspects of the unchosen option and the undesirable aspects of the chosen one. Individuals alleviate this tension by altering their initial preferences to ensure attitudes and actions are consistent (Alós-Ferrer & Shi, 2015).

Most of economic analysis relies on the assumption of stable and well-defined preferences, and investigating the economic significance of choice-induced preference change is therefore clearly important. The purpose of this thesis is to examine the phenomenon's relevance for the concept of other-regarding preferences, thereby exploring a new dimension in choice-induced preference change and dissonance theory. This knowledge is particularly relevant for public policy decisions, considering these are likely shaped by other-regarding preferences. If so, revealing unstableness in these preferences affects public policy decisions, whereupon these decisions may subsequently modify people's other-regarding preferences. Opting for higher levels of redistribution or accommodating refugees may for instance induce residents to behave differently in other domains.

Choice-induced preference changes are mainly explored in the free-choice paradigm, with Brehm's (1956) traditional paradigm requiring subjects to rate eight alternatives according to their desirability, choosing between two of these, and finally rating all the alternatives once more. Chen and Risen (2010) however criticize the validity of this methodology, arguing that it is incapable to control for the information revealed by choice. In particular, they argue that a positive difference between the increased desirability of the chosen option and decreased desirability of the unchosen option, and therefore cannot be interpreted as evidence of choice-induced preference change.<sup>1</sup>

Somewhat surprisingly, the precarious relationship between choices and preferences has so far only been investigated for choices that concern oneself. Individuals are for instance required to rank the

<sup>&</sup>lt;sup>1</sup> Alós-Ferrer and Shi (2015) affirm that, despite Chen and Risen's (2010) mathematical proof being incorrect, positive spreading does not necessarily support induced attitude change in the traditional free-choice paradigm.

desirability before and after choosing between two closely evaluated alternatives (Chen & Risen, 2010), or perform similar tasks with regard to holiday destinations (Alós-Ferrer, Granić, Shi, & Wagner, 2012). Many decisions in life however also involve other individuals, either directly or indirectly. These decisions involve charitable donations, volunteering, or even helping a family member move houses.

Dissonance theory partly explains other-regarding behaviour (e.g., Konow, 2000), with dissonance arising between pure self-interest and a concern for others. Emphasizing fairness seems to influence other-regarding behaviour (Falk & Zimmermann, 2011; Oxoby & Smith, 2014; Cappelen, Hole, Sørensen, & Tungodden, 2011), in addition to individuals appearing to avoid dissonance by preferring to not learn the consequences of their actions on other individuals or by being willing to sacrifice resources in order to opt out of various social dilemmas (Lazear, Malmendier, & Weber, 2012; Dana, Weber, & Kuang, 2007; Larson & Capra, 2009; Matthey & Regner, 2011). However, choice-induced preference changes in other-regarding preferences, in addition to the validity of dissonance theory in explaining these potential preference changes, remain to be investigated appropriately. Rustichini and Villeval (2014) find that people adjust their fairness perceptions consistent with their choice (e.g., perceived more selfish behaviour to be acceptable after acting selfishly). However, Chen and Risen's (2010) critique is not adressed appropriately, in addition to there being considerable time between the second elicitation of individuals' preferences and their actual choices. Effectively identifying choice-induced preference change is therefore impossible, although their attempt alone is noteworthy.

This thesis examines the phenomenon of choice-induced preference change in other-regarding preferences by employing Chen and Risen's (2010) free-choice paradigm. Other-regarding preferences, conceptualized in terms of social value orientations, are analysed before and after individuals face a choice between two alternatives involving someone else that is likely to create dissonance. The experimental design controls for the information revealed by choice in the free-choice paradigm by varying the moment at which subjects face the difficult decision, being either before or after preferences are established once more. This methodology allows an identification of the preference changes that are specifically induced by the act of choice.

The findings suggest choice-induced preference changes are present in other-regarding preferences, with subjects who face a 'difficult decision'<sup>2</sup> between the two elicitations of preferences being more likely to adjust their preferences than those who face it after the second elicitation of preferences. Dissonance reduction however appears to manifest differently than is commonly assumed for self-regarding preferences in the free-choice paradigm. In particular, individuals do not necessarily adjust their preferences consistent with their choice, irrespective of when they face the difficult decision. This

 $<sup>^{2}</sup>$  A 'difficult decision' simply implies that subjects face a trade-off between two alternatives that are hypothesized to be roughly equally desirable to them based on their stated preferences.

may be due to the different nature of the underlying preferences, with decisions being able to threaten one's self-concept. Self-affirmation theory (Steele, 1988) best describes these findings.

The structure of this thesis is as follows. Section 2 summarizes the relevant literature on dissonance theory and other-regarding preferences. Thereafter, Section 3 describes the experimental design. Section 4 analyses subjects' choices and preference changes, identifying those attributable to the act of choice. Hereafter, Section 5 discusses the findings in more detail, provides some experimental limitations, and explores directions for further research. Lastly, Section 6 concludes.

## 2. Related literature

This thesis relates largely to the social psychology and economics literature. More specifically, this thesis concerns the process of cognitive dissonance reduction in explaining choice-induced preference changes and evaluates how this phenomenon relates to other-regarding preferences.

#### 2.1. Cognitive dissonance, the act of choice and the free-choice paradigm

Cognitive dissonance is an uncomfortable feeling or state of mind that arises when an individual holds two or more inconsistent cognitions (Festinger, 1957, 1964). This uncomfortable state is reduced by changing cognitions in order to be consistent. Individuals who face a choice between two equally desirable alternatives experience dissonance between the desirable aspects of the unchosen alternative and the undesirable aspects of the chosen one (Alós-Ferrer & Shi, 2015). Cognitive dissonance reduction then generally manifests by initial preferences adapting to behaviour. This process is often argued to cause choice-induced preference change (Chen & Risen, 2010). Economic applications of dissonance theory include labour economics, the economic theory of crime, voting behaviour and political attitudes, and other-regarding behaviour (see, e.g., Akerlof & Dickens, 1982; Dickens, 1986; Mullainathan & Washington, 2009; Akerlof, 1989; Sloane & Williams, 1996; Konow, 2000).

Most early evidence of preference changes, and specifically of cognitive dissonance reduction, comes from three separate paradigms. Brehm's (1956) free-choice paradigm is potentially the most illustrious, with subjects first rating eight house-hold appliances on their desirability, then choosing between two of them, and finally rating all objects once more. Subjects not only tended to rate the chosen alternative higher and the unchosen one lower after choice as dissonance theory predicts, cognitive dissonance and subsequent attempts to alleviate this tension increased the more the alternatives were rated similarly. Although many subsequent versions of the free-choice paradigm replaced ratings with simpler ranking procedures instead, comparable results were generally observed (Chen & Risen, 2010). Other prominent dissonance paradigms are the induced-compliance paradigm, the effort justification paradigm, and the experimentally more uncommon belief disconfirmation paradigm (see, e.g., Festinger & Carlsmith, 1959; Aronson & Carlsmith, 1963; Aronson & Mills, 1959;

Festinger, Riecken, & Schachter, 1956). Each of these alternatives is however unable to identify preference changes resulting specifically from the act of choice.

Dissonance theory predicts in any of these paradigms that preference changes are induced because people are motivated to alleviate an uncomfortable feeling that resulted from incongruent cognitions and actions. Festinger (1957) states that two factors in particular determine the magnitude of dissonance, being the cognitions' importance and the level of incongruence. Besides these potentially invoking choice-induced preference change, Brehm and Cohen (1962) argue that dissonance reduction can only occur when people commit to their choices.

Other theories may also explain why preferences change after the act of choice, with self-perception theory (Bem, 1967, 1972) likely being dissonance theory's main competitor. Self-perception theory posits that individuals observe their own behaviour and subsequently generate beliefs that correspond with their actions. Both theories suggest choosing itself induces preference change, yet dissonance focusses particularly on instances where arousal or negative affect are involved (Elliot & Devine, 1994; Harmon-Jones, 2000). Fazio, Zanna, and Cooper (1977) state that self-perception theory accurately characterizes preference change phenomena that concern attitude-congruent behaviour, whereas dissonance theory does so for behaviour discrepant with initial attitudes. Cognitive dissonance is widely perceived to be a motivational state, albeit there is some (theoretical) disagreement about the cause of this uncomfortable feeling. Self-affirmation theory (Steele, 1988) for instance suggests that dissonance reduction occurs to maintain one's positive self-image, whereas Cooper and Fazio (1984) emphasize the extent to which people feel personally responsible for generating aversive consequences. Importantly, these alternative interpretations stress that opposing cognitions on their own, as Festinger (1957, 1964) suggests, are insufficient to induce preference changes.

Risen and Chen (2010) emphasize that people should all make the same choice in any of the paradigms to enable any dissonance claims, yet perceive to actually have a choice to engage in them. Consider their illustration of a common induced-compliance paradigm, which requires subjects to write a counter-attitudinal essay (e.g., Linder, Cooper, & Jones, 1967). Suppose that only half of the participants agree to write such an essay when it was described as optional, whereas everyone did so when it is mandatory. Merely observing differences between the condition in which people freely chose to write the essay with the condition where everyone had to do so would then likely not be due to any changes in preferences, since the self-selection by subjects would partly reveal their actual preferences. Traditional free-choice paradigms (e.g., Brehm, 1956) however allow subjects to freely choose one alternative over the other, rendering them incapable of accounting for Samuelson's (1938, 1948) precept of revealed preferences. Chen and Risen (2010) argue that positive spreading between the chosen and unchosen option is therefore always expected, despite people having perfectly stable

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preferences. Their proposition is based on the reasonable assumptions that either ratings or rankings are somehow guided by actual preferences, that their choices are at least partially guided by their preferences and, finally, that ratings or rankings are imperfect measures of preferences. Alós-Ferrer and Shi (2015) however show that these assumptions do not imply positive spreading, yet prove that the traditional free-choice paradigm is methodologically flawed and should be revisited.

