Extrinsic Value Orientation
and "The Tragedy of the Commons"

Kennon M. Sheldon
University of Missouri–Columbia
Holly A. McGregor
University of Rochester

ABSTRACT   Two studies examined the effect of Extrinsic Value Orientation (Kasser & Ryan, 1993, 1996) upon harvesting strategies and personal profit within commons dilemmas, in which individual and group interests can be at odds. At an individual or within-group level of analysis, extrinsically oriented persons (who value money, fame, and popularity) harvested more than intrinsically oriented persons (who value self-acceptance, intimacy, and community). However, a counteracting group-level effect was found such that groups with a greater number of extrinsic members harvested less on average than did groups with more intrinsic members, because their commons did not last as long. As a result, even excessive harvesters within extrinsic groups did no better than did self-restrained harvesters within intrinsic groups. Supplementary analyses indicate that extrinsic values are associated with *acquisitiveness* regarding resources, more so than *apprehension* regarding others' acquisitiveness.

The "tragedy of the commons" (Hardin, 1968) arises from a situation in which all partake of a self-replenishing public resource, such as a central

grazing space. As long as users show restraint the resource is maintained, and all benefit at little cost. Almost inevitably, some begin to take "more than their fair share," for example, by adding extra cattle to their herd. The temptation is strong, because abusers profit directly from their initiative, while paying no direct cost. However, such behavior is problematic—not only does it deplete the pool faster than it can replenish itself but also, when others in the group perceive that someone is harvesting more than his or her share, they may well begin to take more themselves. The process can quickly spiral out of control—hence, the "tragedy."

This phenomenon has been widely studied in the 30 years since Hardin (1968) brought it to our attention, because it offers a compelling means of conceptualizing and researching the inherent conflicts between individual and group interests, or between short-term and long-term resource utilization strategies (Edney, 1980). Many different classes of "resource" dilemma have been postulated and implemented in the experimental laboratory, and many different factors affecting the behavior of people in such dilemmas have been identified. For example, resource dilemmas are best resolved when there is communication between group members (Messick, Allison, & Samuelson, 1988), when a sense of group identity or solidarity exists among group members (Brewer & Kramer, 1986), or when education is given regarding the long-term benefits of cooperation (Allison & Messick, 1985; for further reviews see Komorita & Parks, 1995 or Van Lange, Liebrand, Messick, & Wilke, 1992).

Notably, relatively little work has been conducted on the influence of individual- or personality-level variables upon commons behavior (Knapp & Clark, 1991). Much of the existing research has focused on people's Social Value Orientation (SVO; Kuhlman & Marshallo, 1975; Messick & McClintock, 1968; Van Lange, Otten, De Bruin, & Joireman, 1997). SVO is typically assessed by "decomposed" two-person prisoner's dilemmas games, in which participants are usually typed as cooperators (who attempt to maximize the joint earnings of self and other), individualists (who attempt to maximize their own earnings regardless of others), or competitors (who attempt to maximize the differential between their own and others' earnings). With regard to resource dilemmas, Kramer, McClintock, and Messick (1986), Liebrand (1984), and Van Lange and Kuhlman (1994) have shown that cooperators tend to harvest less on average from a common pool, that individualists harvest more, and that competitors harvest still more.

Although these findings are important, the SVO construct has received little theoretical elaboration in terms of personality dynamics (but see Van Lange et al., 1997), and has not been securely located within any larger framework of values. Further, there is substantial redundancy between the Social Value types (i.e., cooperator, individualist, or competitor, as assessed in simulated social dilemmas) and the behavioral outcomes studied (i.e., cooperation or competition within "real" social dilemmas), leading to concern about what has been learned through the typology's application. Thus, the primary aim of the current research was to examine the effect of personality upon commons behavior using a different model of social values, one whose domains are less theoretically overlapping with the behavior to be explained. We employed this alternative model's theoretical distinction between extrinsic and intrinsic values (Kasser and Ryan, 1993, 1996), seeking a fresh perspective upon the determinants of behavior within commons dilemmas.

The Extrinsic Values Model

Kasser and Ryan (1993, 1996) assumed that the values that individuals adopt do not always reflect and support optimal personality development and emotional well-being. These investigators made a distinction between *intrinsic* and *extrinsic* values: intrinsic values were said to express or be consistent with actualizing and growth tendencies natural to humans, whereas extrinsic values are less directly expressive of such inherent (but fragile) tendencies. This perspective has its roots in prior humanistic (Maslow, 1970; Rogers, 1963) and organismic (Angyal, 1941; Goldstein, 1939) theorizing.

Specific examples of *in*trinsic values include the desire for self-knowledge, emotional intimacy, and community involvement. Such values share in common an orientation towards experiential openness and personal growth (both intrapsychic and psychosocial). Those who endorse such values are assumed to have experienced an optimal past developmental trajectory, characterized by security and psychological need-satisfaction. In contrast, examples of *ex*trinsic values include the desire for fame, physical attractiveness, and wealth. Such values share in common an orientation towards receiving approval, attention, or gratification from others. Those who strongly endorse such values are presumed to have experienced a nonoptimal developmental trajectory, characterized by insecurity and instability. In short, strongly extrinsically

oriented people are assumed to have lost touch with important developmental needs and trends within themselves, and to be engaged in a potentially ineffectual struggle to shore up self-esteem.

