The Role of Individual Differences in the Prediction of Cooperation, Deviance, and Performance

Pletzer, J.L.

2018

document version
Publisher's PDF, also known as Version of record

CHAPTER 2
SOCIAL VALUE ORIENTATION, EXPECTATIONS, AND COOPERATION: A META-ANALYSIS

This chapter is based on Pletzer, J. L., Balliet, D. P., Joireman, J., Kuhlman, D. M., Voelpel, S. C., & Van Lange, P. A. M. (2018). Social value orientation, expectations, and cooperation: A meta-analysis. *European Journal of Personality*, *32*, 62-83. doi: 10.1002/per.2139

A paper draft was presented at the 17th International Conference on Social Dilemmas 2017.

Abstract

Interdependent situations are pervasive in human life. In these situations, it is essential to form expectations about the other's behavior to adapt one's own behavior to increase mutual outcomes and avoid exploitation. Social value orientation, which describes the dispositional weights individuals attach to their own and to another person's outcome, predicts these expectations of cooperation in social dilemmas – an interdependent situation involving a conflict of interests. Yet, scientific evidence is inconclusive about the exact differences in expectations between prosocials, individualists, and competitors. The present meta-analytic results show that, relative to proselfs (individualists and competitors), prosocials expect more cooperation from others in social dilemmas, whereas individualists and competitors do not significantly differ in their expectations. The importance of these expectations in the decision process is further highlighted by the finding that they partially mediate the well-established relation between social value orientation and cooperative behavior in social dilemmas. In fact, even proselfs are more likely to cooperate when they expect their partner to cooperate.

Keywords: cooperation, social value orientation, expectations, trust, social dilemmas

Introduction

Human cooperation is a topic that cuts across several scientific disciplines. The general goal is to understand the mechanisms supporting cooperation. An especially important scientific challenge involves understanding human cooperation in *social dilemmas* (i.e., situations in which short-term self-interest conflicts with long-term collective interests; Parks, Joireman, & Van Lange, 2013; Van Lange, Joireman, Parks, & Van Dijk, 2013). Notably, many social dilemmas involve decision-makers with little to no information about the motives and likely actions of others – for example, in group projects with new colleagues. In these situations, the decision-maker's dispositional concern for other's welfare (or social value orientation (SVO); prosocial, individualistic, and competitive orientation; Van Lange, Otten, De Bruin, & Joireman, 1997) and expectations about others' choices affect cooperation. Yet, it is not clear whether or how these two key variables work together in promoting cooperation.

According to the goal-expectation hypothesis (Pruitt & Kimmel, 1977), cooperation requires both the goal of cooperating (i.e., a desire to maximize joint outcomes) *and* the expectation that one's partner(s) will cooperate. In other words, SVO interacts with expectations to drive cooperation, such that only prosocials who expect others to cooperate will themselves cooperate (Boone, Declerck, & Kiyonari, 2010). An alternative possibility is that social motives influence expectations which in turn predict levels of cooperation. Restated, expectations (at least partially) mediate the impact of SVO on cooperation. In their thorough review of the literature on SVO, expectations, and cooperation, Bogaert, Boone, and Declerck (2008) offer an integrative model proposing that expectations serve to both moderate and mediate the impact of social motives on cooperation.

In the present paper, we utilize meta-analysis to test both the moderation and mediation models. While it is clear that cooperation in social dilemmas is reliably associated with differences in SVO (Balliet, Parks, & Joireman, 2009) and expectations (Balliet & Van Lange, 2013), it is less clear how SVO and expectations work together to drive cooperation. Our meta-analysis offers four contributions to the work on SVO and cooperation in social dilemmas. First, we estimate if the three primary SVOs (i.e., prosocials, individualists, and competitors) differ in their expectations of partner cooperation. Previous research has been inconclusive regarding the exact magnitude of differences in expectations, especially when comparing individualists and competitors (e.g., Kuhlman & Wimberley, 1976; Van Lange, 1992). Moreover, studies always contain very few individuals who dispositionally pursue relative gains over others (i.e., competitors, about 12% of the population; Au & Kwong, 2004; Van Lange et al., 1997), and a meta-analysis can provide a relatively high powered test whether competitors differ from the

more common prosocials and individualists in their expectations of other's cooperation. Second, we examine how variability across the studies affects the relation between SVO and expectations of other's cooperation, such as group size, participant payment, and one-shot versus repeated interactions. Third, we harness recent developments in meta-analysis to provide the first meta-analytic test of the indirect effect of expectations on the relation between SVO and cooperation in social dilemmas. Fourth, we test the assertion that prosocials condition their cooperation on expected partner cooperation, but that individualists' and competitors' decisions to cooperate are independent of expected partner cooperation.

Social Value Orientation and Cooperation in Social Dilemmas

A long history of theoretical development and experimental research in the social and biological sciences has focused on understanding human cooperation in a situation when cooperation is difficult to achieve – social dilemmas (Van Lange et al., 2013). A social dilemma is an interdependent social interaction that contains a conflict between individual and collective interests (Dawes, 1980). In social dilemmas, individuals can achieve the best outcome by deciding not to cooperate while the partner does cooperate (*temptation outcome* (T)). However, mutual cooperation (*reward outcome* (R)) always yields a larger outcome than mutual defection (*punishment outcome* (P)). The worst possible outcome occurs by cooperating with a partner who does not cooperate (*sucker outcome* (S)). The payoffs in all social dilemmas follow the same basic structure: $T > R > P > S$, and all social dilemmas contain a clear structural incentive to defect.

The most widely studied personality construct in relation to cooperation in social dilemmas is SVO – defined in terms of the dispositional weights individuals assign to their own and to others' outcomes in interdependent situations (Kuhlman, Camac, & Cunha, 1986; McClintock, 1972). The SVO construct is derived from research on behavior in experimental games. Traditional game theory assumes that the decisions of individuals in interdependent situations are governed by a motivation to maximize own outcomes (e.g., Luce & Raiffa, 1957), and this assumption of "rational self-interest" has dominated much subsequent theory and research in various disciplines. Because research uncovered considerable individual variation in behavior in various economic games, researchers started to examine motives that transcend (short-term) self-interest. In particular, a guiding assumption underlying research on SVO has been that some individuals consider not only their own outcome in interdependent situations, but also the outcomes of other individuals (Messick & McClintock, 1968) and value equality in outcomes (Van Lange, 1999). As such, SVO reflects stable individual differences in an inherent sense of fairness and equality in outcomes.[1]

Three SVOs are frequently distinguished in the population: (a) *Prosocials* aim to equalize and/or maximize joint outcomes; (b) *Individualists* aim to maximize their own outcomes, regardless of the other's outcomes; and (c) *Competitors* aim to maximize the relative difference between their own and the other's outcome. Individualists and competitors are often combined in a *proself* category (Liebrand, 1984; Van Lange & Kuhlman, 1994). Over the past decades, SVO has usually been assessed with (1) the Triple Dominance Measure (TDM; Van Lange et al., 1997) (2) the Ring Measure (Liebrand, 1984; Liebrand & McClintock, 1988), and (3) the Slider Measure (Murphy, Ackermann, & Handgraaf, 2010). Table 1 displays an example item from each of these SVO measures. Each measure has participants allocate points between themselves and another hypothetical individual. Furthermore, participants are told that the other individual is making the same set of choices that affect the participant's outcomes. For example, in the TDM, participants choose between three options: A) 500 points to the self, 500 points to the other (i.e., cooperative choice), B) 560 points to the self, 300 points to the other (i.e., individualistic choice), or C) 490 points to the self and 90 points to the other (i.e., competitive choice). In the TDM, participants are classified as either prosocials, individualists, or competitors if they make enough choices (six out of nine) consistent with one of the three SVOs. The Ring Measure, in turn, allows for a continuous and for a categorical assessment of SVO, but shows lower test-retest reliability compared to other measures (Liebrand, 1984). Finally, the recently developed SVO Slider Measure overcomes the limitations of the TDM and the Ring Measure because it is efficient and easy to implement and shows good internal consistency while measuring SVO as a continuous construct, with higher scores indicating a more prosocial SVO (Murphy et al., 2010). In this 6-item measure, participants are asked to choose between several self-other payoff combinations. Based on their decisions, an SVO angle on a two-dimensional space consisting of *own payoff* and *other's payoff* can be computed. The Slider measure has good convergent validity with both the TDM and the Ring Measure (Murphy et al., 2010).[2]

SVO is a feature of personality as evidenced by its temporal stability (e.g., Van Lange, Bekkers, Chirumbolo, & Leone, 2012) and its relation to several other relevant personality constructs. In fact, SVO shares significant overlap with HEXACO Honesty-Humility (and with Big Five Agreeableness; Hilbig, Glöckner, & Zettler, 2014). Honesty-Humility describes the tendency to be fair and honest (Ashton & Lee, 2007) and is associated with various socially desirable behaviors, such as a lower likelihood to sexually harass someone (Lee, Gizzarone, & Ashton, 2003) or to be delinquent and criminal (De Vries & Van Gelder, 2013, 2015), and with increased interpersonal cooperation (Thielmann & Hilbig, 2014). Similarly, decades of research

have shown that SVO reliably predicts cooperation not only in social dilemmas (Balliet et al., 2009), but also across a broad range of natural settings (e.g., Van Lange, 2000; Van Lange, Van Vugt, Meertens, & Ruiter, 1998). For example, relative to individualists and competitors, prosocials tend to donate more to a variety of noble causes (e.g., McClintock & Allison, 1989; Van Andel, Tybur, & Van Lange, 2016), are more strongly involved in volunteering (e.g., Van Lange, Schippers, & Balliet, 2011), are more prone to exhibit citizenship behavior in organizations (e.g., Nauta, De Dreu, & Van Der Vaart, 2002), and engage more often in pro-environmental behavior (e.g., Cameron, Brown, & Chapman, 1998; Joireman, Lasane, Bennett, Richards, & Solaimani, 2001).

SVO and Expectations of Others' Cooperation

In social dilemmas, one's own choice and predispositions are often the basis of beliefs about the other's behavior, especially in situations that lack information about the other individuals (Holmes, 2002; Krueger & Acevedo, 2007). The most widely studied personality characteristic used to predict expectations of other's behavior in social dilemmas is SVO. Beginning with the classic work of Kelley and Stahelski (1970), research focused on individual differences in cooperative behavior has shown that prosocials expect more cooperation from others in social dilemmas than proselfs (e.g., Messé & Sivacek, 1979; Van Lange, 1990). Three models have been offered to explain how these dispositional preferences for cooperation influence expectations of other's cooperative preferences. First, the triangle hypothesis proposes that previous experiences and self-fulfilling prophecies lead prosocials to expect heterogeneous behavior from others, whereas proselfs, through their own competitive behavior, elicit only competitive behavior in others and therefore expect only competitive behavior from others (Kelley & Stahelski, 1970; Van Lange, 1992).