Risen and Chen (2010) propose four ways to properly investigate choice-induced preference change in the free-choice paradigm. The first approach is to ensure that everyone makes the same choice, similar as in both the effort justification and induced-compliance paradigm. Another remedy for the free-choice paradigm is to ensure that choosing itself does not reveal any information, for instance by having choices being made without subjects observing what they actually choose. Thirdly, the process of dissonance reduction can be investigated by manipulating choice. Finally, they propose one may control for the information revealed by choice by introducing another condition in which people face the same difficult choice, yet only after the second ranking or rating task. This methodology is deemed appropriate in case it is fairly certain that subjects make similar choices in the two conditions and that the two ranking or rating tasks predict their choices to the same extent in both conditions.

Chen and Risen (2010) in fact apply this methodology in two separate studies, with subjects being required to rank fifteen art prints, choose between two of them and re-rank the original fifteen prints. The critical choice concerned the items subjects initially ranked seventh and ninth, with the timing of this decision varying between the two conditions. Positive spreading was found in both studies between the two choice options in both conditions; providing insufficient evidence for choice-induced preference change or dissonance reduction. The present study employs a similar experimental design as that of Chen and Risen (2010) to explore choice-induced preference changes in other-regarding preferences.

Matching expectations, recent methodologies improving upon the free-choice paradigm yield less robust evidence supportive of choice-induced preference change. Nonetheless, the hypothesized sign according to dissonance theory is evident (Izuma & Murayama, 2013). Izuma, et al. (2010) utilize the methodology of Chen and Risen (2010) in an fMRI study and find the Rank-Choice-Rank condition to exhibit significantly more spreading than the Rank-Rank-Choice condition.<sup>3</sup> Alternatively, using an implicit choice method, Alós-Ferrer, et al. (2012) measure spreading between alternatives that are never compared directly. Rather, holiday destinations (that were similarly appealing) were matched with an alternative that was rated strictly higher and one strictly lower with equal distance; subjects are then only expected to choose the holiday destination when it is paired with the lower-rated alternative. Choice-induced preference changes are found in both the rating and ranking of holiday destinations,

<sup>&</sup>lt;sup>3</sup> In fact, this differs from the results Chen and Risen (2010) find themselves, who only observe weakly supportive evidence of choice-induced attitude change.

with response times confirming that reappraisal processes are already initiated during the act of choice. This methodology may however be inadequate for the present study, mainly due to the difficulty associated with rating many monetary distributions and matching these appropriately. Finally, some experiments have eliminated the information revealed by choice by having subjects make their choices blindly (see, e.g., Egan, Bloom, & Santos, 2010; Sharot, Velasquez, & Dolan, 2010; Izuma, et al., 2015). Unorthodoxly, Izuma, et al. (2015) use a modified choice-blindness paradigm with a condition that ocassionally led participants to believe they had chosen the lesser preferred option.<sup>4</sup>

#### 2.2. Other-regarding preferences and social value orientations

Subjects in economic experiments frequently sacrifice some own monetary gain to benefit others (Charness & Rabin, 2002), thereby challenging the traditional view of economic agents being merely self-interested individuals. Alternatively, individuals sometimes punish those who mistreat them when this in fact hurts their own material payoff (Fehr & Fischbacher, 2002). In economics and social psychology, social preferences concern any type of situation where people also value the outcomes other reference agents accumulate. These preferences relate to the concepts of altruism, fairness, reciprocity and inequity aversion. Two distinctive types of social preferences are generally classified: distributive and reciprocal preferences. Distributive preferences concern final allocations, whereas reciprocal preferences are related to the intentions associated with particular actions.

The self-interest hypothesis was widely supported till the nineteen-eighties. This widespread support was primarily attributable to the relatively quick convergence to the competitive equilibrium observed in experimental markets, with players who are assumed to be exclusively self-interested (see, e.g., Davis & Holt, 1993).<sup>5</sup> The emergence of bargaining games in experimental economics however successfully challenged the self-interest hypothesis, with economists beginning to realize its flaws largely due to the Ultimatum Game. Güth, Schmittberger, and Schwarze (1982) provided the first experimental test of this two-stage bargaining game, where one player (the responder) either decides to accept or reject the offer to divide a fixed sum of money proposed by another player (the proposer). Importantly, none of the players receive any money in case the responder decides to reject the offer. Assuming that both players are rational and only care about the amount they receive themselves, the responder will accept any positive amount that is offered. Knowing this, the proposer offers the smallest possible amount and retains the remainder. Typically however, this subgame perfect equilibrium is not actually reached. Hundreds of replications of the ultimatum game show that proposers on average offer approximately

<sup>&</sup>lt;sup>4</sup> Notwithstanding that this indeed removes the information revealed by choice by dissociating true preferences from the effect of choosing, such deception is generally not accepted in (experimental) economics.

<sup>&</sup>lt;sup>5</sup> Fehr and Schmidt (2006) show that this observation does not imply that other-regarding preferences are necessarily absent. Rather, competition removes their impact by making the adherence to them either impossible or infinitely costly. The convergence to standard competitive predictions may thus occur nonetheless.

40% of the total sum, and that responders are equally likely to accept or reject an offer below 20% of the fixed sum of money (Camerer, 2003).

Outcomes in the Ultimatum Game mostly suggest responders are the ones that care about fairness in outcomes, with low offers generally being perceived as unfair. Proposers however may simply anticipate that low offers are rejected with high probability, causing self-interested proposers to also make generous offers. Forsythe, Horowitz, Savin, and Sefton (1994) evaluate this possibility by comparing the outcomes of the Ultimatum Game with those of the Dictator Game, in which the responder actually does not have an option to reject an offer. Proposers indeed tend to offer less when the possibility of rejection is removed, although non-zero amounts are still offered. Over six hundred repetitions of the Dictator Game show that offers are roughly 25% of the fixed sum, supporting the notion of other-regarding preferences (Engel, 2011). Other experimental games include the Gift Exchange Game, the Trust Game and the Public Goods Game (Fehr & Schmidt, 2006). All of these generally support some type of other-regarding preferences.<sup>6</sup>

Levitt and List (2007) criticize the external validity of results achieved in lab experiments designed to measure other-regarding preferences. One of their main concerns relates to the potential self-selection of subjects into an experiment.<sup>7</sup> Cleave, Nikiforakis, and Slonim (2013) however show that those who self-select do not behave differently in the Trust Game compared to those who did not. Moreover, Camerer (2011) addresses that experiments primarily serve to test economic theories and notes that reliable evidence of increased pro-social behavior in the lab compared to real-world settings is limited. Stoop (2014) even shows that the results obtained in the Dictator Game remain outside of the lab, with a non-standard subject pool and when subjects are unaware of participating in an experiment.

Several theories aim to explain the observed deviations from the self-interest hypothesis within a rational choice framework, with two approaches generally being classified. The first approach is to assume that at least some agents also care about the material payoff to referent others, commonly referred to as distributive preferences. With reciprocal preferences, agents care about the intentions of other agents and it is therefore crucial how they interpret the behaviour of others (see, e.g., Rabin, 1993; Dufwenberg & Kirchsteiger, 2004; Falk & Fischbacher, 2006; Cox, Friedman, & Gjerstad, 2007). Both approaches require specific assumptions regarding the agents' utility function (Fehr & Schmidt, 2006).<sup>8</sup> In explaining charitable giving for instance, Becker (1974) assumes one's utility to be strictly

<sup>&</sup>lt;sup>6</sup> Neuroscience is also applied to these experimental games, identifying brain regions associated with experiencing trust, empathy and those part of the reward system in the process (Fehr & Camerer, 2007).

<sup>&</sup>lt;sup>7</sup> Other concerns include subjects being aware they are monitored, limited financial considerations and choice options, subjects bringing their own context to the experiment, demographic characteristics, in addition to social cues, anonymity and property rights (Levitt & List, 2007).