Preliminary support for these assumptions comes from a variety of studies. Kasser and Ryan (1993, 1996) showed that those who give relatively greater weight to extrinsic compared to intrinsic values were lower in both interviewer-rated adjustment (Kasser & Ryan, 1993) and self-rated well-being (Kasser & Ryan, 1996). This lessened well-being was understood as occurring because extrinsically oriented people do not succeed as well in meeting psychological needs, even when they are successful in achieving their extrinsic goals (Kasser & Ryan, 1999; Sheldon & Kasser, 1995, 1998). Supporting the suggestion that extrinsic values may spur antisocial behavior, Kasser and Ryan (1993) found that extrinsic orientation is associated with incidences of conduct disorder, and Sheldon and Kasser (1995) showed that more extrinsically oriented people are lower in empathy and spend less spend time in their daily lives helping others. Finally, supporting the hypothesis that extrinsic values may result from inadequate developmental environments and may thus reflect compensatory efforts on the part of the person, Kasser, Ryan, Zax, and Sameroff (1995) demonstrated in a longitudinal study that children of cold, controlling parents who grew up in unsafe neighborhoods were more likely to have adopted extrinsic values by late adolescence.

It is also worth commenting on the relationship of extrinsic value orientation (EVO) to other conceptions of intrinsic and extrinsic motivation. EVO is representative of a family of personality constructs which assume that humans can become "disattuned" from natural interests or developmental trends within themselves, as they instead focus on the contingent approval of others. Related measures include control orientation (Deci & Ryan, 1985), trait extrinsic motivation (Amabile, Hill, Hennessey, & Tighe, 1994), and external perceived locus of causality (Ryan & Connell, 1989). Notably, EVO is different from these constructs in that it refers to enduring personal values, which may lead individuals to adopt motives and goals which are chronically unsatisfying of their psychological needs (Sheldon & Kasser, 1998). Thus the EVO construct may supply important information on the "second tier" of personality (McAdams, 1996), that is, the personal motivational system (Higgins & Kruglanski, 1996).

The Current Research

Overview.   As can be seen, past extrinsic values research has focused primarily on the detrimental effects of such values upon psychological well-being. However, in the these studies we attempted to show that those who are very extrinsically oriented may pay an *economic* cost as well. That is, despite their orientation towards external commodities, extrinsic individuals may often acquire *fewer* resources than intrinsic persons, because of the "tragedy of the commons."

   To test this we put participants into groups with others like themselves, and engaged them in a resource dilemma involving timber harvests in a national forest. In line with the above reasoning, we expected that those with stronger intrinsic values would exercise more self-restraint in such dilemmas, because they would feel a greater sense of community and identity with the group (Dawes, van de Kragt, & Orbell, 1990), and would also feel stronger identification with prosocial norms (Ryan, 1995). Therefore they would attempt to preserve the commons. In contrast those with relatively strong extrinsic values, assumed to be more oriented to the acquisition of external commodities (i.e., money, privileges, attention), were expected to take in excess from the commons, and be less concerned about preserving it.

Multilevel hypotheses.   These expectations led to two general hypotheses regarding the total amount that each participant would harvest over the course of the commons dilemma, at two distinct levels of analysis: (a) At an individual (or within-group) level of analysis, more extrinsic persons should make *more* profit, because they will tend to harvest more than their group-mates. Correspondingly, more intrinsic persons should make *less* profit within-groups, because they will be more self-restrained than their group-mates. In contrast, we expected the reverse patterns of effects between-groups. Specifically, (b) extrinsic persons should make *less* profit to the extent that they are matched with others like themselves, because the collective behavior of extrinsic groups will more quickly exhaust the commons. Correspondingly, intrinsic persons should make *more* profit to the extent that they are matched in groups with others like themselves, because the collective behavior of intrinsic groups will better preserve the commons, enabling all members of the group to receive long-term benefits. These hypotheses were to be tested using hierarchical or multilevel data-analytic techniques (Bryk & Raudenbush, 1992;

Sheldon, Ryan, & Reis, 1996), in which both individual-level and group-level (or within- and between-group) effects can be examined simultaneously. Although some have pointed out the natural applicability of hierarchical linear modeling to social dilemma research (Kenney, Kashy, & Bolger, 1998), to date few social dilemma researchers have employed these statistical techniques.

An important question of this research concerned the *relative magnitude* of the within- and between-group effects. Overall, do extrinsic individuals fare better or worse than intrinsic individuals? This question is important from a game-theoretic perspective, which has long explored the efficacy of various strategies for solving social dilemmas (Patchen, 1987; Rapaport & Orwant, 1962). The current multilevel design could provide new information on the relative optimality of acquisitive versus self-restrained strategies in iterated social dilemmas, as a function of varying combinations of individuals. The "relative magnitude" question is also important from an evolutionary or adaptationist perspective, because persons with prosocial values need to be able to acquire at least an adequate share of the physical resources, in order to thrive (Smith, 1982; Sober & Wilson, 1998). If prosocially oriented persons pay too high a price for their self-restraint, then perhaps their values should not be favored by evolution or by policy makers. However, if intrinsic values actually pay off because of the group-level advantages they confer, then such values would appear to be desirable from a resource-acquisition (Axelrod, 1984) as well as a well-being point of view.

We assume that the "cumulative harvest" of each participant (summed over the entire iterated dilemma) is a reasonable outcome to examine in order to consider these questions, because it is simultaneously affected by both within-group and between-group factors. This variable is also affected by the duration of the commons, since the longer the commons lasts the more new resources come into the pool, resources which ultimately go to the players.