Table 1
Overview of Three Measures of Social Value Orientation

	# of Items	Example Item	Reference
TDM	9	A: You get 500, Other gets 500; B: You get 560, Other gets 300; C: You get 490, Other gets 90	Van Lange, P. A. M., Otten, W., De Bruin, E. M., & Joireman, J. A. (1997). Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence. *Journal of Personality and Social Psychology*, *73*, 733–746. doi:10.1037/0022-3514.73.4.733
Ring	24	A: You Get 100, Other Gets 80; B: You Get 60, Other Gets 0	Liebrand, W. B. G. (1984). The effect of social motives, communication and group size on behaviour in an N-person multi-stage mixed-motive game. *European Journal of Social Psychology*, *14*, 239–264. doi:10.1002/ejsp.2420140302
Slider	6[a]	Self: 100 98 96 94 93 91 89 87 85; Other: 50 54 59 63 68 72 76 81 85	Murphy, R. O., Ackermann, K. A., & Handgraaf, M. J. J. (2010). Measuring social value orientation. *Judgment and Decision Making*, *6*, 771–781. doi:10.2139/ssrn.1804189

Note. TDM = Triple Dominance Measure; Ring = Ring Measure; Slider = Slider Measure; [a] The Slider measure also has 9 secondary items that allow to distinguish between prosocials who want to maximize equality or who want to maximize mutual outcomes.

Second, the Structural Assumed Similarity Bias (SASB) proposes that individuals with all SVOs project their own dispositions onto others and expect others to be similar to themselves (Kuhlman et al., 1986; Kuhlman & Wimberley, 1976; Ross, Greene, & House, 1977). Finally, the Cone Model only slightly differs from the SASB as it suggests that this false consensus effect is larger for individualists than for prosocials or competitors (Iedema & Poppe, 1994b, 1999), possibly due to the overestimation of self-interest as a dominant motive underlying social behavior (Miller & Ratner, 1998; Vuolevi & Van Lange, 2010; Vuolevi & Van Lange, 2012).

It is important to note that the current meta-analysis cannot test the three models against each other because the models make predictions about the social dynamics and psychological processes that give rise to the social projection of SVO, and not directly about expected cooperation in social dilemmas.[3] However, it can be assumed that expectations about the distribution of SVO in the population correlate quite highly with expectations of other's cooperation in social dilemmas. Hence, the underlying mechanism of self-fulfilling prophecies or social projection might drive differences in expectations, and subsequently cooperation, as well. Importantly, it needs to be stressed that all three accounts propose that expectations precede and determine cooperative behavior, which is supported by findings showing that dispositional, manipulated, and situation-specific trust all facilitate cooperative behavior (Boone et al., 2010; Kuhlman & Marshello, 1975). While these models diverge on the underlying mechanisms linking different SVOs to expectations in social dilemmas, they all also concur that SVO strongly determines expectations of cooperation, such that relatively more prosocially minded individuals should also expect more cooperation from others. Despite this long-standing assumption, existing evidence is inconclusive about the exact magnitude of these differences in expected cooperation between prosocials, individualists, and competitors, pointing to the value of meta-analytically estimating these effects.

SVO, Expectations, and Cooperation: A Mediation Model

In addition to meta-analyzing the effect of SVO on expectations, we were interested in determining whether expectations mediate the influence of SVO on cooperation. In fact, two prior meta-analyses point to that possibility, as cooperation in social dilemmas has been reliably linked with SVO (Balliet et al., 2009; Renkewitz, Fuchs, & Fiedler, 2011) and expectations (or trust) (Balliet & Van Lange, 2013), providing two pieces of evidence consistent with the mediation model. Also consistent with the mediation model, it has long been assumed that personality exerts its influence on behavior by affecting how people construe situations (e.g.,

Funder, 2009). This is especially true in situations where decision-makers lack information about their interaction partners (e.g., Holmes, 2002).

It is important to note that the expectation-cooperation link can be explained in two ways: 1) Individuals who exhibit cooperative behavior might justify their own behavior by expecting cooperation from others (self-justification; Dawes, McTavish, & Shaklee, 1977), or 2) individuals assume that others are similar to themselves and therefore expect cooperation, which leads them to cooperate (assumed similarity; Messé & Sivacek, 1979). However, scientific evidence and the three theoretical accounts mentioned before suggest that expectations precede and determine cooperative behavior (Boone et al., 2010; Iedema & Poppe, 1994a, 1999; Kelley & Stahelski, 1970; Kuhlman et al., 1986; Kuhlman & Marshello, 1975; Kuhlman & Wimberley, 1976; Van Lange, 1992). In addition, if cooperative behavior would determine expectations (and not vice versa), the correlation between expectations and cooperation should be stronger when expectations are assessed after cooperation. However, a recent meta-analysis including 104 studies that measured expectations either before or after decisions of cooperation found that expectations had the same correlation with cooperation, regardless of when expectations were measured (Balliet & Van Lange, 2013).

Altogether, this evidence does not support an alternative model that cooperation mediates the relation between SVO and expectations. Instead, these prior research findings provide strong reasons to believe that expected cooperation mediates the relationship between SVO and cooperation in social dilemmas. A relatively more prosocial SVO leads individuals to expect more cooperation from others, which subsequently makes them more likely to cooperate themselves. Even though both psychologists and economists have prioritized both SVO (i.e., social preferences; Murphy et al., 2010) and expectations about others' behavior in predicting behavior in interdependent situations (e.g., Fischbacher & Gächter, 2010; Kuhlman & Wimberley, 1976), very few studies (e.g., Sheldon, 1999) have directly tested the proposed mediation model (Bogaert et al., 2008). Hence, existing evidence is inconclusive about how strongly SVO corresponds to beliefs about other's cooperation, and about the role that expectations play in understanding how SVO relates to cooperative behavior. Here, we aim to meta-analytically test this mediation model and to provide an estimate of the magnitude of the indirect effect.

Do proselfs cooperate when they expect their partner to cooperate? Beyond testing the proposed mediation model, we were also interested in evaluating the possibility that the mediation model applies to prosocials, but not to proselfs. Prosocials are predicted to increase their cooperation when they expect their partner to cooperate (Boone, Declerck, & Suetens,

2008). However, proselfs may prefer to exploit a partner who is expected to cooperate and would also most certainly defect with an uncooperative partner. This reasoning suggests a positive relation between partner expected cooperation and own cooperation among prosocials, but a null relation among proselfs (especially in a one-shot interaction). Supporting this hypothesis, Boone and colleagues (2010) found that expectations increase cooperative behavior among prosocials, but not among proselfs.

Overview of the Meta-Analysis

In summary, we aim to achieve four goals with this meta-analysis. First, we estimate the magnitude of difference between each category of SVO in their expectations of others cooperation: (1) prosocials versus individualists, (2) prosocials versus competitors; (3) individualists versus competitors; and (4) prosocials versus proselfs. Second, we test several study characteristics as possible moderators of the relation between SVO and expected partner cooperation, such as the type of participant payment, the number of iterations or the group size in a social dilemma. Third, we utilize recent developments in meta-analysis to estimate the magnitude of the indirect effect of expectations in explaining the link between SVO and cooperation. This approach will illuminate the degree of importance of expectations as a psychological process explaining how individual differences in SVO relate to cooperation. Fourth, we investigate if cooperation is conditional upon expectations for prosocials, but not for proselfs. To do so, we test the relation between expectations and cooperation separately for prosocials and proselfs.

Method

Literature Search and Inclusion Criteria

We systematically searched several scientific databases (*Academic Search Premier, Business Source Premier, EconLit, PsycInfo, PsycARTICLES, SocINDEX*) for relevant English-written articles with the following search terms in the entire text of the article: ("*social value orientation"* OR "*social motive*") AND (*"expectation of cooperation"* OR "*expectations of cooperation*" OR *"expected cooperation*"). This search returned 795 articles after duplicates were removed and we inspected all abstracts. If SVO was mentioned in the abstract, then we searched the entire article for the inclusion of SVO, expectations of other's cooperation, and cooperation in a social dilemma. This way, we included 8 articles with 10 studies. In addition, we searched *GoogleScholar* and found six additional articles with six effect sizes. When an article was published within the last 10 years, but did not include all necessary statistical information to calculate effect sizes, we contacted the authors and requested additional information. This way, we received data for one additional article with two studies. Lastly, we

contacted authors who had published on the topic of interest in the past and received two additional published articles with four studies and four unpublished articles with eleven studies. We also searched the reference lists of all articles deemed relevant in this search for other relevant articles. Finally, we searched all articles included in prior meta-analyses on SVO and cooperation (Balliet et al., 2009) and expectations and cooperation (Balliet & Van Lange, 2013). Overall, we included 21 articles with 33 studies for the comparison between prosocials and proselfs in expected partner cooperation. The earliest included article was from 1976 and our search was conducted through October 2015.

There were several criteria for inclusion. First, studies had to measure participants' SVO (e.g. with the TDM, Ring Measure, or Slider Measure). Second, studies had to include a measure of participants' expectations of other's cooperation in a social dilemma (e.g., prisoner's dilemma, public goods dilemma, and resource dilemma).[4] Lastly, studies had to involve adult participants (age 18 and above). We excluded studies that classified participants as prosocials or proselfs based on a goal choice in a social dilemma task (e.g., Bixenstine, Lowenfeld, & Englehart, 1981; Kelley & Stahelski, 1970; Miller & Holmes, 1975). This is a rare measure of social motives, which shares extensive overlap with decisions in social dilemmas and which has not been validated against existing measures of SVO. We also excluded studies using economic games that are not social dilemmas (e.g., ultimatum or dictator games).

Coding of Effect Sizes

Two individuals coded all effect sizes and study characteristics: the first author and a trained research assistant. There was high agreement between coders (96%). All disagreements were resolved through discussion. Each study contained at least one coded effect size, and when possible we coded several different effect sizes from each study (described below). We used the standardized mean difference as the measure of effect size (Cohen's *d*). Cohen's *d* is calculated by dividing the difference between two means by the pooled standard deviation and correcting for sample size (Hedges & Olkin, 1985). We calculated the *d* value by using the mean and standard deviation of expectations of cooperation for different types of SVOs. When the descriptive statistics were unavailable, we calculated *d* by using either the *t* statistic, the *F* statistic, the Chi-Square value, the proportion of participants expecting cooperation, or the correlation coefficient (*r)* between SVO and expectations of cooperation. When a manipulated variable was included in a study, we coded the main effect of SVO on expectations of cooperation across conditions. A positive *d* value indicates that the relatively more prosocial

comparison group expects more cooperation than the more proself group (i.e., prosocials > proselfs; prosocials > individualists; prosocials > competitors; individualists > competitors).

We coded four comparisons on the relation between SVO and expectations of cooperation: (1) prosocials versus individualists (k = 20, n = 2,686), (2) prosocials versus competitors (k = 13, n = 1,362), (3) individualists versus competitors (k = 13, n = 726), and (4) prosocials versus proselfs (k = 33, n = 4,793). We use the first three comparisons to gain a comprehensive understanding of the relationship between SVO and expectations. We use the fourth comparison to test for potential moderators of the relation between SVO and expectations of cooperation and to test the mediation model. Table 2 shows the included studies and their corresponding coded effect sizes and study characteristics.

Coding of Study Characteristics

We coded several study characteristics that vary across the studies included in the meta-analysis for the comparison between prosocials and proselfs. Below we describe each study characteristic we coded and the number of studies with coded effect sizes at each level of the coded variable. Table 2 reports the coding for each study.