<sup>&</sup>lt;sup>8</sup> A less common approach to characterizing other-regarding preferences is to develop axioms that generate preferences reflecting fairness and reciprocity (see, e.g., Guttman, 2000; Segal & Sobel, 2007).

increasing with that of others. The Dictator Game is arguably the most simple way to elicit such altruistic preferences. Andreoni and Miller (2002) establish distributive preferences by using a series of Dictator Games that have different budgets and relative prices of giving. Approximately 30% of the subjects appear to allocate money such that the payoffs to the dictator and the recipient are equalized, 20% intends to maximize the sum of the monetary payoffs and roughly 50% of the subjects behave selfishly. They conclude that altruistic behaviour is consistent with rationality, although individuals are heterogenous. Other well-known distributive preference models include Fehr-Schmidt inequity aversion, in addition to the Bolton-Ockenfels variant (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000).<sup>9</sup>

The present study conceptualizes other-regarding preferences in terms of social value orientations. In social psychology, social value orientation (SVO) represents a person's preference about how to allocate resources between him or herself and another individual. It corresponds to the weight one assigns to the welfare of others in relation to their own. The SVO concept is thereby closely related to the economics concept of distributive preferences. Establishing a person's SVO occurs by using various Dictator Games, in which the total amount of money to be allocated varies with the dictator's strategy. In fact, this method is comparable to the one used by Andreoni and Miller (2002) to elicit altruistic preferences, although they classify subjects in terms of utility functions rather than attitudes. The major advantage of the SVO concept concerns its simplicity and the fact that it allows a comparison of distributive preferences between individuals. Typically, four types are characterized: (i) individualists aim to maximize their own outcomes, without concern for others' outcomes; (ii) competitors seek to maximize the relative difference between their own and the others' outcomes; (iii) cooperators tend to opt for strategies that are mutually beneficial or minimize the difference between outcomes; and (iv) altruists aim to maximize the outcomes of other individuals (Murphy & Ackermann, 2014). Individualistic and competitive SVOs are generally classified as proself, whereas cooperative and altruistic SVOs are classified as prosocial (Pletzer, et al., 2018). This characterization of SVOs is also implemented in the current study. The most common measures to assess individuals' SVOs are the Triple Dominance Measure (Van Lange, De Bruin, Otten, & Joireman, 1997), the Ring Measure (Liebrand, 1984), and the Slider Measure (Murphy, Ackermann, & Handgraaf, 2011). Various SVO measurements indicate that approximately 50% of individuals are prosocial, over 35% are either individualists or competitors, and the remainder could not be classified as having a consistent SVO (Au & Kwong, 2004).<sup>10</sup>

<sup>&</sup>lt;sup>9</sup> For a comprehensive overview of the literature concerning other-regarding preferences, including theories and a discussion of the experimental evidence, see Fehr and Schmidt (2006).

<sup>&</sup>lt;sup>10</sup> The fact that roughly 15% of the individuals could not be assigned any SVO is mainly the result of the heavy reliance on the Triple Dominance Measure in the literature, with subjects being required to choose a minimum number of options consistent with a particular SVO to actually be categorized (commonly six out of nine). See Murphy and Ackermann (2014) for a discussion of available SVO measurement methods.

#### 2.3. Cognitive dissonance and other-regarding preferences

Konow (2000) integrates fairness with cognitive dissonance theory to explain other-regarding behaviour, specifically to clarify the outcomes generally observed in the Dictator Game. Essentially, he postulates distributive preferences alone are insufficient in explaining allocation decisions. Rather, people's self-interest may conflict with fairness and thereby influence their behaviour. He constructed an experiment with three separate treatments (Standard, Benevolent and Double) to validate his proposition, and to determine the 'fair' allocation, the amount of dissonance and the self-deception involved to reduce this dissonance. The Standard Dictator Game is the same as outlined earlier, in Section 2.2, whereas the Benevolent variant requires dictators to allocate resources between two other individuals (not including themselves); subjects sequentially engage in the Standard and Benevolent variant in the Double Dictator Game, without prior knowledge of this fact. The Standard Dictator Game shows actual behaviour, arising from a trade-off between self-interest and fairness. Dictators' perceptions of a fair allocation are determined using the Benevolent variant. Dissonance theory predicts that the double dictator simply minimizes dissonance by allocating the same amounts in the Benevolent Dictator Game as he or she did in the Standard Dictator Game, essentially believing previous allocations to be fair when they were not. In fact, comparing the allocations in the three treatments reveals that people, on average, tend to allocate more to themselves than their entitlement in the traditional variant and that the allocations of double dictators do not differ significantly between the two variants. These findings suggest people adjust their fairness perceptions in order to reduce cognitive dissonance.

Dissonance avoidance also seems apparent in social dilemmas, implying that someone alleviates potential dissonance simply by avoiding it. People are for instance willing to sacrifice part of the dictator's endowment to opt out of playing the Dictator Game, preferring to avoid the conflict arising between material self-interest and fairness (Lazear, et al., 2012). Alternatively, Dana, et al. (2007) allow subjects in one treatment to remain ignorant regarding their actions and resulting outcomes in the Dictator Game. In particular, dictators faced a choice between two allocations with known outcomes for the dictator (six dollars versus five) and unknown outcomes for the recipient. Dictators were informed that they could reveal the payoffs to the recipient by simply pressing a button. This lack of awareness permits subjects to reasonably behave in their own self-interest, and is in line with the interpretation of Cooper and Fazio (1984) regarding the cause of cognitive dissonance: feeling personally responsible for generating aversive consequences. Indeed, the offers of dictators are considerably lower in the absence of transparency compared to when the relationship between actions and outcomes is clear-cut. These results are corroborated by Larson and Capra (2009), who remove the default option of ignorance and actually require subjects to choose to learn about the repercussions of their actions or to remain ignorant. A within-subject design shows that prosocial subjects who opt to remain ignorant generally find this decision more difficult than either (genuine) prosocial subjects who

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opt for transparency or those who are proself. This is supportive of subjects experiencing cognitive dissonance, so is the fact that they tend to require more time to actually decide whether or not they want to know the repercussions of their actions (Matthey & Regner, 2011).

In their third experiment, Falk and Zimmerman (2011) examine charitable giving after subjects have previously indicated how much they would donate in a hypothetical situation. Essentially, subjects are first tempted to make a (costless) biased statement. In the second stage, they are confronted with a request related to the particular statement. One's preference for consistency is then likely at odds with a person's true other-regarding preferences, arguably creating dissonance in the process. Somewhat surprisingly, the hypothetical giving statement seems to lower actual donations rather than increase them. This is inconsistent with the theory of cognitive dissonance. Yet, a caveat of their experiment concerns the difference between the hypothetical and actual donation decision: in the actual donation decision a list of eight charities is provided, whereas charitable organizations were not explicitly mentioned in the hypothetical situation. The former choice may trigger a higher willingness to donate by being more concrete and credible, potentially explaining why actual donations were larger than the hypothetical donations and lower than those of subjects who did not face a hypothetical situation.

Oxoby and Smith (2014) provide more compelling evidence of biased fairness statements creating dissonance and thereby influencing other-regarding behaviour. In both a Dictator and Public Goods Game, subjects are first required to state whether they agree with the statement "Do you agree with the statement that all individuals (at our university) should be treated fairly by the administration, faculty, and other students?"; subjects only participated in one of the games, and the statement was deliberately designed to be vague such that most would agree (in fact, everyone did). Dissonance is created by either recalling a subject's answer during the allocation decision (Recall), informing subjects that aggregate figures to the fairness statement will be shared with all subjects at the end of the experiment (Commitment), or a combination of these two (Combination). The strategy space is limited in both games, with subjects in the Dictator Game choosing either the allocation (5, 5) or (8, 2) and those in the Public Goods Game being able to contribute either 20%, 50% or 80% of their endowment to the public good. Cognitive dissonance theory predicts that fair allocations and strategies are more likely in each of the three manipulations. In both games, the Commitment and Combination treatment significantly increased prosocial behaviour, whereas Recall was ineffective in doing so. This latter fact may simply be because a private reminder is perceived as an obtrusive attempt to influence behaviour, whereas the effectiveness of Commitment (and, thereby also Combination) is concluded to be consistent with the avoidance of guilt in terms of not matching subjects' expectations (Oxoby & Smith, 2014). Their results suggest cognitive dissonance can in fact manipulate other-regarding preferences.

Before continuing to a Dictator Game, Cappelen, et al. (2011) also confront subjects with fairness ideals and subjects were subsequently asked which of these they identified with most. Importantly, the illustrated hypothetical situations were identical to the Dictator Game about to follow. Not only do they find that reflecting upon fairness ideals appears to influence subsequent allocation decisions, it also appears to actually affect what is perceived as fair.

In fact, Rustichini and Villeval (2014) show that subjects adjust their fairness perceptions consistent with their actual choices in all three of the Dictator, Ultimatum, and Trust Game: the more selfish the actual choice compared to an identical hypothetical one, the more subjects adjust their initial fairness judgments. Changes in these self-reported other-regarding preferences cannot be attributed to the expectations about the choices of others, suggesting subjects engage in self-deception to reconcile their fairness judgments with their behaviour in order to maintain a positive self-image. A limitation of their approach however is that there is considerable time between eliciting subjects' hypothetical preferences and their actual choices in the Dictator, Ultimatum, and Trust Game. More importantly, Chen and Risen's (2010) critique is not adressed and choice-induced preference change is therefore not identified appropriately. It remains an open empirical question whether choice-induced preference change occurs for other-regarding preferences.

#### 3. Research design

This thesis examines choice-induced preference change in other-regarding preferences. Cognitive dissonance reduction in other-regarding preferences is evaluated by adopting the free-choice paradigm proposed by Chen and Risen (2010), which controls for the information revealed by choice through varying the timing of the difficult decision. Other-regarding preferences are elicited (Preference 1), subjects choose between two alternatives involving money (Choice 1), their preferences are elicited once more (Preference 2), and the subjects face another monetary trade-off (Choice 2). Each subject makes a difficult choice between monetary distributions involving other individuals that likely contradicts their initial other-regarding preferences, thereby creating cognitive dissonance. Subjects in the Preference-Choice-Preference (PCP) condition make this choice before preferences are elicited again (in Choice 1). Subjects in the Preference-Preference-Choice (PPC) condition make the difficult choice after the second elicitation of other-regarding preferences (in Choice 2).