Extrinsic values and situational motives/expectations. In order to closely examine the situational goals and expectancies (Pruitt & Kimmel, 1977) underlying the behavior of extrinsically oriented persons in resource dilemmas, we assessed participants' initial levels of "acquisitiveness" and "apprehension." Acquisitiveness refers to the desire to obtain as much of the resource as possible for oneself, and apprehension refers to the expectation that others will be trying to obtain as much as possible

for *them*selves. These two constructs bear some similarity to constructs studied in past social dilemma research, namely "greed" (in which one desires to contribute as little as possible to the common pool, to maintain personal resources) and "fear" (in which one is afraid to make a contribution to the common pool, because others may not do so; see Komorita & Parks, 1994). Research has indicated that both greed and fear contribute to inadequate resource management (Bruins, Liebrand, & Wilke, 1989; Dawes et al., 1990; Poppe & Utens, 1986). Notably, however, most past research has defined greed and fear in terms of numerical variations in the payoff matrices used within a study, rather than in terms of participants' psychological goals and expectations. Also, most past research has studied greed and fear using public goods paradigms (in which participants may "give-some" to a common pool), rather than resource dilemma paradigms (in which participants may "take-some" from a common pool), the type of design employed in the current studies. Because of these discrepancies, we have chosen the terms "acquisitiveness" and "apprehension" in the current research to characterize noncooperative goals and expectancies.

In accordance with our supposition that extrinsically oriented people are insatiably oriented toward the obtainment of external commodities (Kasser & Ryan, 1996), we hypothesized that extrinsic values would be associated with measures of situational acquisitiveness. Because they are actively seeking signs of self-worth, extrinsically oriented persons should be especially concerned with "getting more." In contrast, highly extrinsic persons should not be particularly apprehensive that *others* will be trying to take large amounts, because past experience will have taught them that others are usually less acquisitive than they. In other words, we expected extrinsically oriented people to be more greedy than fearful. This hypothesis was tested by comparing the magnitude of the correlations of EVO with the acquisitiveness and apprehension variables.

Extrinsic Value Orientation and Social Value Orientation. Another important research question concerned the relationship of EVO to the SVOs of Cooperator, Individualist, and Competitor (Kuhlman & Marshallo, 1975; Messick & McClintock, 1968). As noted above, the SVO construct has received the most past attention as a personality-based predictor of behavior in resource dilemmas (Van Lange & Kuhlman, 1994). Given that there are substantial conceptual similarities between the intrinsic/extrinsic distinction and the cooperator/competitor distinction, it is important to

demonstrate that the EVO effects are not empirically reducible to the effects of SVO. Thus, in both studies we measured and controlled for the effects of SVO, predicting that EVO supplies unique predictive information regarding individuals' behavior in resource dilemmas. This prediction was based on the assumption that the EVO construct taps a broader range of values relevant to prosocial versus antisocial behavior than does the SVO construct.

Implications for the person/situation debate. A final perspective on the current research concerns the "person/situation debate" (Kenrick & Funder, 1988; Magnusson & Endler, 1977). Most contemporary models of personality are interactionist, that is, they acknowledge that personality dispositions will have different effects in different situations (Higgins, 1990). In fact, a hallmark of interactionist research is that it attempts to identify and untangle the moderator relationships between important personality and situational variables (Kenrick & Dantchik, 1983). The current research forwards this agenda in a new way, by identifying a potentially important new situational moderator variable: specifically, *the extent to which those with a certain trait are grouped with others like themselves.* The specific substantive question is, how do the economic outcomes experienced by persons of particular value types depend on how many others of their own type they are associated with? Again, this multilevel question may have important implications for evolutionary theories of group cooperation versus competition, and the relative adaptive benefits of prosocial versus antisocial resource-acquisition strategies (Axelrod, 1984).

Study 1

Overview and Hypotheses

In Study 1, we tested some of the individual-level hypotheses outlined above, via a simulated resource dilemma. Participants first completed the Aspirations Index (Kasser & Ryan, 1996), a measure of EVO. Next, they completed a measure of SVO (Van Lange et al., 1997). Then, a scenario involving a resource dilemma was described, in which participants were asked to imagine that they were one of four timber companies making harvests within the same national forest. Participants made ratings regarding the level of acquisitiveness and apprehension they would feel

going into the situation, then indicated what their bid for the 1st year's harvest would be. Because participants were not brought together into actual groups in Study 1 no group-level effects could be examined. Also, extension of the scenario beyond the first year was not feasible, because there was no information to give participants regarding group-level outcomes.

Our hypotheses in this first study were as follows: We expected (a) that EVO would be correlated with a higher 1st-year bid, supporting our assumption that those with strong extrinsic values are willing to "take" more from a group resource. We also expected (b) that this effect would remain significant even when participants' SVO was controlled, that is, we expected EVO to supply unique variance in the prediction of bidding. Finally, we expected (c) that EVO would be more strongly correlated with acquisitiveness than with apprehension, supporting our assumption that extrinsically oriented persons operate more from a desire to get more than other group members, than from an expectation that others will try to get more than they.

METHOD

Participants and procedure

Participants were 80 undergraduates at the University of Rochester, who took part for extra credit in a psychology course. Twenty-four were male and 56 were female. Participants attended a questionnaire session, which was run by trained research assistants. All measures were presented in a single questionnaire packet, which was completed individually by each participant.