SVO. SVO was measured by using the TDM (k = 16; Van Lange et al., 1997), the Ring Measure (k = 8; Liebrand & McClintock, 1988), the Slider Measure (k = 6; Murphy et al., 2010), or with decomposed games (k = 3; Messick & McClintock, 1968). Whenever the Slider Measure was used, we coded the results based on the continuous measurement of SVO (i.e., we converted the correlation coefficient r to Cohen's d). A few older studies asked participants to indicate their SVO by choosing between a cooperative or a competitive orientation (k = 15; e.g., Bixenstine et al., 1981; Miller & Holmes, 1975). These studies were excluded from the main analysis because the decisions of participants to cooperate or to compete share extensive overlap with the decisions in the social dilemma, but we also report the results including these studies to provide a comprehensive overview of the literature.

Table 2
Studies included in the Meta-Analysis

Study	Total *N* (Prosocial *N*)	CO	DL	K	P/UP/L	O/TY	OS/IT (#)	SVO	GS	PS	*d*	*LL/UL*
Prosocials versus Proselfs												
Balliet et al. (2011) Study 2	85 (49)	SG	PD	.200	P	O	IT (2)	TDM	2	PUB	0.704	0.245/1.163
Study 3	47 (28)	SG	PGD	.250	P	O	IT (2)	TDM	2	PUB	0.127	-0.456/0.710
Balliet et al. (2016)	680 (508)	US	PD	.333	UP	O	OS	TDM	2	PUB	0.264	0.090/0.437
Balliet (2012)	404 (242)	US	PD	.333	L	O	OS	Slider	2	UPUB	0.066	-0.130/0.262
Study 2	111 (81)	NL	PD	.333	L	O	OS	Slider	2	UPUB	0.199	-0.180/0.578
Study 3	341 (170)	US	PD	.333	L	O	OS	Slider	2	UPUB	0.802	0.572/1.031
Boone et al. (2008)	73 (42)	DK	PGD	.922	P	O	IT (15)	TDM	2	PUB	0.602	0.128/1.077
De Bruin & van Lange (1999)	144 (77)	NL	PGD	.333	UP	O	OS	TDM	2	PUB	0.429	0.098/0.760
De Cremer et al. (2008)	88 (46)	NL	PGD	.357	P	O	IT (-)	TDM	5	PUB	0.466	0.042/0.890
Eek & Gärling (2006)	54 (34)	SE	PD	.286	UP	O	OS	TDM	2	PUB	0.961	0.249/1.673
Kiyonari (2011)	130 (62)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.492	0.143/0.842
Study 2	149 (75)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.438	0.113/0.763
Study 3	54 (26)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.939	0.376/1.501
Kiyonari & Barclay (2008)	87 (64)	CA	PGD	.444	P	O	OS	TDM	4	PUB	0.273	-0.205/0.752
Study 2	73 (54)	CA	PGD	.444	P	O	OS	TDM	4	PUB	0.634	0.101/1.167
Study 3	108 (78)	CA	PGD	.444	P	O	OS	TDM	4	PUB	0.189	-0.233/0.610
Kiyonari et al. (2008)	119 (86)	BE	RD	.444	P	O	OS	TDM	4	UPUB	0.588	0.179/0.996
Study 2	113 (85)	BE	PGD	.444	P	O	OS	TDM	4	UPUB	0.257	-0.171/0.685
Kramer et al. (1986)	53 (26)	US	RD	---	P	O	IT (12)	DG	6	PUB	0.446	-0.100/0.991
Kuhlman & Wimberley (1976)	128 (59)	US	PD	.200	P	TY	IT (30)	DG	2	PUB	0.423	0.030/0.816
Liebrand et al. (1986)	126 (58)	NL	PD	---	P	O	IT (8)	Ring	8	PUB	0.411	0.057/0.765
Smeesters et al. (2003) Study 2	186 (95)	BE	PGD	.400	UP	O	OS	Ring	2	PUB	0.325	0.035/0.614
Study 3	128 (62)	BE	PGD	.370	UP	O	OS	Ring	2	PUB	0.349	0.000/0.699
Study 4	155 (81)	BE	PGD	.370	UP	O	OS	Ring	2	PUB	0.376	0.058/0.694
Smeesters et al. (2003)	140 (70)	NL	PGD	.400	UP	O	OS	Ring	2	UPUB	0.223	-0.109/0.555
Van Lange (1992)	123 (52)	NL	PD	.333	UP	O	IT (4)	DG	2	PUB	0.738	0.293/1.183
Van Lange (1999)	164 (93)	NL	PGD	.333	P	O	OS	Ring	2	PUB	0.593	0.278/0.909
Van Lange & Liebrand (1989)	78 (45)	US	PGD	.333	P	O	OS	Ring	2	PUB	0.136	-0.314/0.585
Van Lange & Liebrand (1991b)	59 (38)	NL	PGD	.333	P	O	OS	Ring	2	PUB	0.469	-0.071/1.008
Wu et al. (2013)	119 (97)	CN	PGD	.333	P	TY	OS	Slider	2	UPUB	0.374	0.004/0.745
Study 2	195 (173)	CN	PD	.500	UP	TY	IT (4)	Slider	2	UPUB	0.381	0.093/0.669
Study 3	186 (151)	CN	PD	.500	UP	TY	IT (4)	Slider	2	UPUB	0.289	-0.004/0.582
Yamagishi et al. (2013)	93 (70)	JP	PD	.333	P	O	OS	TDM	2	PUB	0.410	-0.061/0.881
Prosocials versus Proselfs (with Goal Choice)												
Bixenstine et al. (1981)	64 (32)	US	PD	.500	P	TY	IT (40)	Choice	2	PUB	2.301	0.716/3.887
Study 2	96 (48)	US	PD	.500	P	TY	IT (20)	Choice	2	PUB	1.867	1.026/2.709
Centers & Kelley (1969)	289 (225)	US	PD	---	UP	---	---	Choice	---	UPUB	1.522	1.100/1.943

Study 2	238 (181)	US	PD	---	UP	---	---	Choice	---	UPUB	1.852	1.320/2.385
Dorris (1969)	40 (16)	---	---	---	---	TY	---	Choice	---	UPUB	1.077	0.091/2.062
Kanouse & Wiest (1967)	187 (101)	US	PD	.400	UP	O	OS	Choice	2	PUB	1.863	1.427/2.300
Kelley et al. (1970)	550 (203)	US	DM	---	UP/P	TY	IT (-)	Choice	2	PUB	1.203	0.928/1.478
Kelley & Stahelski (1970)	219 (129)	US	PD	1.00	P	TY	IT (10)	Choice	2	PUB	0.988	0.643/1.333
Kelley & Stahelski (1970b)	101 (52)	US	PD	1.00	---	TY	IT (30)	Choice	2	PUB	0.389	-0.085/0.863
Loomis (1959)	198 (111)	US	PD	.500	UP	O	IT (5)	Choice	2	PUB	1.452	1.066/1.839
Messé & Sivacek (1979)	172 (73)	US	PD	.467	P	O	OS	Choice	2	PUB	1.156	0.774/1.539
Miller & Holmes (1975)	36 (28)	CA	PD	.500	UP	TY	IT (30)	Choice	2	PUB	1.435	0.095/2.775
Study 2	34 (26)	CA	PD	.500	UP	TY	IT (30)	Choice	2	PUB	0.757	-0.175/1.689
Misra & Kalro (1979)	249 (70)	IN	PD	.900	UP	TY	OS	Choice	2	PUB	1.168	0.820/1.516
Schlenker & Goldman (1978)	158 (83)	US	PD	.800	---	TY	IT (30)	Choice	2	PUB	0.463	0.048/0.878
Prosocials versus Individualists												
Balliet et al. (2011) Study 2	75 (49)	SG	PD	.200	P	O	IT (2)	TDM	2	PUB	0.555	0.010/1.101
Study 3	45 (28)	SG	PGD	.250	P	O	IT (2)	TDM	2	PUB	0.280	-0.326/0.885
Balliet et al. (2016)	666 (508)	US	PD	.333	P	O	OS	TDM	2	PUB	0.278	0.099/0.457
Boone et al. (2008)	71 (42)	DK	PGD	.922	P	O	IT (15)	TDM	2	PUB	0.695	0.208/1.182
De Cremer et al. (2008)	88 (46)	NL	PGD	.357	P	O	IT (-)	TDM	5	PUB	0.466	0.042/0.890
Kiyonari (2011)	123 (62)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.616	0.254/0.977
Study 2	144 (75)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.431	0.101/0.762
Study 3	51 (26)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.877	0.302/1.451
Kiyonari & Barclay (2008)	86 (64)	CA	PGD	.444	P	O	OS	TDM	4	PUB	0.241	-0.245/0.727
Study 2	72 (54)	CA	PGD	.444	P	O	OS	TDM	4	PUB	0.562	0.021/1.103
Study 3	106 (78)	CA	PGD	.444	P	O	OS	TDM	4	PUB	0.108	-0.324/0.540
Kiyonari et al. (2008)	117 (86)	BE	RD	.444	P	O	OS	TDM	4	UPUB	0.583	0.166/1.001
Study 2	112 (85)	BE	PGD	.444	P	O	OS	TDM	4	UPUB	0.231	-0.203/0.665
Kuhlman & Wimberley (1976)	98 (59)	US	PD	.200	P	TY	IT (30)	DG	2	PUB	0.327	-0.127/0.780
Van Lange (1992)	85 (52)	NL	PD	.333	UP	O	IT (4)	DG	2	PUB	0.762	0.305/1.219
Van Lange (1999)	153 (93)	NL	PGD	.333	P	O	OS	Ring	2	PUB	0.576	0.245/0.907
Wu et al. (2013)	119 (97)	CN	PGD	.333	P	TY	OS	Slider	2	UPUB	0.374	0.004/0.745
Study 2	195 (173)	CN	PD	.500	UP	TY	IT (4)	Slider	2	UPUB	0.381	0.093/0.669
Study 3	186 (151)	CN	PD	.500	UP	TY	IT (4)	Slider	2	UPUB	0.289	-0.004/0.582
Yamagishi et al. (2013)	93 (74)	JP	PD	.333	P	O	OS	TDM	2	PUB	0.191	-0.314/0.696
Prosocials versus Competitors												
Balliet et al. (2011)	56 (49)	SG	PD	.200	P	O	IT (2)	TDM	2	PUB	1.694	0.085/3.302
Study 3	30 (28)	SG	PGD	.250	P	O	IT (2)	TDM	2	PUB	-0.373	-1.811/1.065
Balliet et al. (2016)	522 (508)	US	PD	.333	UP	O	OS	TDM	2	PUB	0.107	-0.424/0.638
Boone et al. (2008)	44 (42)	DK	PGD	.922	P	O	IT (15)	TDM	2	PUB	-0.731	-2.158/0.696
Kiyonari (2011)	69 (62)	JP	PD	.333	P	O	OS	TDM	2	UPUB	-0.325	-1.108/0.459
Study 2	80 (75)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.452	-0.456/1.359
Study 3	29 (26)	JP	PD	.333	P	O	OS	TDM	2	UPUB	1.448	-3.169/6.065