Other-regarding preferences are established using the SVO concept. Recall that one's social value orientation (SVO) represents a person's preference about how to allocate resources between the self and another individual. These SVOs can be measured using various Dictator Games, in which the total amount of money to be allocated varies with the dictator's strategy. The SVO Slider Measure developed by Murphy, et al. (2011) is used to establish individuals' distributive preferences. Based on individuals' most preferred allocations in six specific Dictator Games, the SVO angle for each individual is

constructed. Importantly, the SVO Slider Measure captures the four most common idealized orientations (altruistic, cooperative, individualistic, and competitive) and produces a continuous scale rather than a nominal category. Moreover, if desired, the SVO angles can still be reduced to a nominal categorization. Essentially, a larger SVO angle indicates a greater concern for others. Details concerning the six SVO Slider items are provided in Appendix 1.<sup>11</sup>

The experimental design allows a comparison in spreading of SVO angles from Preference 1 to Preference 2 for subjects who make a difficult choice before the second elicitation of preferences and for those who do so afterwards. Dissonance theory only predicts SVO angles to differ between the two elicitations of preferences in the PCP condition (Chen & Risen, 2010). Since the PCP and PPC conditions are identical except for the moment of choice, the experimental design enables an isolation of the spreading resulting from the act of choice. Importantly, individuals need to be presented choices that (likely) compromise their initially stated social preferences. Choice alternatives are however not standardized, such as with rankings or ratings. Simplistically put, individuals are presented a choice between two alternatives that (likely) contrast with their SVO angle established in Preference 1.

The survey software package Qualtrics is used to conduct the experiment in an online environment, which allows a random allocation of subjects to either the PCP or PPC condition.<sup>12</sup> Subjects are informed beforehand that stating their true preferences is most likely to yield them what they actually desire, since one of the performed tasks may be selected (for some participants) to be paid out. Each subject is requested to provide his or her email address to be able to contact them afterwards related to potential payout. With regard to choices involving other individuals, subjects are notified that strangers in Rotterdam will be approached at random to receive the allocated amount. Photos of these occasions will be shared with all subjects via email.

Subjects in both the PCP and PPC condition are presented with the six dictator games according to the SVO Slider Measure (Preference 1). For each of the six games, the subjects are informed to indicate their most preferred monetary distribution (see Appendix 1). The SVO angle for each subject is then computed based on the chosen allocations.<sup>13</sup> Subjects in the PCP condition then face a difficult choice between two allocations based on their SVO angle. For simplicity, and since competitive types are

<sup>&</sup>lt;sup>11</sup> The secondary component of the SVO Slider Measure considers nine additional dictator games that are explicitly designed to disentangle prosocial motivations of joint maximization from inequality aversion. In eliciting individuals' other-regarding preferences these secondary items are disregarded.

<sup>&</sup>lt;sup>12</sup> The allocation to both conditions occurs randomly, although subjects are first blocked based on their SVO characterization. This somewhat ensures that the subjects in the two conditions are similar, in particular with respect to the conditions outlined by Risen and Chen (2010) for a comparison between the PCP and PPC condition to be appropriate.

<sup>&</sup>lt;sup>13</sup> The SVO angle is computed in the following way. First, the mean allocation to oneself and the mean allocation to the other is calculated. Five euros is then subtracted of both since the maximum allocation to either oneself or the other is ten euros, appropriately shifting the origin of the angle. The SVO angle then equals the inverse tangent of the mean allocation to the other (minus five euros) divided by the mean allocation to oneself (minus five euros).

generally not identified (Au & Kwong, 2004; Murphy, et al., 2011), SVO angle ranges are constructed that correspond to altruistic, cooperative and individualistic orientations.<sup>14</sup>

Consider the following difficult choices. Each of the six Dictator Games essentially represents a different trade-off between SVO classifications (see Appendix 1). Subjects with their SVO angle within the altruistic range face two allocations of the cooperative-individualistic Dictator Game (around their expressed preference). Alternatively, subjects within the individualistic range face two allocations of the altruistic-cooperative Dictator Game. The choices for individualistic and altruistic types both emphasize a contrasting social value orientation and may be considered difficult since the alternatives are at either side of their expressed preference. Finally, cooperative subjects face two alternatives of the altruistic-individualistic Dictator Game; these alternatives are further apart from the subjects' initially stated preference to ensure that both choice alternatives contrast their social value orientation, yet are still located at either side of the subjects' stated preference.<sup>15</sup> Arguably, these choices result in actions that are inconsistent with initial distributive preferences and satisfy the criteria for dissonance reduction to occur (Festinger, 1957; Brehm & Cohen, 1962). Subjects in the PPC condition on the other hand choose between two lotteries instead of allocations (Choice 1).

Before all subjects are presented with the items of the SVO Slider Measure once more, the subjects perform some mathematical exercises to negate potential memory effects. Specifically, all subjects are informed to solve as many exercises within two minutes. Afterwards, subjects in both the PCP and PPC condition are presented with the original six Dictator Games and are required to indicate their most preferred allocation for each of them (Preference 2). They are notified that this is not a memory test and that they should simply state the allocations they prefer at that particular moment. Each subjects' SVO angle is then computed again based on the chosen allocations. Subjects in the PPC condition then face the same choice as subjects in the PCP condition did earlier, and vice versa (Choice 2). This means subjects in the PCP condition face a choice between two lotteries, while subjects in the PPC condition are presented a difficult choice according to their SVO angle from Preference 1.

All subjects are finally debriefed, asking them whether they identified the hypothetical other as the stranger in Rotterdam and whether they considered the implications of their preferences for this other individual. Additionally, they are questioned whether they were informed about the contents of the experiment by another subject beforehand. Subjects are notified that they will be contacted in approximately one month via email with regard to potential payout, including the selected allocations

<sup>&</sup>lt;sup>14</sup> Specifically, altruistic orientations correspond to a SVO angle larger than 57,15°, cooperative orientations have angles between 22,45° and 57,15°, and individualistic orientations correspond to SVO angles smaller than 22,45°. <sup>15</sup> Subjects may have initially stated to prefer one of the extreme options in any of the three dictator games they eventually face as the difficult choice. These subjects will then be presented a choice between their stated preference and the closest alternative in the respective dictator game.

and possible photos with strangers. Payments to individual subjects are wire-transferred after requesting their bank details in a separate email (see Appendix 2).

## 4. Results

One hundred fifty-six subjects in total participated in the online experiment. Of these, fourteen subjects are excluded from the analysis since they indicated to have sufficient knowledge about the experiments' contents beforehand or required considerably more time reasonably suggested to complete the experiment. The majority of subjects are in their twenties and there are slightly more males than females (see Appendix 3), approximately evenly distributed across the PCP and PPC condition. In the concluding questionnaire, most subjects declared to be unfamiliar with allocating resources between themselves and someone else (63%), only a small fraction identified this other person as a Rotterdam inhabitant (18%), and the majority considered that their choices impacted this other individual (58%).

	Condition							
		PCP		PPC				
SVO type	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev.		
Cooperative	45	36,02	5,52	42	36,33	5,38		
Individualistic	25	9,00	7,67	27	9,04	6,66		
Competitive	1	-16,26	0,00	2	-16,26	0,00		

Table 1: Overview SVO angles and types in Preference 1. Means and standard deviations in degrees, rounded to two decimals.

Table 1 classifies the sample of one hundred forty-two subjects according to their preferred allocations in Preference 1. The distribution of SVO types is largely consistent with those generally identified (see, e.g., Au & Kwong, 2004; Murphy, et al., 2011). Unexpectedly, three subjects had a competitive orientation (i.e., SVO angle smaller than -12,04°). The employed randomization procedure ensures that SVO types are nearly evenly distributed across the two conditions; deviations can be attributed to some subjects not completing the experiment after randomization ocurred in addition to the exclusion of the fourteen aforementioned observations. Besides SVO types being evenly distributed across the two conditions, the mean and standard deviation of the underlying SVO angles do not differ significantly (Equality of means t-test and Levene's equality of variances test, respectively, p > 0,60 and p > 0,50). No altruistic SVOs are identified in either of the two conditions.

Choice-induced preference changes are evaluated using three calculations. These calculations differ somewhat from those of Chen and Risen (2010), yet the concept is similar. First, chosen spread is calculated and is contingent on subjects' choices. Chosen spread equals the absolute difference in SVO angles between Preference 1 and Preference 2 when this adjustment is consistent with their choice; chosen spread equals the negative absolute difference when the adjustment in SVO angle is inconsistent with their choice. Each choice, regardless of SVO type, involves an alternative that can be classified as being more altruistic and the other as being more selfish. To illustrate, consider someone who is initially identified as being cooperative with an SVO angle of 30 degrees (Preference 1), chooses the more selfish alternative, and is subsequently identified as an individualist with an SVO angle of 20 degrees (Preference 2): the chosen spread for this individual is then positive and equals 10 degrees, since the adjustment in SVO angle (minus 10 degrees) is consistent with the selfish choice. Chosen spread is also decomposed into selfish spread and altruistic spread, corresponding to the chosen alternative in the difficult decision. This methodology enables a comparison of chosen spread for the PCP and PPC condition, determining the spreading resulting solely from the act of choice.