Measures

EVO.   Participants first completed the Aspirations Index (Kasser & Ryan, 1996). Specifically, they were presented with 30 statements regarding the future, and asked to rate how important it is that each occur in the future. Fifteen of these statements represented the extrinsic domains of Financial Success ("I will have many expensive possessions"), Social Recognition ("My name will be known to many people"), and Appealing Appearance ("I will achieve the 'look' I've been after"), and 15 statements represented the intrinsic domains of Self-Acceptance ("I will know and accept who I really am"), Community Feeling ("I will help the world become a better place"), and Affiliation ("I will have a committed, intimate relationship"). Participants rated the importance of attaining

each outcome on a scale ranging from 1 (*not at all important*) to 9 (*very important*).

As noted above, past research and theory has emphasized that extrinsic values are only problematic when they are relatively stronger than intrinsic values (Kasser & Ryan, 1993, 1996). In order to quantify the *relative* strength of extrinsic as compared to intrinsic values (Kasser & Ryan, 1993, 1996) we computed a single "Extrinsic Value Orientation" measure from these ratings, by subtracting the intrinsic items from the extrinsic items. The resulting 30-item measure represented a continuum ranging from relatively strong intrinsic orientation at the low end, to relatively strong extrinsic orientation at the high end. Coefficient alpha for the EVO measure was .82.[1]

Social Value Orientation. Next participants completed a decomposed game measure of Social Value Orientation (Van Lange et al., 1997). Specifically, they made a series of nine choices between three different allocations of points to themselves and to another person (i.e., for the first decision, Choice A gave Self 500 and Other 100; Choice B gave both Self and Other 500; and Choice C gave Self 550 and Other 300). Participants were informed that they would receive the sum of the points they allotted themselves and the points another (anonymous) person at the session allotted to them, and that the other person would receive the sum of the points he/she allotted him/herself and the points the participant allotted him/her. Prior to choosing, participants were asked to imagine that the points have value both to them and to the other person—the more accumulated by either participant, the better for that participant.

In order to be classified as a dispositional Cooperator, Individualist, or Competitor, participants have to show a preference for a particular type of decision (see Kuhlman, Brown, and Teta, 1992, for a general discussion of scoring procedures for decomposed games). In the current study participants were classified as Cooperators if at least five of their nine choices in the decomposed game maximized joint gain for self and "other." Participants were classified as Individualists if at least five of their nine choices maximized gain for self. Participants were classified as Competitors if at least five of their nine choices maximized gain for self relative to the "other." Accordingly, 43 participants were classified as Cooperators, 14 as Individualists, and 6 as Competitors.

---

1. Kasser and Ryan (1993) used a regression procedure to partial out participants' *mean* level of valuing, prior to assessing the effects of particular value domains upon well-being. This removed the potential confound of overall high versus low overall valuing, and also focused the analyses on the relative strength of different values. In the current research we merely subtracted the intrinsic ratings from extrinsic ones, in order to derive an aggregate value score. This simpler procedure also controls for mean levels of valuing, and also yields a measure of the relative strength of different values within the person's value system.

Seventeen participants were unclassifiable. Notably, SVO researchers often report substantial skews (Kuhlman & Wimberley, 1975; Van Lange & Kuhlman, 1994) and/or high nonclassification rates (Kuhlman et al., 1992; Kuhlman & Marshallo, 1975), such as those found in the current study.

Resource dilemma. Later in the questionnaire packet, participants read the following instructions:

> Now, we would like you to imagine that you are in a particular situation. Try to anticipate what you would actually do in this situation, being as realistic and honest as you can.

> Here's the situation (please read carefully): you are the owner of a timber company. Your company and three other timber companies are all working within the same national forest. There are 200 hectares of timbered land within this forest (a hectare is 100 acres, if you're curious). Your goal is to cut as many hectares of trees as you can, so that your company will profit and thrive. Each year, each of the four companies makes bids regarding how many hectares it will cut that year, ranging from a minimum of 0 to a maximum of 10. None of the companies ever finds out what the other companies have bid; all they know is the total number of hectares cut each year. This total amount can range from 0 (if all four companies bid 0) to 40 (if all four companies bid 10). Thus, in a given year, the forest can be reduced by as much as 40 hectares (i.e., in year 1, the forest can shrink from 200 to 160 hectares). Of course the forest also regenerates, at a rate of about 10% per year.

> Obviously, one danger is that the forest will eventually be wiped out, leaving all four companies "out in the cold." Thus, it may be to the four companies' collective advantage to make smaller bids. However, another danger is that a company will not do as well because it cuts less than the other three companies. Thus, it may be to each company's individual advantage to make larger bids.

> What we are interested in is how you would think and behave in a situation such as this. Please answer the questions below, by imagining yourself in the above situation and anticipating your own responses. There are no "right" answers here; different people resolve such dilemmas in different ways.

Participants first rated the extent to which they would prefer to profit more than the other three companies (referred to as *Acquisitiveness*) and the extent to which they would expect the other companies to try to cut maximum amounts each year (referred to herein as *Apprehensiveness*), using a 1 (*not at all*) to 7 (*very much*) scale. Next, they indicated how much of the forest they themselves would cut in the first year (referred to as "*Year 1 Bid*;" this variable could range from 0 to 10 hectares).

RESULTS

Table 1 presents descriptive statistics for the EVO and the Acquisitive-ness, Apprehension, and Year 1 Bid variables, and also presents their intercorrelations.[2] As predicted by the first hypothesis, EVO was associ-ated with a larger bid. We then conducted a one-way analysis of covari-ance (ANCOVA) to test our second hypothesis, that the significant effects of extrinsic values would persist even when social value type was in the equation. In this analysis Year 1 Bid was predicted from SVO, with EVO as a linear covariate. The SVO effect was nonsignificant, $F(2, 59) = .72$, $p < .5$ (see Parks, 1994, for a similar result). More importantly, the EVO effect remained significant, $F(1, 59) = 5.60$, $p < .05$.