Kiyonari & Barclay (2008) Study 3	80 (78)	CA	PGD	.444	P	O	OS	TDM	4	PUB	1.377	-0.042/2.797
Kiyonari et al. (2008)	88 (86)	BE	RD	.444	P	O	OS	TDM	4	UPUB	0.610	-0.794/2.015
Kuhlman & Wimberley (1976)	89 (59)	US	PD	.200	P	TY	IT (30)	DG	2	PUB	0.556	0.039/1.073
Van Lange (1992)	90 (52)	NL	PD	.333	UP	O	IT (4)	DG	2	PUB	0.717	0.281/1.153
Van Lange (1999)	104 (93)	NL	PGD	.333	P	O	OS	Ring	2	PUB	0.759	0.126/1.393
Yamagishi et al. (2013)	81 (74)	JP	PD	.333	P	O	OS	TDM	2	PUB	0.944	0.155/1.732
Individualists versus Competitors												
Balliet et al. (2011)	33 (26)	SG	PD	.200	P	O	IT (2)	TDM	2	PUB	1.156	-0.481/2.793
Study 3	19 (17)	SG	PGD	.250	P	O	IT (2)	TDM	2	PUB	-0.679	-2.160/0.802
Balliet et al. (2016)	172 (158)	US	PD	.333	UP	O	OS	TDM	2	PUB	-0.165	-0.712/0.381
Boone et al. (2008)	31 (29)	DK	PGD	.922	P	O	IT (15)	TDM	2	PUB	-1.164	-2.625/0.297
Kiyonari (2011)	68 (61)	JP	PD	.333	P	O	OS	TDM	2	UPUB	-1.268	-2.079/-0.457
Study 2	75 (69)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.050	-0.857/0.958
Study 3	28 (25)	JP	PD	.333	P	O	OS	TDM	2	UPUB	0.681	-2.495/3.856
Kiyonari & Barclay (2008) Study 3	30 (28)	CA	PGD	.444	P	O	OS	TDM	4	PUB	1.174	-0.291/2.639
Kiyonari et al. (2008)	33 (31)	BE	RD	.444	P	O	OS	TDM	4	UPUB	0.025	-1.405/1.455
Kuhlman & Wimberley (1976)	69 (39)	US	PD	.200	P	TY	IT (30)	DG	2	PUB	0.230	-0.331/0.790
Van Lange (1992)	71 (33)	NL	PD	.333	UP	O	IT (4)	DG	2	PUB	-0.045	-0.518/0.428
Van Lange (1999)	71 (60)	NL	PGD	.333	P	O	OS	Ring	2	PUB	0.133	-0.511/0.776
Yamagishi et al. (2013)	26 (19)	JP	PD	.333	P	O	OS	TDM	2	PUB	0.654	-0.231/1.539

Note. Total *N* = Number of participants in study; Prosocial *N* = Number of prosocial participants in study; CO = country; SG = Singapore; US = United States; NL = the Netherlands; DK = Denmark; SE = Sweden; JP = Japan; CA = Canada; BE = Belgium; CN = China; DL = Social dilemma in which expectations were assessed; PD = Prisoner's Dilemma; PGD = Public Goods Dilemma; RD = Resource Dilemma; K = K Index; P = paid; UP = unpaid; L = Lottery; T = Target of expectations; O = other; TY = typical; OS = one-shot; IT(##) = iterated (number of iterations); SVO = Measure of SVO; TDM = Triple Dominance Measure; DG = decomposed game measure; Slider = SVO slider measure; Ring = Ring measure of SVO; GS = Group size; PS = Publication status; PUB = Published; UPUB = Unpublished; *d* = Cohen's *d*; LL/UL = 95% confidence interval with lower and upper limit.

Type of dilemma. We coded the type of social dilemma in the study, including the prisoner's dilemma (PD; *k* = 15), public goods dilemma (PGD; *k* = 16), and resource dilemma (RD; *k* = 2). In the PD and PGD, individuals decide how much to contribute to a common shared pool, which subsequently accumulates interest (e.g., is doubled) and is then evenly distributed among all participants. Thus, individuals face the temptation to benefit from others' contributions while not contributing themselves. In the RD, individuals decide how much to take from a common shared resource, which is depleted if a certain threshold is reached. In this situation, participants are tempted to take as much as possible, while taking too much can

deplete the resource. We reverse coded effect sizes with the RD, so that higher scores indicate greater cooperation.

The social dilemmas vary on how much conflict they contain between individual and collective interests. Therefore, we coded the index of cooperation (K index), which can range from 0 to 1 and is calculated by (R – P) / (T – S). A lower value indicates a higher degree of conflict between individual and collective interests. We coded 31 studies, for which the K index ranged between 0.20 and 0.92 (M = 0.38, SD = 0.13).

Target of expectations. Participants were asked how much cooperation they expected from the other individual(s) in the social dilemma. Most studies assessed expectations about the specific other person in the social dilemma (k = 29), but a few other studies measured expectations about a typical other person (e.g., the typical student; k = 4).

Additional codings. We coded whether participants were paid for the outcomes in the social dilemma (k = 20), received lottery tickets (k = 3), or were asked to imagine that they were playing for something valuable (i.e., hypothetical outcomes; k = 10). Participants either interacted in a one-shot (k = 23) or in an iterated social dilemma (k = 10). We also coded the number of iterations as a continuous variable ranging from 1 to 30 (Median = 1; Mode = 1; M = 3.06, SD = 5.04). We coded whether participants interacted in a dyad (k = 25) or in a group of three or more individuals (k = 8). Group size was also coded as a continuous variable, ranging from 2 to 8 (Median = 2, M = 2.70, SD = 1.42). We included both published (k = 21) and unpublished studies (k = 12). Most studies were conducted in the Netherlands (k = 9) and in the USA (k = 6). Other countries represented in the sample include Belgium, Canada, China, Denmark, Japan, Singapore, and Sweden. Studies were published (or conducted, for unpublished studies) between 1976 and 2016 (Median = 2008).

Overview of Analysis

Overall estimated effect sizes. We use Cohen's d as a measure of effect size and conduct the meta-analysis in Comprehensive Meta-Analysis (CMA) software using inverse variance weights (Borenstein, Hedges, Higgins, & Rothstein, 2009). The overall analyses are conducted using a random effects model because we did not assume to have sampled all studies out of the population of studies and because we assumed that the effect size differs between studies due to differences in study characteristics. In addition to the mean weighted overall effect size, we report the 95% confidence interval and the 90% prediction interval (Hedges & Olkin, 1985). Next, we examine the variation in the overall effect size using indicators of heterogeneity of variance (T, T^2, and I^2). T^2 is an index of between-study variance (DerSimonian & Laird, 1986). The I^2 index measures variability in effect sizes due to real (as opposed to chance) differences

between studies (25% = low, 50% = moderate, 75% = high; Higgins, Thompson, Deeks, & Altman, 2003).

We then use multiple indices to test for the possibility of publication bias in our sample. First, we report the distribution of studies in a funnel plot (in which all studies are plotted according to their sample size and standard error). We use Duval and Tweedie's (2000) trim-and-fill method to assess the symmetry of the effect size distribution in the funnel plot. This method removes small studies at the extremes, while the effect size is recalculated at each iteration until symmetry is achieved. Publication bias is present if the interpretation of the newly estimated effect size differs from the interpretation of the observed effect size. However, readers should interpret results from the trim-and-fill method with caution: This method might underestimate the effect size because it corrects for publication bias that does not exist (Terrin, Schmid, Lau, & Olkin, 2003) or overestimate the effect size because it does not adequately correct for publication bias that does exist (Carter, Hilgard, Schönbrodt, & Gervais, 2017). Second, we report Begg and Mazumdar's rank correlation (Begg & Mazumdar, 1994), which provides a correlation between the ranks of effect sizes and the ranks of their variances, and Egger's regression intercept (Egger, Davey Smith, Schneider, & Minder, 1997), which regresses the standard normal deviate on the study's precision. Statistically significant results indicate possible publication bias in the data. These analyses were conducted with Comprehensive Meta-Analysis software. Third, we examine if published studies show larger effect sizes than unpublished studies, which would indicate publication bias. In addition, it is possible that the selective reporting of statistically significant results within primary studies influenced our meta-analytic results. While this possibility cannot be ruled out, we believe that it is not very likely that it influenced the results of the current meta-analysis because the relation between SVO and expectations was often not the main focus of published studies and because we included several unpublished studies.

Moderation analyses. We test for possible moderators of the relation between SVO and expectations of other's cooperation. For these moderation analyses, we employ Robust Variance Estimation (RVE), a random-effects meta-regression that can account for dependent effect sizes (Hedges, Tipton, & Johnson, 2010), even when only a small number of studies are included (Tipton, 2015). This method allows us to conduct moderator analyses simultaneously on all included effect sizes as opposed to conducting them on only one comparison (i.e., prosocials versus proselfs), and therefore increases the power of the moderator analyses. Because the effect sizes are nested within studies, we use correlated effects RVE with random-effect weights, and report robust *t* tests (results are only trustworthy if $df > 4$). We conduct these

analyses using the robumeta package in R and set rho at the recommended .80 (Tanner-Smith & Tipton, 2014). Whenever a moderator was categorical with three levels (e.g., SVO measure: TDM, Ring, Slider), we created dummy variables and compared each moderator level against all others (e.g., 1 = Slider, 0 = Other).

Meta-analytic mediation model. We test the hypothesis that expectations of other's cooperation mediate the relation between SVO and own cooperation in social dilemmas. To conduct the meta-analytic mediation test, we coded two additional effect sizes: (1) SVO predicting own cooperation; and (2) expectations of other's cooperation predicting own cooperation. We used recent meta-analyses (Balliet et al., 2009; Balliet & Van Lange, 2013) and examined all studies measuring the relationship between SVO and expectations to obtain these effect sizes. Studies had to report at least two of the three effect sizes of interest to be included in the meta-analysis.[5] In a few cases, the sample sizes differed between those three coded effect sizes per study, in which we coded the average sample size across the three effect sizes. Table 3 reports the studies and their corresponding coded effect sizes for all studies included to test the mediation model.

To test the mediation model, we used the correlation coefficient (r) as the measure of effect size. When the correlation was not reported in the article, we used the same statistics mentioned above to calculate the correlation coefficient (r). For the correlation between SVO and expectations, a positive correlation indicates that the relatively more prosocial participants expect more cooperation from others than relatively more proself participants (k = 32, n = 4,689). The same holds for the correlation between SVO and cooperation: A positive correlation indicates that the relatively more prosocial participants cooperate more than the relatively more proself participants (k = 39, n = 5,521). A positive correlation between expectations and cooperation indicates that higher levels of expected cooperation are associated with higher levels of cooperation (k = 34, n = 4,932).

We adopted a two-stage random-effects meta-analytic structural equation modeling (MASEM) approach to examine the hypothesized mediation effect (Cheung, 2015). This approach combines meta-analysis with structural equation modeling. In the first stage, the correlations between all variables (i.e., SVO, expectations, cooperation) from all primary studies are synthesized into one pooled correlation matrix.

In the second stage, this meta-analytic correlation matrix is treated as an observed correlation matrix and subjected to a structural equation model to test the hypothesized mediation effect. A mediation effect of expected cooperation on the relation between SVO and cooperation would be present if the indirect effect is significant, while the direct effect

decreases in magnitude or becomes nonsignificant. The MASEM analyses were conducted using default values in *R* with the metaSEM package (Cheung, 2014).