	Condition						
Measure of			PPC				
SVO spreading	Obs.	Mean	Std. Dev	Ob	s.	Mean	Std. Dev.
Chosen spread	71	1,16 <sub>a</sub>	8,03	7	1	0,91 <sub>a</sub>	5,87
Altruistic spread	3	1,00 <sub>a</sub>	14,81	10	)	0,39 <sub>a</sub>	2,38
Selfish spread	68	1,17 <sub>a</sub>	7,79	63	1	1,00 <sub>a</sub>	6,27
General spread	71	-1,08 <sub>b</sub>	8,04	7	1	-0,80b	5,89

Table 2: Spreading of SVO angles between Preference 1 and 2. Means and standard deviations in degrees, rounded to two decimals. The means that share a subscript letter do not differ significantly at the 5% level; general spread is not compared to chosen, altruistic or selfish spread. General spread is calculated as the SVO angle in Preference 2 minus the angle in Preference 1; chosen spread equals the absolute general spread when a subject's choice is consistent with the adjustment in Preference 2, otherwise it equals the negative absolute difference; altruistic and selfish spread consider chosen spread for subjects who chose the more altruistic and selfish option, respectively.

Table 2 shows summary statistics of the aforementioned calculations, in addition to those for the (basic) difference in SVO angles between Preference 1 and 2 for both conditions. In both conditions, positive chosen spread is observed: subjects in the PCP and PPC condition adjust their SVO angle consistent with their choice, on average, with respectively 1,16° and 0,91°. The positive chosen spread in the PPC condition supports Chen and Risen's (2010) preference-driven model of choice, and implies that only 0,25° of the chosen spread in the PCP condition can actually be attributed to the act of choice. The positive difference in chosen spread between the two conditions indeed suggests choice-induced preference change, yet proves to be insignificantly different from zero (p > 0,80).<sup>16</sup>

Evidently, the majority of subjects eventually chose the more selfish option. This suggests the decision may not have been as difficult as originally hypothesized. Yet, decomposing chosen spread into altruistic and selfish spread does not suggest that one of the alternatives potentially invokes more dissonance reduction. On average, those who chose the altruistic (selfish) alternative tended to be more

<sup>&</sup>lt;sup>16</sup> This holds for all types of SVO spreading, with the independent two-sample t-test yielding p = 0.83, p = 0.89, and p = 0.89 for the difference between the PCP and PPC condition in respectively chosen spread, altruistic spread, and selfish spread. The Wilcoxon rank-sum test yields similar conclusions.

altruistic (individualistic) in Preference 2. More importantly however, note that dissonance may still arise between cognitions and subsequent actions when these are incongruent, even if the choice itself is not particularly difficult. Again, positive chosen spread is observed in both conditions and, although the difference between the PCP and PPC condition is positive, the evidence in favor of choice-induced preference change is insufficient. Finally, note that the negative general spread indicates that subjects, on average, become less altruistic in Preference 2, irrespective of the condition they were assigned to.

Table 2 is also constructed for prosocial (altruistic, cooperative) and proself (individualistic, competitive) SVOs separately (see Appendix 4). Interestingly, prosocials on average tend to adjust their SVO in the direction of their choice, whereas proselfs do the exact opposite: this may relate to the difficulty of the decision the two groups of subjects faced, with the trade-off between altruism and mere self-interest likely being more salient for the prosocials. Additionally, prosocials in both conditions are observed to become more selfish and proselfs actually tend to become more altruistic (irrespective of their choice), suggesting a potential regression to the mean more than a preference-driven model of choice. Peculiarly however, yet not significantly different at any of the conventional significance levels, absolute chosen and general spread is on average larger in the PCP condition than in the PPC condition.

The difficult decision subjects faced in both conditions only concerns one of the six Dictator Games of the SVO Slider Measure. Proself SVOs (individualistic, competitive) chose between two allocations around their stated preference in the altruistic-cooperative Dictator Game; prosocial SVOs (altruistic, cooperative) faced two allocations of the altruistic-individualistic variant. The dissonance subjects experience may therefore be limited to one out of the six Dictator Games in total, thereby only generating minor choice-induced preference changes. Arguably, chosen spread may in the current research design not be sufficiently able to detect choice-induced preference changes. Table 3 evaluates the consistency of subjects' choices with their SVO adjustment, and is primarily constructed to evaluate this possibility.

	Condition							
Choice consistency	РСР				РРС			
with SVO adjustment	Everyone	Proselfs	Prosocials		Everyone	Proselfs	Prosocials	
Selfish, consistent	26	7	19		14	5	9	
Selfish, inconsistent	20	10	10		13	7	6	
Selfish, no change	22	9	13		34	17	17	
Altruistic, consistent	1	0	1		2	0	2	
Altruistic, inconsistent	2	0	2		2	0	2	
Altruistic, no change	0	0	0		6	0	6	

Table 3: Consistency of subjects' SVO angle adjustment with their choice. Proselfs contain subjects with both individualistic and competitive SVOs; prosocials only contain subjects with cooperative SVOs, since no altruistic SVOs are identified.

Table 3 is primarily constructed to evaluate the possibility that chosen spread alone is not sufficiently able to detect shows for both conditions the number of subjects that adjusted their SVO angle consistent with the choice eventually made (e.g. chose the selfish option and became more selfish), adjusted their SVO angle in the opposite direction (e.g. chose the selfish option and became more altruistic), or did not adjust their SVO angle at all. To illustrate, twenty-two subjects in the PCP condition chose the selfish alternative and did not adjust their SVO in Preference 2, whereas thirty-four subjects in the PPC condition did not adjust their SVO before acting self-interestedly. Dissonance theory predicts that those who face the difficult decision between the SVO measurements are more likely to adjust their SVO according to their choice than subjects who do so after the second SVO measurement. This prediction can be tested by evaluating the distribution of subjects who adjust their SVO consistent with their choice compared to those who do not in both the PCP and PPC condition. The distribution over these two outcomes indeed seems to differ between the two conditions (Fisher exact test, p < 0,10), and primarily appears to be generated by subjects who do not adjust their SVO angle: approximately twice as many subjects in the PPC condition did not alter their SVO angle between measurements.

In fact, the distribution of subjects who adjust their SVO compared to those who do not differs significantly between the PCP and PPC condition (Fisher exact test, p < 0,01).<sup>17</sup> Another way dissonance may be reduced is by producing new cognitions in order to justify the conflicting behaviour. This would for instance manifest when subjects who opt for the selfish alternative actually becoming more altruistic afterwards, essentially justifying the exhibited selfish behaviour in the earlier task by being more altruistic in the following task. Alternatively, consistent with moral self-licensing,<sup>18</sup> someone who opts for the altruistic option first will act more selfishly afterwards. The fact that the proportion of subjects who change their SVOs is considerably larger in the PCP than in the PPC condition supports choice-induced preference change through dissonance reduction, either by realizing one may not be as altruistic as initially thought or by justifying the conflicting behaviour with new cognitions.

One hundred two subjects provided their email address. These individuals actually opted to have a chance to be allocated one of their choices afterwards and, reasonably, they perceive their choices to be more important than those who did not provide their email. These subjects are therefore expected to experience a greater level of dissonance. To evaluate this possibility chosen spread, altruistic spread and selfish spread are constructed once more. Table 4 provides these statistics only for the subjects

<sup>&</sup>lt;sup>17</sup> Multiple hypotheses are evaluated simultaneously, implying a higher probability to incorrectly infer differences between the two conditions. The Holm-Bonferroni method corrects for the familywise error rate, and rejects both the current null hypothesis (i.e., no differences between the two conditions in terms of the distribution of subjects who adjusted their SVO and those who did not) and the earlier null hypothesis (i.e., no differences in terms of the distribution of subjects who adjusted their SVO consistently with their choice and those who did not across the two conditions) at the 10% significance level.

<sup>&</sup>lt;sup>18</sup> Self-licensing is evident when someone allows him or herself to act immorally after doing something moral first (Merritt, Effron, & Monin, 2010).

who provided their email address. Somewhat surprisingly, the difference between the two conditions in terms of chosen spread actually decreases instead of increases. Moreover (see Appendix 5), the distribution of subjects who adjust their SVO consistent with their choice compared to those who do not does not differ significantly between the two conditions anymore (Fisher exact test, p > 0,15). Subjects in the PCP condition however remain more likely to adjust their SVO in the first place (Fisher exact test, p < 0,01).<sup>19</sup>

	Condition, email provided								
Measure of	PCP				РРС				
SVO spreading	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev.			
Chosen spread	44	0,96a	9,15	58	0,94a	5,58			
Altruistic spread	0	N/A	N/A	7	0,37 <sub>a</sub>	2,89			
Selfish spread	44	0,96 <sub>a</sub>	9,15	51	1,00 <sub>a</sub>	5,87			
General spread	44	-0,96 <sub>b</sub>	9,15	58	-0,85 <sub>b</sub>	5,60			

Table 4: Spreading of SVO angles between Preference 1 and 2, only for those individuals who provided their email address. Means and standard deviations in degrees, rounded to two decimals. The means that share a subscript letter do not differ significantly at the 5% level; general spread is not compared to chosen, altruistic or selfish spread. General spread is calculated as the SVO angle in Preference 2 minus the angle in Preference 1; chosen spread equals the absolute general spread when a subject's choice is consistent with the adjustment in Preference 2, otherwise it equals the negative absolute difference; altruistic and selfish spread consider chosen spread for subjects who chose the more altruistic and selfish option, respectively.

## 5. Discussion

In this section some experimental limitations are discussed. Thereafter, the results are closely evaluated and alternative explanations are explored. Lastly, recommendations for further research are offered.