Table 1 also reveals that EVO was positively associated with Acquisi-tiveness (desire for a large profit for oneself, at the expense of others) but was not associated with Apprehension (the expectation that others might cut large amounts). To explicitly test our third hypothesis, that EVO is more strongly associated with Acquisitiveness than with Apprehension, we statistically compared the magnitude of the two correlations (Cohen & Cohen, 1983). This t test revealed that the former correlation was significantly stronger than the latter, $t(77) = 4.02$, $p < .01$.

BRIEF DISCUSSION

Study 1 provided good initial support for our individual-level hypotheses. As expected, those higher in EVO tended to bid more in the first harvest-year. Also, the effects of EVO were not empirically reducible to those of SVO, the personality variable that has received the most past attention as a predictor of behavior in commons dilemmas. Finally, participants' self-reports prior to playing indicate that they are more motivated by acquisitiveness (the desire to get as much as possible) than by apprehension (the expectation that others would be making large bids themselves).

Although these results are encouraging, Study 1 has substantial limi-tations. First, there were no actual groups involved. As a result the Study 1 data do not permit a test of our group-level hypothesis that extrinsic types, despite their proclivity to take more for themselves, might actually

---

2. In neither study in this article was gender associated with Acquisitiveness, Apprehen-sion, Bid, or EVO. Therefore we do not discuss gender in either study.

Table 1
Study 1: Descriptive Statistics and Correlations Between EVO,
Acquisitiveness, Apprehension, and Year 1 Bid

	EVO	Year 1 Bid	Apprehension	Mean	Standard Deviation
EVO				– 52.16	25.93
Year 1 Bid	.32**			5.80	2.05
Apprehension	–.10	.28*		4.91	1.55
Acquisitiveness	.29**	.56**	.15	4.76	1.68

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

do worse overall because their strategy promotes quick "exhaustion" of the commons. Second, the resource dilemma employed in Study 1 lasted only 1 year. The more typical experimental paradigm is one in which participants go through many cycles of bidding and feedback. It may be that extrinsic types would be less "greedy" in a situation in which real others are involved, or in which the perishable nature of the commons becomes clearer as the years (trials) go by.

Thus, the primary aim of Study 2 was to extend Study 1 findings by lengthening the duration of the dilemma, and by bringing participants together in actual groups of 4. Specifically, we used a median split of the EVO measure to create three different types of group: (a) Groups composed of 4 extrinsic people, (b) Groups composed of 2 extrinsic and 2 intrinsic people, and (c) Groups composed of 4 intrinsic people. We hypothesized that EVO would again correlate positively with bidding, and that this would lead to a within-group effect such that more extrinsic individuals harvest more than others within their groups. However, we expected to find a counteracting effect at the between-group level, such that more extrinsic groups would harvest less, in the long run, than would intrinsic groups. Specifically, we tested for a linear trend among group-type means such that intrinsic groups would harvest most on average, mixed groups would harvest an intermediate amount, and extrinsic groups would harvest least. As noted above, we employed hierarchical or multilevel modeling to analyze the Study 2 data (Bryk & Raudenbush, 1992), in order to correctly partition and evaluate the individual-level and group-level effects.

In Study 2 we again assessed SVO, to ensure that the EVO effects are not reducible to the effects of SVO. However in Study 2 we employed a

different measure of SVO, hoping to reduce the nonclassification and skewness problems found for the SVO measure used in Study 1.

Study 2

METHOD

Participants

Participants were 152 undergraduates at the University of Rochester, who participated for extra credit in their psychology courses. Fifty-six were male and 96 were female. Preliminary analyses revealed that gender was again independent of major study variables, and thus gender is omitted from further discussion.

Value Measures

Aspirations Index. Early in the semester participants were given the Aspirations Index, in large-group testing sessions. An EVO score was computed for each participant, in the same way as in Study 1. A median split was performed on the resulting distribution, in order to classify participants into one of two types: Extrinsic (E) or Intrinsic (I).[3]

Social Value Orientations. Participants also completed the Ring measure of SVO (Liebrand, 1984), in a different questionnaire packet administered later in the semester. In this measure, also based on "decomposed" prisoner's dilemmas (Messick & McClintock, 1968), participants make 24 choices between two different allotments of points to self and other. Instructions informed participants that they had been anonymously paired with another person in the study, that the points each would receive would be the sum of the points they allotted to themselves plus the points the other allotted to them, and that they should consider the points as valuable both to themselves and to the other. The Ring measure is scored by summing the points that each participant allots to himself or herself and also the points that he/she allots to the other, separately across the 24 choices. These two sums are treated as x and y coordinates which locate participants on a circle; participants are classified as Cooperators, Individualists, or Competitors according to which portion of the circle they fall within. To be

---

3. Although we thereby designated participants as either Extrinsic or Intrinsic, it is important to remember that the Aspirations Index was not originally designed to classify people into types, as does the Social Values measure (described below); instead, it yields a continuum of scores, which in the current research was divided via median split, in order to make group assignments.

classifiable participants must also choose above a certain threshold of consistency (see Liebrand, 1984, for further details on scoring procedures). As a result, 31 participants were classified as Cooperators, 73 as Individualists, and 22 as Competitors, a more balanced distribution across types than was found in Study 1. However, 26 participants were not classifiable. Thus the sample size for analyses involving SVO was 126, rather than 152.