Expectations and cooperation: Prosocials versus Proselfs. To examine if expectations and cooperation are positively related among prosocials, but not among proselfs, whenever possible we coded the correlation coefficient (*r*) between expectations and cooperation and the sample size *N*, separately for prosocials and proselfs (see Table 4). Then, we applied the same meta-analytic techniques outlined above that were used to examine the relation between SVO and expectations.

The Open Science Framework webpage for this article is: http://osf.io/2dc4p. This webpage contains the dataset and R script for all analyses conducted using R.

Table 3
Studies included in the Meta-Analytic Test of Mediation

	SVO - EXP		SVO - COOP		EXP - COOP		
Study	*N*	*r*	*N*	*r*	*N*	*r*	Coded *N*
Balliet et al. (2011) Study 2	85	.332	84	.370	93	.402	87
Study 3	47	.062	49	.220	59	.443	51
Balliet et al. (2016)	680	.114	682	.310	726	.707	696
Balliet (2012)	404	.033	404	.210	404	.517	404
Study 2	111	.099	111	.160	111	.690	111
Study 3	341	.372	341	.160	341	.751	341
Boone et al. (2008)	73	.285	73	.251	73	.645	73
De Bruin & van Lange (1999)	144	.209	144	.324	---	---	144
De Cremer et al. (2008)	88	.227	88	.205	---	---	88
De Dreu & McCusker (1997)	---	---	74	.520	83	.420	78
Eek & Gärling (2006)	54	.421	54	.460	54	.853	54
Kiyonari (2011)	130	.239	131	.391	130	.811	130
Study 2	149	.214	150	.377	149	.539	149
Study 3	54	.425	54	.477	54	.589	54
Kiyonari & Barclay (2008)	87	.120	87	.182	87	.539	87
Study 2	73	.268	73	.378	73	.487	73
Study 3	108	.084	108	.220	108	.503	108
Kiyonari et al. (2008)	119	.254	119	.285	119	.419	119
Study 2	113	.110	113	.387	113	.294	113
Kramer et al. (1986)	53	.217	53	.370	---	---	53
Liebrand et al. (1986)	126	.201	126	.310	48	.810	100
Smeesters et al. (2003)	---	---	102	.330	203	.590	152
Study 2	186	.160	192	.400	193	.590	190
Study 3	128	.172	132	.420	140	.850	133
Study 4	155	.184	167	.490	167	.590	163
Smeesters et al. (2003)	140	.111	140	.323	---	---	140
Stouten et al. (2005)	---	---	79	.290	108	.410	93
Van Lange (1992)	123	.342	123	.340	144	.800	130
Van Lange (1999)	164	.282	164	.320	---	---	164
Van Lange & Kuhlman (1994)	---	---	334	.270	334	.670	334
Van Lange & Liebrand (1989)	78	.067	78	.340	87	.610	81
Van Lange & Liebrand (1991a)	---	---	59	.390	59	.750	59
Study 2	---	---	56	.340	56	.530	56
Van Lange & Liebrand (1991b)	59	.219	55	.360	55	.380	56
Study 2	---	---	60	.420	60	.570	60
Wu et al. (2013)	119	.184	119	.299	119	.724	119
Study 2	195	.187	198	.238	195	.680	196
Study 3	186	.143	197	.176	186	.693	189
Yamagishi et al. (2013)	93	.172	93	.201	93	.812	93

Note. *N* = Number of participants in study; Coded *N* = average number of participants across all three effect sizes coded for the MASEM.

Table 4
Studies included in the Meta-Analyses on Expectations and Cooperation Separately for Prosocials and Proselfs

	Prosocials		Proselfs		Overall	
Study	*N*	*r*	*N*	*r*	*N*	*r*
Balliet et al. (2011) Study 2	48	.393	35	.252	93	.402
Study 3	30	.638	19	.085	59	.443
Balliet et al. (2016)	508	.701	172	.721	726	.707
Balliet (2012)	249	.511	155	.550	404	.517
Study 2	81	.796	30	.655	111	.690
Study 3	170	770	171	.614	341	.751
Boone et al. (2008)	42	.774	31	.472	73	.645
Wu et al. (2013)	97	.699	22	.779	119	.724
Study 2	173	.693	22	.531	195	.680
Study 3	151	.691	35	.674	186	.693

Note. *N* = Number of participants in study.

Results

SVO and Expectations: Overall Estimated Effect Sizes

We begin by first reporting the estimated average population effect size for each comparison for SVO and expectations of cooperation. For each comparison, we report the overall weighted effect size (with a corresponding confidence interval and prediction interval), estimates of heterogeneity in the effect size distribution, and three estimates of the presence of publication bias (see Table 5).

Prosocials versus individualists. Prosocials expected significantly more cooperation from others than individualists, d = 0.402, 95% CI [0.319, 0.485], 90% prediction interval [0.330, 0.474], $p < .001$. There was no variance in the true effect size distribution (T = 0.000, T^2 = 0.000, I^2 = 0.00). We used Duval and Tweedie's (2000) trim-and-fill method to examine publication bias. No effect sizes were imputed above the overall effect size, but four were imputed below the overall effect size, which did not change the overall effect size substantially, d = 0.359, 95% CI [0.270, 0.449]. Begg and Mazumdar's rank correlation (p = .284) as well as Egger's regression intercept (p = .090) were nonsignificant, suggesting that publication bias did not significantly influence these results.

Prosocials versus competitors. Prosocials expected significantly more cooperation from others than competitors (d = 0.481, 95% CI [0.197, 0.764], 90% prediction interval [-0.057, 1.019], $p < .01$). There was substantial variation in the true effect size distribution (T = 0.270, T^2 = 0.073), and some of this variation could be explained by systematic differences between studies (I^2 = 30.52). The trim-and-fill method (Duval & Tweedie, 2000) imputed only two effect sizes below the overall weighted effect size, which did not substantially change the

interpretation of the effect size, d = 0.440, 95% CI [0.156, 0.724], p < .01. Begg and Mazumdar's rank correlation (p = .760) as well as Egger's regression intercept (p = .989) were nonsignificant, indicating that publication bias did not significantly influence the results of this analysis.

Individualists versus competitors. Individualists and competitors did not significantly differ in their expectations of cooperation, d = -0.022, 95% CI [-0.349, 0.306], 90% prediction interval [-0.716, 0.672], p = .896. There was variation in the true effect size distribution (T = 0.359, T^2 = 0.129), and part of that variation could be explained by between-study differences (I^2 = 41.33). Using Duval and Tweedie's (2000) trim-and-fill method, three studies were imputed below the estimated effect size, but the interpretation of the overall estimated effect size did not change (d = -0.131, 95% CI [-0.465, 0.203]). Begg and Mazumdar's rank correlation (p = .669) and Egger's Regression intercept (p = .775) were nonsignificant, suggesting an absence of publication bias for this comparison. Thus, across each of the three comparisons we did not find evidence that our sample of effect sizes was contaminated by publication bias.

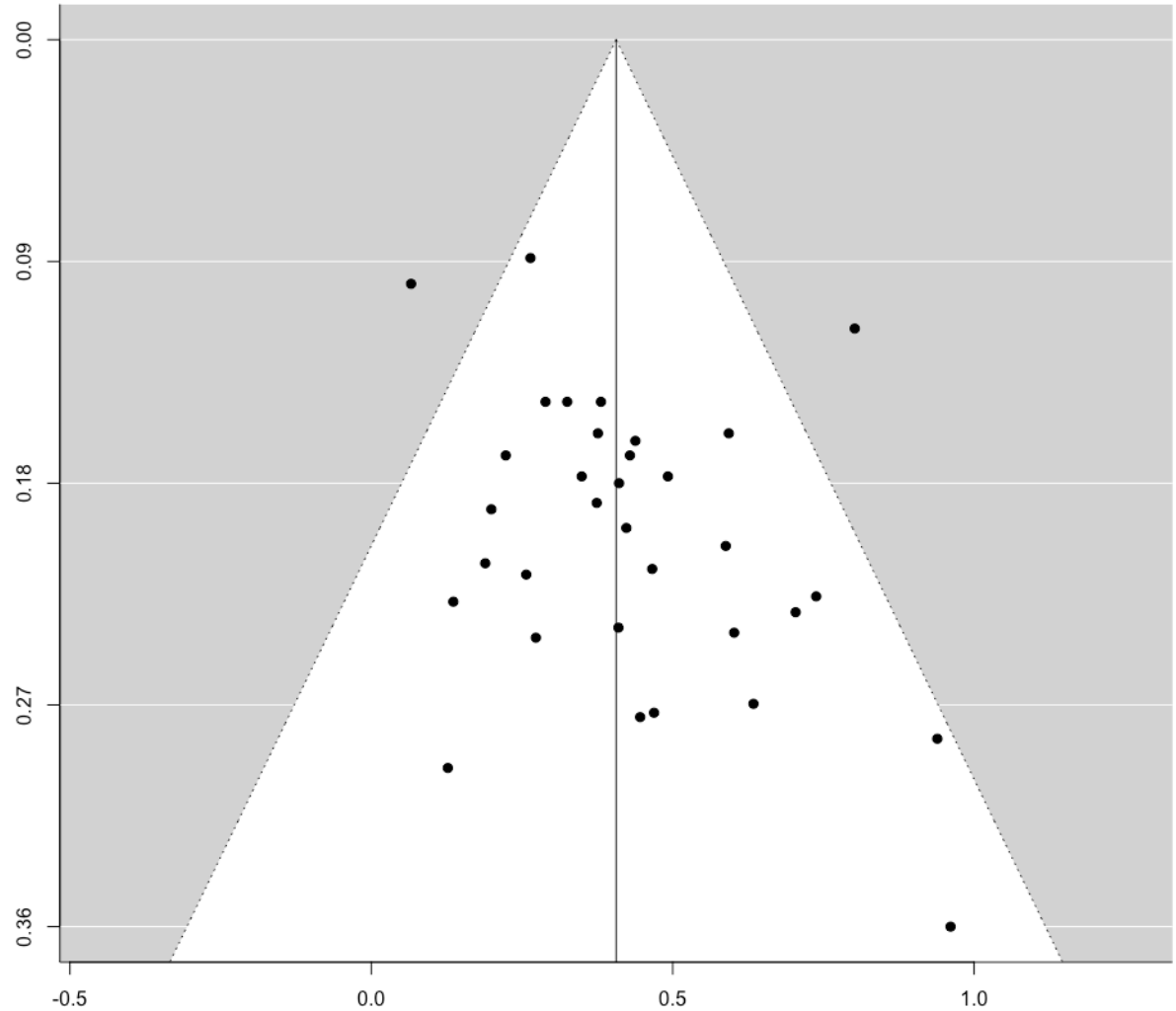
Moderators of the SVO-Expectation Relation

We conducted several univariate moderator analyses to test whether specific study characteristics moderate the relation between SVO and expectations. In all moderation analyses, we focus on the comparison between prosocials and proselfs. Overall, prosocials expected greater cooperation than proselfs (d = 0.405, 95% CI [0.329, 0.481], 90% prediction interval [0.194, 0.616], p < .001).[6] There was variation in the true effect size distribution (T = 0.118, T^2 = 0.014), which can be explained in part by differences between studies (I^2 = 30.62). Figure 1 displays the funnel plot for this comparison. Using the trim-and-fill method (Duval & Tweedie, 2000), eleven studies were inserted below the estimated effect size. The re-estimated effect size (d = 0.300, 95% CI [0.213, 0.388]) differed from the original effect size estimate (d = .405), but the confidence intervals still overlap. Begg and Mazumdar's rank correlation (p = .086) was nonsignificant, whereas Egger's regression intercept (p = .050) was significant. However, published studies did not show a larger effect size (d = .395, k = 21) than unpublished studies (d = .402, k = 12), Q(1) = 0.005, p = .945. The publication status also did not moderate the relation between SVO and expectations when testing it on the entire sample of studies using RVE moderator analyses (see Table 6). Overall, we find mixed evidence that publication bias could have influenced the results of this analysis.