### 5.1. Experimental limitations

The employed research design contains some shortcomings. First and foremost, choices hypothesized to be difficult may actually not have been perceived as such by subjects. In that case, individuals are not likely to experience any dissonance, nor to attempt to reduce this discomfort by changing their original preferences or cognitions. This may explain why chosen spread is not substantially different between the two conditions, even though subjects in the PCP condition are observed to be more likely to adjust their SVO angle than those in the PPC condition. Oxoby and Smith (2014) create dissonance between a biased fairness statement and actions in the Dictator Game, where the strategy space only includes the allocations (8, 2) and (5, 5): the first is more selfish, the second is egalitarian and more fair-minded. Arguably, allocation decisions are perceived by subjects in the same way and are hence more likely to create dissonance between other-regarding preferences and actions. However, SVO types likely predict subjects' eventual choices with such a decision, implying that the difficulty of the decision differs

<sup>&</sup>lt;sup>19</sup> This finding remains after correcting for the issue of multiple comparisons using the Holm-Bonferroni method, although being at the 5% significance level.

between prosocials and proselfs. Presenting choices centered around subjects' stated preferences was therefore initially considered to be more appropriate. Nonetheless, considering the vast majority of subjects actually chose the more selfish option, it is acknowledged that an alternative allocation decision may invoke more cognitive dissonance and preference changes. This is primarily a concern for subjects with proself SVOs, for whom likely not much dissonance was created, and may explain why no positive chosen spread is observed for these subjects in the PCP condition.

The second possible limitation concerns the fact that dissonance may already be created by the first SVO measurement, particularly for subjects in the PPC condition. Chen and Risen (2010) argue that these subjects may experience dissonance in the first elicitation of preferences and attempt to reduce it afterwards. If so, showing choice-induced preference change is more troublesome since dissonance reduction is also expected in the control condition. This concern seems imminent for other-regarding preferences as well, especially since dissonance is frequently put forward to explain other-regarding behaviour. Chen and Risen (2010) are able to evaluate this possibility in the traditional ranking procedure by comparing the spreading of those who eventually chose the lower-ranked alternative, arguing that subjects in the PPC condition would spread the alternatives from the first ranking procedure regardless of their eventual choice. Unfortunately, such a procedure is not readily implementable in the current research design. Nonetheless, a somewhat more imperfect procedure could shed light on this possibility. Following Chen and Risen's (2010) approach, the SVO spreading of subjects in the PPC condition is predicted to be conditional on their initial SVO type in case they indeed already experience dissonance from the first SVO procedure. More specifically, prosocials and proselfs respectively would be expected to become even more altruistic and selfish regardless of their eventual choice. In fact, subjects in the PPC condition appear to do the opposite and exhibit some form of regression to the mean in terms of their SVO angles. Therefore, if dissonance in other-regarding preferences manifests by people preferring the chosen alternative more and the unchosen one less, it seems unlikely that subjects in the PPC condition are adjusting their SVOs in response to dissonance.<sup>20</sup>

Dissonance may also be created in another way in the PPC condition, and is arguably more problematic than preference changes potentially being invoked by the first SVO measurement. Subjects in the PPC condition faced a choice between two lotteries between the two SVO measurements instead of the difficult choice involving another individual. Orthogonality between other-regarding preferences and the lottery choice is thereby assumed, whereas this may not actually be the case. Presenting

<sup>&</sup>lt;sup>20</sup> Peculiarly, subjects in the PCP condition tend to exhibit this regression to the mean to an ever greater extent. The fact that proself SVOs do not exhibit positive chosen spread in the PCP condition may relate to the decision not being particularly difficult for them, whereas the choice for prosocials is arguably considerably more difficult. This however cannot explain why prosocials and proselfs in the PPC condition do not become more altruistic and selfish, respectively, in case they would experience dissonance from the first SVO measurement by preferring the chosen alternative more and the unchosen one less.

individuals with a choice between two lotteries may direct their focus to themselves, adjusting their SVO angles downwards regardless of their eventual choice. Even though subjects in the PPC condition indeed appear to become more selfish, those in the PCP condition do even more so. Moreover, subjects in the PPC condition who eventually chose the altruistic option did not become more selfish, on average. Orthogonality between other-regarding preferences and the lottery choice therefore seems plausible.

Memory effects concern a fourth limitation of the current design. In fact, subjects remembering their answers is a concern in any free-choice paradigm that is designed to detect dissonance reduction in a relatively short time-period (e.g. ten minutes). This concern reasonably decreases with the number of options one needs to remember, which seems considerably difficult with the SVO Slider Measure. Unfortunately however, the SVO Slider Measure could not be easily implemented in Qualtrics as an actual slider item and was therefore administered similarly as the paper based choice task of Murphy, et al. (2011). Subjects may therefore have been able to somewhat recall their answers from Preference 1 in Preference 2. If so, individuals' desire to be consistent potentially decreases the likelihood of detecting choice-induced preference change.

The math task was specifically designed to negate these memory effects, with the number of choice alternatives equaling those in the SVO measurement. Otherwise, if the online variant of the SVO Slider Measure could have been implemented properly, an intermediate task requiring subjects to drag several sliders to their correct position within two minutes would have been more appropriate. Potentially, requiring subjects to solve mathematical equations may invoke a more rational and deliberate state of mind when facing the second SVO measurement. In fact, several subjects indeed indicated they believed the purpose of the experiment was to investigate such relationships (e.g., "Whether I make choices based on mathematical rationale"). Completely eliminating the possibility that mathematics alone may affect other-regarding preferences is unfortunately not feasible. Yet, why would this occur more in either one of the two conditions? There is no apparent reason to suspect this is actually the case, and the math task is therefore not considered to impede the chances of detecting choice-induced preference change in other-regarding preferences through dissonance reduction.

Finally, the sampling procedure may not be representative of the general population in terms of their other-regarding preferences. Levitt and List (2007) argue that a self-selection bias may be present, with individuals who are more altruistic being more likely to participate. Notwithstanding the fact their argument may indeed be valid, self-selection is of no concern in the current experiment. This is mainly because this thesis is concerned with changes in other-regarding preferences, and there is thus far no indication that the process of dissonance reduction suffers from any such selection bias. Moreover, the SVO types identified correspond to those commonly identified in the literature, either generally or specifically with the SVO Slider Measure (Au & Kwong, 2004; Murphy, et al., 2011).

#### 5.2. Choice-induced preference change in other-regarding preferences

The findings suggest that subjects in the PCP condition are more likely to adjust their SVOs than those in the PPC condition, and supports choice-induced preference change in other-regarding preferences. Yet, the question remains whether this process is actually the result of dissonance reduction. If so, it appears to manifest differently than commonly assumed in the traditional free-choice paradigms with either rankings or ratings. This could be because preferences are elicited differently, or simply because the nature of the underlying preferences differs from those traditionally investigated.

Dissonance-based explanations in the free-choice paradigm generally explore whether the chosen alternative becomes more desirable than the unchosen one by evaluating whether positive spreading is present. Cognitive dissonance reduction is then solely considered to occur when people adjust their preferences consistent with their choice. Suppose you are required to rank the desirability of several holiday destinations. Afterwards, you face a decision between two closely ranked alternatives. If this decision invokes dissonance, it is reasonable to assume this will only be reduced by increasing the ranking of the chosen alternative and decreasing the ranking of the unchosen alternative; an adjustment in the opposite direction would only increase dissonance. The decision itself does not threaten one's self-concept and does not have any repercussions beyond the choice alternatives themselves.

Now consider you are supposed to state the desirability of allocations between you and someone else. Again, you face a decision where you are somewhat indifferent between the two alternatives. This decision however can threaten one's self-concept, which is most likely not the case for the decision between holiday destinations. Self-affirmation theory posits that individuals have a flexible sense of self that allows them to offset weaknesses in one domain by highlighting strengths in another (Steele, 1988), which enables them to accommodate threats to their self-concept. Self-integrity is promoted by engaging in activities that affirm one's values and beliefs. People then justify their attitude-incongruent actions by adding (new) cognitions and thereby reduce dissonance. One may do so by acting altruistically in one task to compensate earlier selfish behaviour. Self-licensing covers the opposite timing of events, with earlier altruistic behaviour being followed by more selfish behaviour.

Self-affirmation theory suggests dissonance reduction may manifest by people adjusting their SVO angles in the opposite direction of their choice. These explanations are only reasonable when subjects perceive the difficult choice and the SVO measurements as separate tasks or domains. Otherwise, only one domain exists and self-integrity cannot be balanced within the context of the experiment. Such an explanation may however also apply to the PPC subjects, with the initial SVO measurement potentially already generating dissonance. Moreover, the results suggest this process of preserving one's self-integrity is not alone in inducing preference changes since SVO adjustments consistent with the eventual choice also appear more likely. Rather, it seems subjects respond differently to dissonance: some adjust their other-regarding preferences in line with what is hypothesized for self-regarding preferences,

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whereas others behave according to self-affirmation theory. This can potentially be attributed to the apparent conflict between material interest and one's concern for others. Disentangling these explanations seems unfeasible in the current research design. The findings suggest other-regarding preferences may be affected by choices themselves, yet the question remains whether these can actually be attributed to dissonance reduction and, if so, what is causing this mental discomfort.