Experimental procedure. Throughout the semester, participants came to the laboratory in groups of 4. Groups were scheduled such that there were three different group compositions: (a) 4 participants classified as intrinsic (IIII), (b) 2 participants classified as intrinsic and two classified as extrinsic (IIEE), and (c) 4 participants classified as extrinsic (EEEE). In all, 14 Intrinsic (IIII) groups were run, 11 Mixed (IIEE) groups were run, and 13 Extrinsic (EEEE) groups were run (38 groups in all × 4 participants/group = 152 participants).

Participants were greeted by a trained research assistant and asked to sit around a large table upon which dividers had been installed to minimize nonverbal communication. In addition, participants were asked not to speak to each other during the procedure. Instructions for the resource dilemma were delivered via tape recording. The dilemma was essentially the same as that of Study 1, involving timber harvests in a national forest that initially holds 200 hectares of timbered land. The tape recorded instructions informed participants that (a) they would be making a bid of up to 10 hectares prior to each year, (b) that their individual bids would be anonymous, (c) that before making the next year's bid they would be told how much the group as a whole had cut during the last year and how much forest remained after 10% was added back in, (d) that the process would continue either until the forest was gone or until a "randomly determined number of years had passed" (25 years was the preset limit), and (e) that their goal was to "cut as many hectares of trees as you can, so that over time, your company will profit and thrive." To ensure that participants fully comprehended the instructions an example was presented, and then each participant was given a quiz regarding the instructions. Clarifications were provided by the experimenter as needed.

Prior to the start of the actual procedure participants rated the extent to which they would prefer to profit more than the other three companies (Acquisitiveness), and the extent to which they expected the other three companies to cut large amounts each year (Apprehensiveness), using a 1 (*not at all*) to 7 (*very much*) scale. These items and this scale were the same as in Study 1. Next, participants wrote their bid for the 1st year on a "yearly bid sheet." The experimenter collected the bid sheets, tabulated the four bids, subtracted the sum from 200, and added 10% of the remainder back in to determine the size of the forest going into the 2nd year. The sum total harvested during the 1st year, and the new forest size, was announced to the participants. The experimenter then instructed participants to consider their bids for the 2nd year and to again record

their bid on a new bid sheet. The procedure continued until the forest was gone or until 25 years had elapsed, at which time participants were debriefed, thanked for their participation, and released. Each participant had scores on seven key variables: SVO, EVO, Group-Type (intrinsic, mixed, or extrinsic), Acquisitiveness, Apprehension, Year 1 Bid, and Cumulative Harvest.

RESULTS

Individual-Level Analyses

We first examined the correlations between EVO, Year 1 Bid, Acquisitiveness, and Apprehension, to replicate the Study 1 findings that EVO predicts Year 1 Bid and is more strongly associated with Acquisitiveness than with Apprehension. These two hypotheses were testable via individual-level correlational analysis because the data were collected prior to participants' exposure to events unique to the particular group they were in. Table 2 presents these correlations, as well as descriptive statistics. Consistent with the findings of Study 1, the correlation between EVO and Year 1 Bid was again positive ($r = .17$, $p < .05$). As in Study 1 EVO was positively correlated with Acquisitiveness ($r = .16$, $p < .05$) but not with Apprehension ($r = .04$, ns). However, the difference between these correlations was not significant, $t(149) = 1.22$, $p > .10$. Thus, correlational results did not fully replicate from Study 1 to Study 2.

Analyses Involving Group-Level Effects

Next, we examined each participant's *accumulated* harvest, as a function of both his or her Group-Type and his or her EVO score. Because the

Table 2
Study 2: Descriptive Statistics and Correlations Between EVO,
Acquisitiveness, Apprehension, and Year 1 Bid

	EVO	Year 1 Bid	Apprehension	Mean	Standard Deviation
EVO				– 43.06	25.80
Year 1 Bid	.17*			5.50	2.09
Apprehension	.04	.42**		3.75	1.48
Acquisitiveness	.16*	.37**	.23 *	4.91	1.55

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

feedback given participants after Year 1 was the same for each of the 4 members of a particular group, the assumption of independence for the post–Year 1 data of participants within the same group could not be made. This necessitated the use of a hierarchical or multilevel strategy to analyze the Total Harvest data. Multilevel analysis enables one to correctly partition lower-level (i.e., individual or within-group) and upper-level (i.e., between-group) effects, facilitating appropriate significance tests (Bryk & Raudenbush, 1992). This partitioning is especially important in the present study, because group-level and individual-level effects were confounded—recall that a median split was performed on the individual-level (EVO) variable in order to assign participants to groups. One result of multilevel analysis is that individual- and group-level variables are "deconfounded."

We employed a Weighted Least Squares approach (WLS; Kenny et al., 1998), using the statistical analysis software general linear model procedure (Sheldon et al., 1996). The WLS approach offered two advantages in this case: first, it compensated for the somewhat differing number of groups of each type (14, 11, and 13), by giving slightly greater weight to types represented by more groups. Second, it compensated for differences in variances within groups. For example, those in the middle groups (which were composed of 2 intrinsic and 2 extrinsic people) necessarily displayed more variability in the EVO measure than did those in the all-intrinsic or the all-extrinsic groups, because the range of the EVO measure was truncated in the latter two groups. The WLS approach gave somewhat greater weight to the mixed group, under the assumption that the increased variability within that group allows for more precise estimation of effects. We expected that groups would earn less as a continuous function of how many extrinsic types were contained within the group. Thus, Group-Type was coded so as to test for a linear trend among group means (i.e., –1, 0, +1). We report results based on Type III or partial Sums of Squares.