Table 6 shows the results of the univariate categorical and continuous moderator analyses using RVE for meta-analyses (Hedges et al., 2010; Tipton, 2015). Whenever the degrees of

freedom of a moderation analysis were smaller than four, the results should not be trusted and we therefore omitted them from Table 6 (Tipton, 2015). This holds for the following moderators: payment (1 = lottery, 0 = other), the classification of SVO (1 = decomposed games, 0 = other), the continuous codings of group size, and the social dilemma (1 = resource dilemma, 0 = other). The overall conclusion from these analyses is that none of the coded study characteristics significantly moderated the relation between SVO and expectations of other's cooperation.

Figure 1
Funnel Plot for the Comparison between Prosocials and Proselfs on Expected Cooperation in Social Dilemmas



Note. The x-axis displays the studies' effect size (Cohen's *d* values). The y-axis shows the studies' precision (standard error of Cohen's *d*). Circles indicate individual studies. The vertical line shows the overall weighted effect size.

Table 5
Overall Average Effect Sizes, Heterogeneity and Publication Bias

	Overall Effect Size					Heterogeneity			Publication Bias	
Type of Effect Size	*k*	*N*	*d*	95% CI	90% PI	*T*	T^2	I^2	B&M*p*	ER*p*
Prosocials versus Proselfs	33	4793	0.405	[0.329, 0.481]	[0.194, 0.616]	0.118	0.014	30.62	.086	.050
With Goal Choice	48	7414	0.644	[0.516, 0.771]	[-0.018, 1.306]	0.386	0.149	80.36	.007	.009
Prosocials versus Individualists	20	2686	0.402	[0.319, 0.485]	[0.330, 0.474]	0.000	0.000	0.00	.284	.090
Prosocials versus Competitors	13	1362	0.481	[0.197, 0.764]	[-0.057, 1.019]	0.270	0.073	30.52	.760	.989
Individualists versus Competitors	13	726	-0.022	[-0.349, 0.306]	[-0.716, 0.672]	0.359	0.129	41.33	.669	.775

Note. *k* = number of included effect sizes; *d* = Cohen's d; CI = confidence interval; PI = prediction interval; B&M*p* = two-sided *p*-value for Begg & Mazumdar's rank correlation; ER*p* = two-sided *p*-value for Egger's Regression Intercept.

Table 6
Results of the Categorical and Continuous Univariate Moderator Analyses on the SVO and Expectations of Cooperation Effect Sizes

Variables and Codings	*n*	*k*	Intercept	*ß*	*SE*	95% CI for *ß*	*t*	*df*	*p*	T^2	I^2
Payment											
1 = Paid, 0 = Other	33	79	0.361	0.003	0.079	-0.160, 0.167	0.040	25.80	.968	.032	41.96
1 = Unpaid, 0 = Other	33	79	0.365	-0.004	0.077	-0.166, 0.157	-0.057	19.20	.955	.033	42.03
Target of Expectation											
1 = Other, 0 = Typical	33	79	0.353	0.012	0.056	-0.142, .167	0.215	4.08	.840	.033	41.96
Iterations											
1 = Yes, 0 = No	33	79	0.352	0.037	0.068	-0.112, 0.185	0.534	12.10	.603	.032	41.72
Classification of SVO											
1 = TDM, 0 = Other	33	79	0.363	-0.000	0.086	-0.181, 0.180	-0.002	19.30	.998	.032	41.98
1 = Ring, 0 = Other	33	79	0.372	-0.030	0.069	-0.179, 0.119	-0.431	12.80	.674	.033	42.00
1 = Slider, 0 = Other	33	79	0.366	-0.010	0.126	-0.294, 0.275	-0.076	9.36	.941	.033	42.03
Group Size											
1 = more than two, 0 = two	33	79	0.350	0.062	0.070	-0.097, .221	0.880	8.84	.401	.031	41.60
Dilemma											
1 = PD, 0 = Other	33	79	0.353	0.020	0.089	-0.163, 0.203	0.224	23.40	.825	.033	42.04
1 = PGD, 0 = Other	33	79	0.378	-0.031	0.084	-0.204, 0.142	-0.369	24.10	.715	.033	42.02
K Index											
Continuous	31	77	0.568	-0.562	0.364	-1.520, 0.400	-1.550	4.57	.188	.036	44.66
Publication Status											
1 = Published, 0 = Unpublished	33	79	0.314	0.085	0.095	-0.114, 0.283	0.891	19.63	.384	.031	41.06

Note. *n* = number of included studies; *k* = number of included effect sizes nested within studies; Intercept = intercept of the meta-regression; *ß* = unstandardized regression coefficient; SE = standard error of *ß*; *df* = degrees of freedom; *p* = p-value; T^2 = tau-squared estimate based on rho = .80. Because results are only trustworthy if *df* > 4, we omitted the following moderator analyses from this table: payment (1 = lottery, 0 = other), the classification of SVO (1 = decomposed games, 0 = other), the continuous codings of group size, and the social dilemma (1 = resource dilemma, 0 = other)

Do Expectations Mediate the SVO-Cooperation Relation?

In the first step of testing the mediation model, we estimated an overall pooled correlation matrix using all effect sizes from primary studies that contain at least two of the three correlations of interest (see Table 7). Each effect size distribution contained variation that could be explained by systematic differences between studies (I^2 ranging from 39.70% to 89.34%; see Table 7). In addition, we can reject the null hypothesis of homogeneity of variance of the correlation matrix ($Q(102) = 538.81$, $p < .001$). These results support our decision to apply a random-effects model. Replicating the results of prior meta-analyses (Balliet et al, 2009; Balliet & Van Lange, 2013), we found a medium-sized overall correlation between SVO and cooperation ($r = .317$, $p < .001$),[7] and a large overall correlation between expectations and cooperation ($r = .626$, $p < .001$). The correlation between SVO (prosocial vs. proself) and expectations ($r = .207$, $p < .001$) also replicates the effect size reported above ($d = 0.405$ or $r = 0.195$). The observed correlations, standard errors, confidence intervals, and estimates of the between-study variance are displayed in Table 7.

Table 7
Overall Average Effect Sizes and Heterogeneity included in the Meta-Analytic Mediation Model

Relationship	*k*	*N*	*r*	*SE*	95% CI	I^2
SVO – EXP	32	4689	.207	.019	[.170, .244]	42.20
SVO – COOP	39	5521	.317	.016	[.286, .349]	39.70
EXP – COOP	34	4932	.626	.025	[.577, .676]	89.34

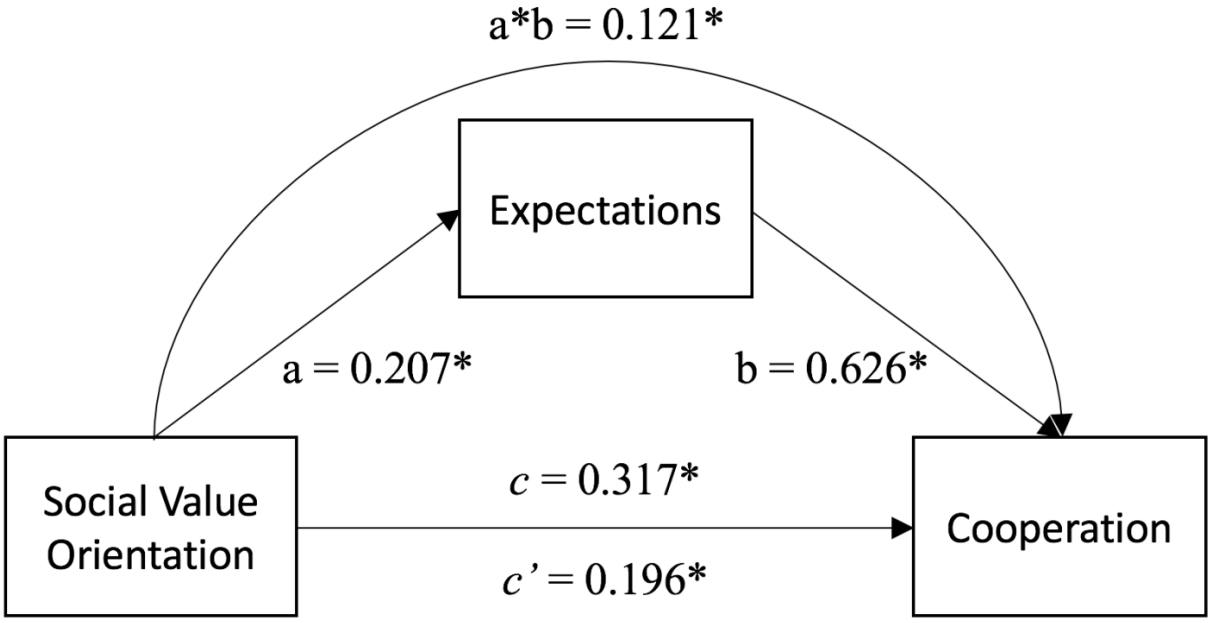
Note. *k* = number of included effect sizes; *N* = number of participants; *SE* = standard error; CI = confidence interval.

In the second step, we estimated the mediation effect by fitting a structural equation model to the pooled meta-analytic correlation matrix. Because the proposed mediation model is a just identified (saturated) path analysis model, the chi-square statistic for the model is 0 and the goodness-of-fit-indices common to structural equation modelling are not applicable (Cheung, 2015). Figure 2 displays the path diagram for the mediation model fitted to the pooled meta-analytic correlation matrix. Although the direct effect remained significant ($c' = 0.196$, 95% CI [0.160, 0.232]), it decreased in magnitude compared to the meta-analytic estimate of the effect size ($c = 0.317$, 95% CI [0.286, 0.349]). The indirect effect of SVO on cooperation via expectations was statistically significant ($a*b = 0.121$, 95% CI [0.098, 0.146]). These results provide evidence for partial mediation (Baron & Kenny, 1986).

Does the Expectations-Cooperation Relation Differ between Prosocials and Proselfs?