Decomposing the SVO spreading into that of prosocials and proselfs suggests a regression to the mean exists in both conditions: prosocials become more selfish, whereas proselfs tend to behave more altruistically in the second SVO measurement. Moreover, chosen spread of the proself SVOs is on average negative, which is inconsistent with a revealed preference argument. This may however be because the choice for these SVO types may have been considerably easier than hypothesized initially. Nonetheless, proselfs in the PCP condition still appear more likely to adjust their preferences than those in the PPC condition. This also suggests choice-induced preference change is present, although the direction of SVO adjustments for these subjects in particular remains to be validated.

Notwithstanding the fact that spreading in SVO angles occurs in both conditions, the comparison between the PCP and PPC condition allows an isolation of the spreading resulting from the act of choice. Choice-induced preference change may however also be explained by different phenomena than dissonance reduction alone. Self-perception theory (Bem, 1967, 1972) posits that people change their preferences after making a decision since they infer their own preferences from their choice. This interpretation of choice-induced preference change shares many similarities with the economic precept of revealed preferences, and specifically predicts preferences to shift consistent with the chosen alternative. Self-perception theory is usually regarded to describe preference changes that concern attitude-congruent behaviour (Fazio, et al., 1977). The findings however suggest SVO adjustments may happen in either direction by the act of choice, which self-perception theory cannot explain. Dissonance theory describes the observed preference changes in other-regarding preferences therefore more accurately, with subjects appearing to respond heterogeneously to the experienced mental discomfort. Self-affirmation theory in particular seems able to reconcile the evidence.

#### 5.3. Recommendations for further research

Reflecting upon the findings and experimental limitations yields several suggestions for improvements and alternative directions to explore. First and foremost, self-affirmation theory should be investigated more closely to establish whether it truly explains choice-induced preference change in other-regarding preferences. The current experimental design is primarily concerned with establishing choice-induced preference change in other-regarding preferences, which can be considered the first appropriate attempt in doing so within the free-choice paradigm. Whereas self-affirmation theory appears to be able to explain the findings, at least more than self-perception theory or alternative dissonance interpretations, the current research design does not allow the theory to be tested more adequately. Modifying the current methodology slightly could however validate self-affirmation theory. Early studies establishing self-affirmation did so by using a variant of the induced-compliance paradigm in which subjects had a strongly-held value affirmed after the dissonant act, but before preferences were established again (see, e.g., Steele & Liu, 1983; Simon, Greenberg, & Brehm, 1995). This self-affirmation promotes individuals' self-integrity, and defuses the threat posed to one's self-concept by the dissonant act. Implementing such a procedure in the current design and comparing the SVO adjustments of this condition with those of the PCP condition could then shed light on the plausibility of choice-induced preference change in other-regarding preferences being the result of self-affirmation.

Secondly, alternative paradigms may be explored to investigate preference changes when the underlying preferences are socially orientated. Instead of SVO angles for instance, fairness statements may be used to evaluate individuals' distributive preferences before and after the act of choice; Rustichini and Villeval's (2014) procedure may be particularly interesting, although it seems less comprehensive. Their findings suggest individuals adjust their fairness perceptions, elicited through a slider task requiring them to indicate the lowest allocation of money they perceive fair in various experimental games (Dictator, Ultimatum, and Trust Game), consistent with their choice. Yet, Chen and Risen's (2010) critique is not adressed appropriately and there was considerable time between the two elicitations of preferences. Utilizing fairness statements instead of SVO types in the current design would allow their findings to be validated. Besides variants of the free-choice paradigm, the inducedcompliance paradigm may also be used to evaluate preference changes in other-regarding preferences. One way this could for instance be done is by requiring subjects with a proself SVO to advocate why the other person should receive as much money as possible in the six allocation decisions. Effectively doing so may be difficult in an online environment however, with individuals being required to actually make an effort in performing the task and should perceive to not have a choice in participating in order to enable any inferences about induced preference change.

Dissonance reduction is considered more likely to occur when cognitions are important and when their level of incongruence increases (Festinger, 1957). Only evaluating the SVO adjustments of subjects who provided their email address, which is a reasonable proxy for choices being important, yields similar conclusions as those for the entire sample. Directly testing this condition for dissonance reduction to occur could for instance be done effectively in a laboratory setting by varying the allocation amounts.<sup>21</sup>

The closely related condition of a decision's difficulty depends on a person's preferences. Apparently, the decision was not particularly difficult considering the altruistic option was barely chosen. In fact, subjects with a proself SVO did not do so at all, which seems reasonable considering their stated

<sup>&</sup>lt;sup>21</sup> Of course, such a procedure assumes decisions become more important when stakes increase.

preference may have been amongst the choice alternatives and would be identified as the selfish option. Prosocials therefore faced a more difficult decision, with future investigations being able to shed light on how the difficulty of the decision affects the extent of dissonance reduction. This is especially valuable to validate the direction of SVO adjustments of proself subjects in the PCP condition, and potentially even the manifestation of dissonance in other-regarding preferences in general. One way this could be evaluated is by presenting prosocial subjects a choice between alternatives at one end of their stated preference, or with one alternative actually being their stated preference. Alternatively, proself subjects could be presented a choice in which being selfish is more costly, which can be achieved by presenting a choice between options of the altruistic-competitive Dictator Game instead of one between alternatives of the altruistic-cooperative Dictator Game. In hindsight, this would likely have been more appropriate to evaluate dissonance theory.

Finally, other experimental limitations could be addressed in more detail in subsequent research. This concerns alternative sampling procedures and implementing the online variant of the SVO Slider Measure as mentioned earlier, but also evaluating dissonance theory in more depth by recording response times (see, e.g., Alós-Ferrer, et al., 2012).

#### 6. Concluding remarks

The purpose of this thesis is to examine whether other-regarding preferences are affected by choices, rather than choices merely reflecting these preferences. Dissonance theory predicts that the act of choice generates some mental discomfort, with individuals being motivated to adjust their preferences to relieve this discomfort. The present study addresses Chen and Risen's (2010) critique and provides the first appropriate attempt to identify choice-induced preference change in other-regarding preferences. This thesis thereby explores a new dimension in the synchronous relationship between choices and preferences important for social psychology, judgment and decision-making, and microeconomics.

Other-regarding preferences, conceptualized in terms of SVO angles, are analysed before and after individuals face a difficult decision between two monetary distributions. The experimental design controls for the information revealed by choice by randomly assigning subjects to either the PCP or PPC condition in which they face the same difficult choice, varying the timing of this choice between the two conditions. This methodology allows an identification of the preference changes that are specifically induced by the act of choice.

The findings suggest no difference between the PCP and PPC condition in terms of chosen spread, being SVO angle adjustments consistent with subjects' choices. Rather, subjects in the PCP condition are found to be more likely to adjust their SVO angle either consistently or inconsistently with their choice than those in the PPC condition. Dissonance reduction appears to manifest differently than is

commonly hypothesized for self-regarding preferences. This is likely due to the different nature of the underlying preferences, with decisions potentially threatening one's self-concept. Self-affirmation theory's interpretation of dissonance (see, Steele, 1988) best explains the current findings.

Some experimental limitations may however impair dissonance theory as an explanation of the observed preference changes in other-regarding preferences. This mainly concerns the difficulty of the actual decision, which may not have been particularly difficult to create dissonance. This possibility can simply be evaluated by presenting a different decision, either one that is likely easier or one that is reasonably more difficult. Especially proselfs seem to not have experienced the decision as difficult, with all of them opting for the more selfish alternative over the altruistic option. Nonetheless, even if the decision was not that difficult, this only implies finding any significant results becomes less likely. In fact, this actually strengthens the evidence for choice-induced preference change, although it does not necessarily support dissonance theory. Memory effects also impede the chances of finding any significant evidence for choice-induced preference.

Dissonance theory partly explains other-regarding behaviour (e.g., Konow, 2000), yet its validity in explaining preference changes in other-regarding preferences is still to be fully considered and evaluated appropriately. The findings suggest people may preserve their self-integrity by promoting their values in one task, and justify discrepant behaviour in others through self-affirmations. However, the fact the choice may not have been that difficult for subjects with a proself SVO somewhat impedes the accuracy of this interpretation. Self-affirmation theory can be evaluated more closely by affirming a strongly-held value after the difficult choice, but before SVOs are measured once more. If self-affirmation is present, less subjects are expected to affirm their values in the second SVO measurement by adjusting their preferences (compared to the current PCP condition). In the end, discussion does not appear to revolve around choices actually modifying other-regarding preferences. Rather, the psychological processes responsible for these preference changes remain to be determined.

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# Appendix 1: SVO Slider Measure and difficult choices

The six primary items of the SVO Slider Measure are depicted in Figure 1. These are presented similarly in Qualtrics, both in Preference 1 and Preference 2. Importantly, the third item is considered the altruistic-cooperative Dictator Game, the fourth item concerns the altruistic-competitive Dictator Game, the fifth item the altruistic-individualistic Dictator Game, and the sixth item concerns the cooperative-individualistic Dictator Game.