Table 3 gives the standardized coefficients generated by the analysis. As can be seen, there was a significant individual-level effect upon Cumulative Harvest, such that those who were more extrinsically oriented tended to harvest greater amounts than those who were less extrinsically oriented. This reflects the fact that extrinsic types tend to make larger bids than their group-mates, as shown above in the correlations involving Year 1 Bid.

However, Table 3 also demonstrates a counteracting group-level effect, as evidenced by a significant linear trend. As hypothesized, those in the

Table 3

Study 2: Standardized Regression Coefficients Representing Effects of
Extrinsic Value Orientation and Group-Type Upon Individual Harvests

	ß	$F(3, 148)$	p
Extrinsic Value Orientation	.38	11.27	.0010
Group-Type	−.35	13.22	.0004
Extrinsic Value Orientation × Group-Type	−.06	.50	.4807

Note. Group-type was coded –1 (intrinsic), 0 (mixed), and +1 (extrinsic).

most extrinsic groups harvested least on average (M = 91.4), whereas
those in mixed groups harvested somewhat more (M = 96.9), and those
in intrinsic groups harvested the most on average (M = 100.9). Finally,
there was no interaction effect of Group-Type and EVO upon Total
Harvest. This means that the degree of positive association between EVO
and Total Harvest was the same in all three groups. Thus, despite the fact
that the range and variance of the EVO variable were attenuated within
the extrinsic and intrinsic groups compared to the mixed group, enough
coherent within-group variation remained for an "EVO to Cumulative
Harvest" effect to emerge within all three types of group.[4]

Figure 1 provides a graphic representation of these results. A separate
slope is given for each type of group, representing the positive association
between EVO and Total Harvest within each group. The three slopes are
essentially parallel, reflecting the nonsignificant interaction reported
above. The slopes are also spaced at nearly equal intervals, reflecting the
linear trend among group means. Finally, Figure 1 contains predicted
values, generated in order to concretely demonstrate how a participant
low or high in EVO (compared to others within his/her group) would tend
to fare in each group. Predicted values were computed using an equation
derived from the regression analysis reported above. EVO scores either
one standard deviation above or below the mean EVO score for each of
the three types of group were inserted into the equation, in order to
generate the six values plotted in Figure 1.

4. Supplementary analyses employing HLM 2/3 software (Bryk & Raudenbush, 1992)
confirmed the basic pattern of results uncovered with the SAS models. We favored the
SAS GLM approach in this data set because it is better known by most readers and
because the technical details of HLM analyses take considerable space to communicate.
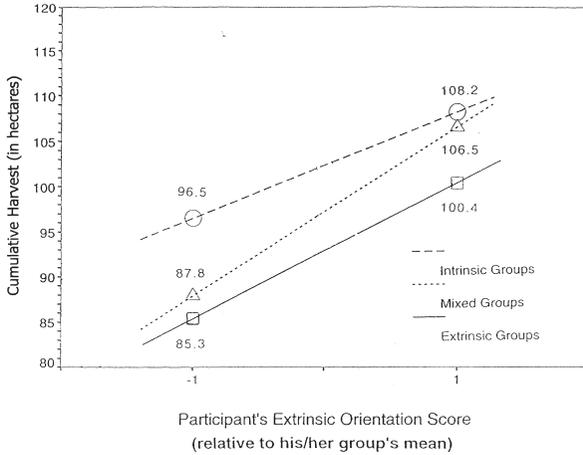
Figure 1
Relationship between Extrinsic Value Orientation and Cumulative Harvest as a function of both group membership and relative standing within groups.

Recall that an important purpose of this study was to compare the magnitude of the harvests obtained by intrinsic versus extrinsic persons. One way to do this is to compare the mean harvests for each group type, as presented above. In the latter test, intrinsic values came out ahead. A second, more conservative test is to ask, "Do those who profit *least* in the intrinsic groups fare just as well as those who profit *most* in the extrinsic groups?" Finding no difference between these two means would suggest that intrinsic strategies indeed prove best overall, because even when intrinsic types "lose" within their own groups they still do better than those who "win" within extrinsic groups.[5] As can be seen in Figure 1, the predicted value for the more intrinsic and self-restrained members of the intrinsic groups (96.5 hectares) was in fact less than the predicted value for those who bid more excessively within the extrinsic groups (100.4 hectares). However, because this difference was not significant, $t(108) = .74, p > .40$), the two types of participant can be treated as having attained equivalent scores. In short, it appears that even those with very prosocial

5. Although the analysis is not appropriate, strictly speaking, the reader may be interested to know that the simple bivariate correlation between Extrinsic Orientation and Cumulative Harvest was not significant ($r = .10$). This suggests that there was no clear advantage or disadvantage to possessing extrinsic values; the association depends on the type of group one finds oneself in.

values can do quite well in a benign environment, in part because their self-restraint helps everyone in that environment to obtain longer-term benefits.

Interestingly, the most harvest was achieved by those who were relatively more extrinsic within the intrinsic groups (109 hectares). This suggests that from a purely resource-acquisition point of view the best strategy is to be a little more prosocial than average, but less prosocial than one's group-mates. The least harvest was achieved by those with relatively more intrinsic values, within the highly extrinsic groups (86 hectares). This suggests that intrinsically oriented people may indeed pay a substantial price for their prosocial values, if they find themselves among too many "greedy opportunists."