We meta-analyzed the correlation between expectations and cooperation separately for prosocials and proselfs. For prosocials, there is a strong positive correlation between expectations and cooperation (r = .684, k = 10, N = 1549, 95% CI [.617, .741], p < .001). There was variation in the true effect size distribution (T = 0.155, T^2 = 0.024), and parts of this variation could be explained by systematic differences between studies (I^2 = 76.99). Using Duval and Tweedie's (2000) trim-and-fill method, one study was imputed below the overall weighted effect size, but this did not substantially change the interpretation of the effect size, r =.669, 95% CI [.601, .728]. Begg and Mazumdar's rank correlation (p = .999) and Egger's regression intercept (p = .961) were both nonsignificant, indicating an absence of publication bias. For proselfs, there was also a strong positive correlation between expectations and cooperation (r = .581, N = 692, k = 10, 95% CI [.476, .669], p < .001). Again, there was substantial variation in the true effect size distribution (T = 0.172, T^2 = 0.030) and this might be explained by systematic differences between studies (I^2 = 63.71). Duval and Tweedie's (2000) trim-and-fill method did not impute any effect sizes, and Begg and Mazumdar's rank correlation (p = .592) and Egger's regression intercept (p = .280) were nonsignificant as well. The relation between expectations and cooperation did not significantly differ between prosocials and proselfs, $Q(1)$ = 3.314, p = .069.[8]

Figure 2
Path Diagram of the Meta-Analytic Mediation Model of Expectations Mediating the Effect of SVO on Cooperation



Note. a = Effect of SVO on Expectations, b = Effect of Expectations on Cooperation; a*b = Indirect effect, c = Total effect, c' = Direct effect in the full mediation model; * p < .01

Discussion

People experience a wide variety of interdependent situations with others in their day-to-day lives. In these situations, the decisions and actions of each person can impact their own and other's outcomes. Expectations of other's behavior in interdependent situations are essential to enable successful coordination, avoid exploitation, and to achieve mutually beneficial outcomes (Holmes, 2002), and this is especially true in interdependent situations that involve a conflict of interests, such as social dilemmas (Balliet & Van Lange, 2013). Yet, in many social dilemma situations, people do not have any information about their partners. Previous theory suggests that personality may play a pivotal role in forming expectations of others' behavior (Holmes, 2002; Rusbult & Van Lange, 2003). By far, most attention has been paid to how SVO relates to expectations of partner cooperation in social dilemmas (e.g., Balliet & Van Lange, 2013; Kuhlman & Wimberley, 1976). However, studies have remained inconclusive about the magnitude of the effect of SVO on expectations, and especially if there is a meaningful difference in the amount of expected partner cooperation between individualists and competitors. Moreover, existing research has not provided a strong test of the claim that expectations play an essential role in mediating the relation between SVO and cooperation or that SVO moderates the relation between expectations and cooperation.

We applied meta-analysis to summarize nearly 50 years of research on the relation between SVO and expectations of partner cooperation in social dilemmas. Furthermore, we utilized meta-analytic structural equation modeling to examine the proposed mediation of expected cooperation on the relationship between SVO and cooperation in social dilemmas. We found a moderate association between SVO and expected cooperation in social dilemmas. Prosocials expected significantly more cooperation than individualists (d = 0.402) and competitors (d = 0.481), but there was no significant difference in expected cooperation between individualists and competitors (d = -0.022). The relation between SVO and expectations generalized across variations in the studies, including the type of social dilemma, group size, participant payment, and number of iterations. Furthermore, we replicated the results of previous meta-analyses that both SVO (r = 0.318) and expectations (r = 0.626) are related to cooperative behavior (Balliet et al., 2009; Balliet & Van Lange, 2013). Complementing these findings, we further demonstrated that expectations partially mediate the relation between SVO and cooperation. We also found that both prosocial and proselfs increase their cooperation when they expect their partner to cooperate. Together, these findings illuminate the important role expectations play in determining and facilitating cooperative behavior in social dilemmas for both prosocials and proselfs.

SVO and Expectations

In social dilemmas, one's own outcomes are jointly determined by one's own actions and the actions of one's partner. In many social dilemma situations, people face a great deal of uncertainty about the consequences of their decisions, largely because there is no information about how others will behave. In the absence of information about how others behave, one's own preferences can be a cue on which to base expectations of other's behavior, and this process tends to be automatic, intuitive, and difficult to change with explicit contradictory information (for an overview, see Krueger, 2007). Indeed, we found evidence that individuals with internalized, dispositional prosocial values expect more cooperative behavior from others across different types of social dilemmas and independently of which SVO measure was used. Individuals project their own preferences onto others (Krueger, 2007), and this can form the basis of beliefs about others' behavior in interdependent situations.

While the results of the meta-analysis support a social projection process, the results do not allow a comparison of the three theories explaining why and how SVO relates to expectations (i.e., triangle hypothesis, SASB, cone model). This is because these theories make predictions about the expectations people have about the distribution of SVO in the population and not directly about expected cooperation in social dilemmas. However, Aksoy and Weesie (2012) provided convincing evidence in support of the cone model by not only assessing expectations, but also variance in expectations. According to the cone model, social projection, which is assumed to maximize the expected accuracy of one's own prediction (Krueger, 2007), is used by prosocials, individualists, and competitors when they project their own preferences onto others to form expectations. Nonetheless, general conceptions and stereotypes about individuals as selfish but not competitive (Miller & Ratner, 1998; Vuolevi & Van Lange, 2010; Vuolevi & Van Lange, 2012) can lead individualists to expect even less cooperation from others compared to either prosocials or competitors. This also becomes evident as Aksoy and Weesie (2012) found less variability in expectations among individualists as compared to prosocials and competitors.

Previous research was inconclusive about how individualists and competitors would differ in their expectations of others' behavior. For example, some previous research suggested that individualists form intermediate expectations of cooperation, somewhere between prosocials and competitors (e.g., Van Lange, 1992). Individualists are likely to have a more varied history of interactions with others, because they will cooperate (and so elicit cooperation from others) in a broader range of situations when cooperation is in their self-interest, such as during possible repeated interactions (Van Lange, Klapwijk, & Van Munster, 2011), when

behavior can have reputational consequences (Wu, Balliet, & Van Lange, 2015), and in the presence of possible punishment or rewards (Boone et al., 2010). Competitors tend to defect across a broader range of situations, have difficulties even learning how to maintain cooperation, and so tend to elicit greater non-cooperation from others (McClintock & Liebrand, 1988; Sattler & Kerr, 1991; Sheldon, 1999). Therefore, if past experiences partly inform expectations of other's behavior, individualists may expect greater cooperation than competitors. In the present meta-analysis, individualists and competitors did not differ in their expectations of other's cooperation. One possible explanation is that non-cooperation in social dilemmas is the dominating strategy for both individualists and competitors (Dawes, 1980). Therefore, in social dilemmas, individualists and competitors do not differ in their expectations of others' cooperation, because their different goals can be achieved by the same non-cooperative choice. However, when expectations are assessed in decomposed games for which a dominant choice exists for each SVO, expectations differ significantly between individualists and competitors (Kuhlman & Wimberley, 1976). Future research may benefit from further examining how individualists and competitors differ in their expectations of others' cooperation across various types of interdependent situations (e.g., stag hunt, battle of the sexes, and maximizing differences) and across settings known to affect cooperation (e.g., incentives, communication, and anonymity).

Expectations Mediate the SVO – Cooperation Relation

Previous research has focused on how SVO and expectations of others' cooperation each independently foster cooperative behavior (e.g., Balliet et al., 2009; Balliet & Van Lange, 2013). However, it was largely overlooked how these stable cooperative preferences (i.e., SVO) might lead to increased expected cooperation, which in turn fosters cooperation. Using an innovative meta-analytic approach, this study is the first to provide robust evidence for partial mediation: Individuals with a relatively more prosocial SVO are more likely to cooperate than proself individuals, in part because they expect more cooperation from others. Thus, SVO exerts a direct effect on cooperative behavior *and* an indirect effect on cooperation via influencing expectations about partner cooperation.

Altogether, these results provide support for Bogaert and colleagues' (2008) assertion that expectations mediate the relationship between SVO and cooperation. As such, cooperative behavior is more likely to emerge and to be maintained if individuals with prosocial values expect others to cooperate. However, it needs to be noted that - due to the correlational nature of the data - cooperative behavior could also lead to higher levels of expected cooperation (Thielmann & Hilbig, 2014). Expectations and cooperative behavior are mutually reinforcing

processes, but a wide variety of experimental studies on social dilemmas suggest that expectations can cause cooperation (Balliet & Van Lange, 2013; Boone et al., 2010; Iedema & Poppe, 1994a, 1999; Kelley & Stahelski, 1970; Kuhlman et al., 1986; Kuhlman & Marshello, 1975; Kuhlman & Wimberley, 1976; Van Lange, 1992).

While prosocials aim to achieve collective welfare by cooperating in social dilemmas, the results indicate that relatively more prosocial individuals do not cooperate at all costs. Instead, the likelihood of cooperation among prosocials increases if they expect others to cooperate as well. This is in line with findings from Kuhlman and Marshello (1975), who found that prosocials show high levels of cooperation in an iterated PD unless their partner consistently defects. For proselfs, behavior of their partner did not matter as much: Competitors consistently defect independently of their partner's actions, whereas individualists would only cooperate with a partner pursuing a tit-for-tat strategy. In support of this, Boone, Declerck, and Kiyonari (2010) showed that expecting cooperation fosters cooperation for prosocials, whereas expectations do not influence proselfs' cooperative behavior.

Based on this previous research, prosocials, but not proselfs, would be predicted to condition their cooperation on their partner's expected cooperation. Indeed, proselfs could maximize their own short-term outcomes by exploiting a partner they expect will cooperate. However, we found that both prosocials and proselfs equally, and strongly, condition their cooperation on their partner's expected cooperation.[9] Yet, proselfs expect much less cooperation from others than prosocials. These findings suggest that proselfs may be encouraged to cooperate by reinforcing expectations of partner cooperation. In fact, even proselfs may maximize their own long-term outcomes by forming mutually beneficial cooperative relationships. Taken together, these findings indicate that expectations are equally important for prosocials and proselfs.

Broader Implications

Although this meta-analysis examined dispositional preferences for cooperation and expectations of other's cooperation in social dilemmas, the results contain insight about a broad range of scientific topics and societal challenges. Below, we discuss implications for future research in social and personality psychology and for the promotion of cooperative behavior in many societal social dilemmas, such as public good and resource dilemmas.

Personality, SVO, and social behavior. Personality can determine the construal of situations and the goals individuals pursue in social interactions (Sherman, Nave, & Funder, 2013), partly by affecting the expectations these individuals hold. Thus, the beliefs individuals have about others' behavior in such interdependent situations can at least partially explain the

link between personality and behavior. The current meta-analysis is aligned with this perspective on the importance of personality in the construal of situations (Sherman et al., 2013), and how people approach and perceive others (e.g., Felfe & Schyns, 2010; Fong & Markus, 1982).