	SVO Slider Measure								
	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt. 5	Opt. 6	Opt. 7	Opt. 8	Opt. 9
You Receive	€8.50	€8.50	€8.50	€8.50	€8.50	€8.50	€8.50	€8.50	€8.50
Other Receives	€8.50	€7.60	€6.80	€5.90	€5.00	€4.10	€3.30	€2.40	€1.50
You Receive	€8.50	€8.70	€8.90	€9.10	€9.30	€9.40	€9.60	€9.60	€10.00
Other Receives	€1.50	€1.90	€2.40	€2.80	€3.30	€3.70	€4.10	€4.60	€5.00
You Receive	€5.00	€5.40	€5.90	€6.30	€6.80	€7.20	€7.60	€8.10	€8.50
Other Receives	€10.00	€9.80	€9.60	€9.40	€9.30	€9.10	€8.90	€8.70	€8.50
You Receive	€5.00	€5.40	€5.90	€6.30	€6.80	€7.20	€7.60	€8.10	€8.50
Other Receives	€10.00	€8.90	€7.90	€6.80	€5.80	€4.70	€3.60	€2.60	€1.50
You Receive	€10.00	€9.40	€8.80	€8.10	€7.50	€6.90	€6.30	€5.60	€5.00
Other Receives	€5.00	€5.60	€6.30	€6.90	€7.50	€8.10	€8.80	€9.40	€10.00
You Receive	€10.00	€9.80	€9.60	€9.40	€9.30	€9.10	€8.90	€8.70	€8.50
Other Receives	€5.00	€5.40	€5.90	€6.30	€6.80	€7.20	€7.60	€8.10	€8.50

Figure 1: The six primary items of the SVO Slider Measure as presented to the subjects, both in Preference 1 and 2. For each of the six items, subjects could indicate their most desired distribution out of nine options by clicking that particular alternative. Presentation in Qualtrics may have varied slightly depending on the device (laptop, smartphone) subjects used.

Identified altruistic SVOs face a difficult choice between two options of the cooperative-individualistic Dictator Game (Figure 1, sixth item), cooperative SVOs choose between two alternatives of the altruistic-individualistic Dictator Game (Figure 1, fifth item), and individualistic SVOs face a decision between options of the altruistic-cooperative Dictator Game (Figure 1, third item). These difficult choices involve options at either side of the subject's expressed preference. If one of the extreme options is preferred, the subject faces a decision between their stated preference and the closest alternative in the respective dictator game. To illustrate, suppose an individual is identified as being individualistic in Preference 1, and preferred ( $\in 8.50$ ,  $\in 8.50$ ) in the altruistic-cooperative Dictator Game.

The subject will then face a choice between this alternative and ( $\leq 8.10$ ,  $\leq 8.70$ ) as the difficult choice. Alternatively, a cooperative subject who preferred ( $\leq 7.50$ ,  $\leq 7.50$ ) in the altruistic-individualistic item faces a choice between ( $\leq 8.10$ ,  $\leq 6.90$ ) and ( $\leq 6.90$ ,  $\leq 8.10$ ).

## Appendix 2: Payout of choices

Of the one hundred fifty-six subjects who completed the experiment, one-hundred twelve provided their email address. Each of these subjects is assigned a unique number. Three numbers are randomly drawn from this set using https://andrew.hedges.name/experiments/random/, corresponding to a particular subject. The first subject in the series of drawn numbers will receive one of his or her stated preferences in the first SVO measurement (Preference 1), the second receives his or her choice in the difficult decision (Choice 1 or Choice 2, depending on the condition the subject is assigned to), and the third subject receives one of the preferences stated in the second SVO measurement (Preference 2). The random number generator is utilized once more for the first and third subject to determine which of the choices in the six Dictator Games is paid out to them.

The described lottery was performed on the 9<sup>th</sup> of July, with the following series of numbers being returned: {80, 64, 85}. For subject 80, the stated preference in the fifth Dictator Game was selected (Preference 1). Subject 85 receives the stated preference in the fourth Dictator Game (Preference 2). The choices eventually selected were, in order: ( $\notin$ 7.50,  $\notin$ 7.50), ( $\notin$ 8.50,  $\notin$ 8.50), and ( $\notin$ 8.50,  $\notin$ 1.50).

On the same day (9<sup>th</sup> of July), respective subjects were notified individually via email about their prospective payouts and from which tasks these were selected. Their bank details were requested and they were informed that they could expect their winnings, in addition to photos of strangers in Rotterdam receiving their cut, somewhere the following week. Since some subjects may feel uncomfortable providing this sensitive information, they were given the option to receive a bol.com gift card worth  $\in$ 5.00 instead of their entitlement; the stranger in Rotterdam would still receive the money they originally opted for. All three subjects replied to the email before the 20<sup>th</sup> of July, providing their bank details and indicating they would like to receive their entitlement.

The money allocated to strangers by the three subjects was distributed on the 20<sup>th</sup> of July, at the campus of the Erasmus University in Rotterdam. These individuals were informed that an experiment had taken place in which money was divided between a subject and another person. In case they wanted the money, they were told a photo had to be taken together with the experimenter. Upon agreement, they received their allocation in an envelope and were thanked for their contribution. These photos were shared with all subjects who provided their email address on the following day, the 21<sup>st</sup> of July. The three winning subject were transferred their entitlement.

# Appendix 3: Sampling and descriptive statistics

One hundred fifty-six subjects in total participated in the online experiment, who were recruited by means of convenience sampling. Of these, fourteen subjects are excluded since they either indicated to have sufficient knowledge about the experiments' contents beforehand or required in excess of thirty minutes to complete the experiment. Table 5 provides some descriptive statistics of the final sample.

	Descriptive statistics							
	Obs.	Mean	Std. Dev	Minimum	Maximum			
First SVO angle (in degrees)	142	25,12	15,60	-16,26	52,91			
Second SVO angle (in degrees)	142	24,18	14,99	-16,26	52,91			
Female	142	0,42						
Age (in years)	142	29,86	12,04	15	77			
Duration (in minutes)	142	11,27	3,99	2,93	27,6			
Email address provided	142	0,72						
Familiarity allocation decisions	142	0,37						
Other person, Rotterdam	142	0,18						
Other person, impact decisions	142	0,58						

Table 5: Descriptive statistics (rounded to two decimals when applicable, for dummy variables only the number of observations and means are depicted); the figures in the table concern the final sample.

Some clarifications with regard to the final three items in Table 5 are required. First, "Familiarity allocation decisions" concerns subjects' answer to the question "Have you performed similar allocation decisions before?", which could either be answered with 'Yes' or 'No'. Second, "Other person, Rotterdam" asks subjects whether or not they identified the other person in the allocation decisions as someone in Rotterdam, since subjects were explicitly informed that any payout to their counterpart in the allocation decisions would be distributed to strangers in Rotterdam. Finally, "Other person, impact decisions" concerns subjects' answer to the question "Did you consider that your choices may actually affect the life of this other person", which again could be answered with either 'Yes' or 'No'. Importantly, the means of all these three items, in addition to those of "Female" and "Email address provided", depict the fraction of subjects who answered 'Yes'.

# Appendix 4: Spreading of SVO angles, decomposed into prosocials and proselfs

The first SVO measurement classified eighty-seven subjects as being prosocial (altruistic, cooperative) and fifty-five as being proself (individualistic, competitive). Table 6 provides chosen spread, altruistic spread, selfish spread, and general spread for these SVOs separately.

	Condition, prosocials							
Measure of		РСР			PPC			
SVO spreading	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev.		
Chosen spread	45	2,85a	8,22	42	1,74a	5,72		
Altruistic spread	3	1,00 <sub>a</sub>	14,81	10	0,39a	2,38		
Selfish spread	42	2,98ª	7,84	32	2,16ª	6,40		
General spread	45	-2,71 <sub>b</sub>	8,27	42	-1,55 <sub>b</sub>	5,78		
		Condition, proselfs						
Measure of		РСР			PPC			
SVO spreading	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev.		
Chosen spread	26	-1,76 <sub>a</sub>	6,89	29	-0,28a	5,97		
Altruistic spread	0	N/A	N/A	0	N/A	N/A		
Selfish spread	26	-1,76 <sub>a</sub>	6,89	29	-0,28 <sub>a</sub>	5,97		
General spread	26	1,76 <sub>b</sub>	6,89	29	0,28b	5,97		

Table 6: Spreading of SVO angles between Preference 1 and 2, decomposed into individuals who classified as prosocials and proselfs in Preference 1. Means and standard deviations in degrees, rounded to two decimals. The means that share a subscript letter do not differ significantly at the 5% level; general spread is not compared to chosen, altruistic or selfish spread. General spread is calculated as the SVO angle in Preference 2 minus the angle in Preference 1; chosen spread equals the absolute general spread when a subject's choice is consistent with the adjustment in Preference 2, otherwise it equals the negative absolute difference; altruistic and selfish spread consider chosen spread for subjects who chose the more altruistic and selfish option, respectively.

# Appendix 5: Consistency choices with SVO adjustment, e-mail provided

One hundred two subjects provided their email address, with forty-four of these being assigned to the PCP condition and fifty-eight to the PPC condition. Table 7 shows the consistency of these subjects' choices with their SVO adjustment.

	Condition, email provided							
Choice consistency	РСР				РРС			
with SVO adjustment	Everyone	Proselfs	Prosocials		Everyone	Proselfs	Prosocials	
Selfish, consistent	16	4	12		12	3	9	
Selfish, inconsistent	15	9	6		10	5	5	
Selfish, no change	13	4	9		29	15	14	
Altruistic, consistent	0	0	0		1	0	1	
Altruistic, inconsistent	0	0	0		2	0	2	
Altruistic, no change	0	0	0		4	0	4	

Table 7: Consistency of subjects' SVO angle adjustment with their choice, only for those individuals who provided their email address. Proselfs contain subjects with both individualistic and competitive SVOs; prosocials only contain subjects with cooperative SVOs, since no altruistic SVOs are identified.