SVO is a relatively narrow personality trait. However, it shares significant overlap with the broader personality dimension of Honesty-Humility in the HEXACO (and with Big Five Agreeableness) (Hilbig et al., 2014). Research is needed to further consolidate SVO in broader models of personality and to establish if SVO is a facet of specific personality traits, such as Honesty-Humility and Agreeableness. For example, individuals high on Honesty-Humility weigh their own and others' outcomes equally strong, indicating a prosocial preference for fairness in outcomes. Demonstrating the generalizability of our findings to a broader personality construct, Pfattheicher and Böhm (2017) found that the relation between Honesty-Humility and cooperation in a trust game was mediated by social expectations about the trustworthiness of others. To further examine if our findings generalize to broader personality constructs, future research could examine if individuals scoring high on Honesty-Humility expect others to score similarly high on Honesty-Humility, especially with limited information about the other (i.e., social projection), which would subsequently lead to more cooperative behavior with the other. It might be that such a process is fully mediated by SVO. For example, people who are high on Honesty-Humility tend to think situations contain less conflict of interests, but this is completely mediated by SVO (Gerpott, Balliet, Columbus, Molho, & De Vries, 2017). Furthermore, those perceptions of conflict partially mediated the relation between SVO and cooperative behavior. Such findings underscore the importance of personality in how people think about others, and ultimately behave, during interdependent situations. More work is needed on how SVO fits in the broader nomological network of personality constructs, and to what extent, if any, SVO can account for how broader personality constructs relate to social behavior.

SVO and trust. Expectations of others' behavior in social dilemmas can be considered an operationalization of trust. Trust is often defined as a belief about another's benevolent motive toward oneself (Balliet & Van Lange, 2013; Rousseau, Sitkin, Burt, & Camerer, 1998). Indeed, if people expect others to cooperate in social dilemmas, this means they believe that the other person is willing to engage in costly behavior to provide them a benefit. So far, research on SVO and expectations has largely neglected to address the link between SVO and trust – it remains an open topic of research. Preliminary evidence indicates that prosocials tend to be more trusting than proselfs (Kanagaretnam, Mestelman, Nainar, & Shehata, 2009), and

that individuals scoring high on Honesty-Humility, a personality domain that shares significant overlap with SVO (Hilbig et al., 2014), are also more trusting toward others, but do not trust others unconditionally (Pfattheicher & Böhm, 2017). Nevertheless, there remains a need to generalize the SVO-expectation relation to how SVO relates to various measures of state and trait trust. It may be that SVO is affecting variability in expectations of others' behavior in social dilemmas, but not necessarily trust. That is, prosocial people may expect others to cooperate, but they believe that others are simply cooperating out of their own self-interest or for other reasons besides their internalized benevolent motives (e.g., the threat of being punished or a motive to maintain their reputation). It could also be that prosocial individuals are responding more strongly to or are even actively looking for cues that could be used to infer trust in others. For example, recent findings from an eye-tracking study indicate that deviations from a purely selfish value orientation (i.e., individualistic) predict how much attention is directed to searching for information about the other's payoff in social dilemmas (Fiedler, Glöckner, Nicklisch, & Dickert, 2013), and these differences in information search might generalize to other situations. The findings in the present meta-analysis underscore the need to further examine how SVO relates to trust.

Practical implications. The findings also emphasize several opportunities to strategically promote cooperation outside of the laboratory. Most of the empirical work on cooperation centers around how cooperation can be promoted to enhance solidarity and prosperity in and between societies. For example, SVO and trust have been studied as predictors of various organizational outcomes (Dirks & Ferrin, 2001), commuting preferences (Van Lange et al., 1998; Van Vugt, Meertens, & Van Lange, 1995), and adherence to tax laws (Van Dijke & Verboon, 2010). But in these situations, an enhanced threshold to cooperate exists because such cooperative behavior increases the risk of exploitation and abuse from others. One approach to promote cooperation is to reduce the conflict of interests and so align the goals of prosocials, individualists, and competitors (Smith, 1979). Yet, these structural changes to payoff matrices might not be easy or even impossible to implement. For example, most common resources, such as limited water supply in certain areas, cannot be equally split between all members of society due to practical or political limitations. In such situations, punishment for non-cooperation or reward for cooperation can increase expectations that others cooperate, and ultimately promote cooperative behavior (Balliet et al., 2011; Buckley, Burns, & Meeker, 1974).

Another approach to promote cooperation in interdependent situations would be to ensure that individuals perceive that others are cooperating as well. If the expectation arises

that others are cooperating, own cooperation becomes more likely. In addition, trust in others often supports one's own goals, thereby reinforcing the influence of individual predispositions on behavior. Political messages or marketing campaigns, for example, should highlight the high percentage of individuals who already cooperate, instead of mentioning the percentage of individuals who do not cooperate. By enhancing perceived similarity among individuals, interpersonal trust and expectations of cooperation increase and reciprocal cooperation becomes more likely (Fischer et al., 2013). Such reciprocal cooperation can lead to substantial increases in collective action and in benefits for society as a whole (Fehr & Gächter, 2000). Importantly, our findings suggest such appeals would affect everyone because once the expectation that others cooperate is elicited, it is associated with increased cooperation levels for prosocials and proselfs. Hence, the current findings may be used to promote any prosocial behavior, such as voting, recycling, volunteering, or donating to charities.

Another practical implication of the current findings pertains to partner selection. Especially in dyadic contexts, individualists and competitors might often find their initial beliefs confirmed by eliciting selfish behavior from others through their own selfish actions (Kelley & Stahelski, 1970; Miller & Holmes, 1975), leading prosocials to selectively interact with other cooperatively-minded individuals (Rand, Arbesman, & Christakis, 2011). Hence, our findings may generalize to partner selection because cooperative individuals are more likely to be selected as future social partners (Rockenbach & Milinski, 2011), and individuals who select their future partners might be largely guided by their beliefs about the other's motives. As such, it is possible that prosocials only form lasting social relationship with other prosocials. However, it might also be that prosocials are initially more open to forming new relationships, whereas proselfs are more skeptical and reluctant, and only form lasting relationships with others when additional information is available. The influence of cooperative preferences on partner selection promises to be another fruitful avenue for future research.

Limitations

The current meta-analysis is not without limitations. Despite strong theoretical and empirical reasons that support the hypothesis that expectations mediate the relation between SVO and cooperation, the meta-analytic mediation model cannot support claims about causality. In fact, the position of all variables in the mediation model could be re-arranged and the outcome of the mediation model would remain unchanged. We did consider alternative models. For example, we did consider the possibility that cooperation mediates the relation between SVO and expectations (cf. self-justification; Messé & Sivacek, 1979), but did not find this model to be a viable alternative because of research showing that manipulated expectations

result in increased levels of cooperation (e.g., Boone et al., 2008; Kuhlman & Marshello, 1975), and because the correlation between expectations and cooperation is not stronger when expectations are assessed after versus before the measurement of cooperation (Balliet & Van Lange, 2013). Another model would be that cooperation determines SVO. However, this alternative is countered by the fact that SVO acts as a relatively stable personality characteristic (e.g., Van Lange, 1999; Van Lange et al., 2012) and most of the studies included in the meta-analysis (a) measure SVO before cooperation and (b) involved anonymous one-shot interactions. Therefore, based on existing theory and research we believe that the mediation model we present here is the most plausible model.

Future research could consider using an instrumental variable (IV; Angrist, Imbens, & Rubin, 1996) to determine if expected partner cooperation has a causal effect on cooperation and mediates the relation between SVO and cooperation. IVs are used to determine causality, but a requirement of this method is that the IV only affects the dependent variable (cooperation) through the mediating variable (expectations), but not directly. As such, IVs are usually hard to identify. Possibly, information about a partner's past behavior toward others (i.e., reputational information) could serve as such an IV. Future research might examine if the effect of partner reputational information on own cooperation (J. Wu, Balliet, & Van Lange, 2016) only occurs through expectations of partner cooperation, and then test the mediating effect of expectations on the relation between SVO and cooperation (also including the IV in the model). This approach could address another limitation of the current meta-analysis: the meta-analytic structural equation model was a just identified (saturated) path model, contained no degrees of freedom, and so we could not evaluate model fit. If an IV would be added to the model, then the direct path from this IV to cooperation could be omitted to gain one degree of freedom, allowing for model fit to be evaluated.

Conclusion

For nearly 50 years, theory and research on social dilemmas has devoted significant attention to SVO and expectations of cooperation as two important variables predicting cooperation in social dilemmas. The current meta-analysis is the first quantitative review of this literature that examines the interplay between both of these classic variables. We show that stable personality differences (i.e., SVO) predict expectations of cooperation, which in turn predict levels of cooperation in social dilemmas. Importantly, expectations are positively related to cooperation for both prosocials and proselfs. Thus, this meta-analysis helps to solve one puzzle of human cooperation. Although SVO and expectations of other's cooperation exert independent influences on cooperation, we now have strong evidence that these variables are

interrelated in shaping human cooperation, with expectations partially mediating the relation between SVO and cooperation.

Footnotes

[1] Although most research treats SVO as a stable dispositional personality construct, recent research has also considered how situations can activate state motives that are part of the SVO framework (e.g., Kelley et al., 2003; for a recent discussion on the state versus trait approach of SVO, see Ackermann, Fleiß, & Murphy, 2016; Pulford, Krockow, Colman, & Lawrence, 2016).

[2] Research in economics has developed and studied a related construct – conditional cooperation (Kocher, Cherry, Kroll, Netzer, & Sutter, 2008; Vollan & Ostrom, 2010).

[3] The three models make predictions about how specific social dynamics and psychological processes affect how an individual's own SVO relates to beliefs about the distribution of others' SVO in a population. In the present meta-analysis, we examine how SVO relates to beliefs about other's cooperation in a social dilemma. Because both individualists and competitors tend to defect in social dilemmas, we cannot use these data to test how individualists and competitors differentially project their own SVO on others. For this reason, we cannot use these data to test different predictions from each of these three models. Instead, we examine the more general assertion that SVO should predict expectations of other's cooperation in social dilemmas, and that these expectations can mediate the relation between SVO and cooperation.

[4] A few studies (e.g., Haselhuhn, Wong, & Ormiston, 2013; Iedema & Poppe, 1995) assessed expectations of other's behaviors in the same task used to measure SVO. These were excluded, because they increase the chance of common-method bias and because the SVO measures are not social dilemmas.

[5] Professor Mike Cheung recommended in a personal consultation that all included studies should measure at least two of the three effect sizes of interest to ensure the validity of the MASEM approach used to examine this mediation.

[6] The effect size substantially increased after including studies that classified participants as prosocial or proselfs based on a goal choice in a social dilemma task, $d = 0.644$, 95% CI [0.516, 0.771], 90% prediction interval [-0.018, 1.306], $p < .001$.

[7] We also examined moderators of the relation between SVO and cooperation. These moderator analyses can be found on the OSF webpage for this article.

[8] For proselfs, the relation between expected partner cooperation and own cooperation may be stronger in iterated, compared to one-shot, social dilemmas, because cooperation can potentially maximize long-term outcomes during iterated interactions. However, for proselfs, the overall weighted effect size was actually significantly smaller in iterated ($r = .439$, $k = 5$,

95% CI [.218, .617], $p < .001$) than in one-shot social dilemmas ($r = .650$, $k = 5$, 95% CI [.563, .723], $p < .001$), $Q(1) = 4.393$, $p = .036$. Yet, the number of iterations did not significantly moderate the relation between expectations and cooperation among proselfs ($\beta = -0.015$, $p = .442$). For prosocials, iterations did not moderate the relation between expectations and cooperation. The results of these analyses should be interpreted with caution due to low statistical power.

[9] This statistical test contains only a few studies and has low statistical power.