Figure 2 presents the data in another way, by plotting the mean harvest for each group-type for each of the 25 years of the study (notably, beginning with Year 10 these means are based on declining numbers of groups, as groups began to eradicate their forests and "go extinct"). As can be seen, extrinsic groups took an early lead, but then their harvests dropped off as their forests disappeared. In contrast, although intrinsic groups harvested less in the beginning they harvested more in the long run, because their restraint allowed them to benefit from the new timber which came into the pool (i.e., regrowth).

In order to explicitly assess the hypothesis that intrinsic groups do better in part because they "last" longer than extrinsic groups, we
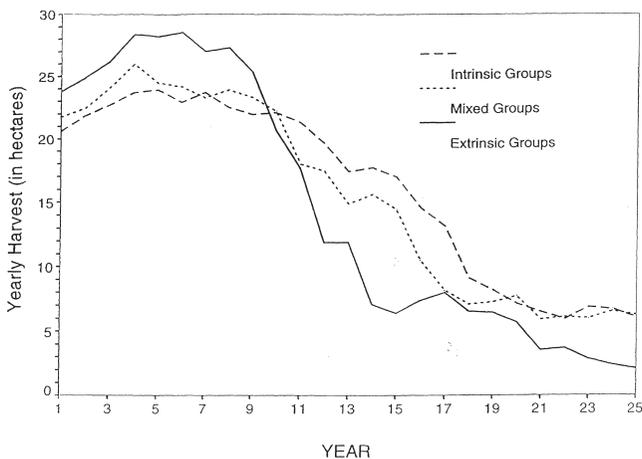

Figure 2
Average Harvest obtained each year by each of three types of group.

computed a variable representing the number of years that each group preserved its forest ($n = 38$, $M = 17.68$ years). We found a significant linear trend in this data, $t(35) = 2.18$, $p < .05$. Specifically, intrinsic groups preserved their forest longest on average ($M = 19.66$ years), mixed groups not as long ($M = 18.25$ years), and extrinsic groups eliminated their forest soonest ($M = 15.08$ years).

Finally, we examined the effects of SVO (the traditional measure of social values) upon all of the variables that were assessed prior to the beginning of group-level processes. Specifically, we used a multivariate analysis of variance to examine the relationship of SVO to EVO, Year 1 Bid, Acquisitiveness, and Apprehension. In these analyses Competitors were found to have more extrinsic values than Individualists and Cooperators (Ms $= -35.19, -44.65$, and -44.71, respectively), to make a higher bid at Year 1 (Ms $= 6.00, 5.14$, and 5.23), and to be more motivated by both Acquisitiveness (Ms $= 5.05, 4.88$, and 4.52) and Apprehension (Ms $= 4.23, 3.74$, and 3.58). However none of these effects were significant (ps ranged from .10 to .20 when linear trend analyses were conducted). Next we conducted regression analyses to predict Year 1 Bid, Acquisitiveness, and Apprehension from EVO, controlling for SVO (two dummy variables represented the three SVO types in these analyses). In these models, the results for EVO were essentially unchanged from the correlational results reported at the beginning of this results section, again indicating that the EVO effects are not empirically reducible to those of SVO.

GENERAL DISCUSSION

These studies demonstrate that extrinsic values can promote "the tragedy of the commons." Those high in EVO—that is, those who value money, popularity, and physical attractiveness more strongly than they value self-acceptance, emotional intimacy, and community feeling—tended to make larger bids than their less extrinsic group-mates. At an individual or within-group level of analysis, this resulted in greater harvests for them. However, while "winning the battle," extrinsic types may "lose the war"—an orthogonal group-level effect emerged such that on average, extrinsic participants actually profited somewhat less than did intrinsic participants, because their groups tended to use up the commons sooner.

Supplementary analyses found extrinsic types to be motivated more by acquisitiveness than by apprehension, that is, more by the desire to

get more than others, than by the expectation that others would try to get more than them. Three explanations can be offered for this finding. First, extrinsic types may realize that others tend to be less acquisitive than they, and thus that they have little to fear from others. Second, extrinsic types may realize that they themselves do not intend to contribute to supporting the commons. As defined in public goods research, "fear" refers to the possibility that one will contribute to the public good, but that one's contribution will be wasted (Komorita & Parks, 1994). The analogue in the current resource dilemma research is apprehension that one's self-restraint will be wasted because others will not be similarly self-restrained. But since those high in EVO probably had less intention of exercising self-restraint, they may have felt little to fear on this score. Third (and most importantly), theory suggests (Kasser & Ryan, 1993, 1996; Kasser et al., 1995) that those high in EVO are strongly motivated by an urge to obtain compensatory signs of self-worth. If so, the desire to obtain such symbols may outweigh any defensive desire to avoid loss.

Both studies found that the effects of EVO could not be accounted for by an alternative model of social values, in which participants are classified as Cooperators, Individualists, or Competitors (Van Lange & Kuhlman, 1994). Specifically, controlling for SVO (the personality construct receiving the majority of past research attention) did not affect the primary results involving EVO. This suggests that the EVO measure supplies unique information regarding the effect of individual differences upon commons behavior. This may occur because the Aspirations Index (Kasser & Ryan, 1993, 1996) assesses a broader range of values than do decomposed prisoner's dilemma games, thus providing a more comprehensive picture of people's value systems.[6] It may also occur because the Aspiration Index assesses values by focusing on participants' *future* goals and guiding principles, tapping an aspect of personhood that decomposed prisoner's dilemma games do not. Finally, it may be that the EVO measure taps *self-attributed* values or motives, whereas the more behavioral and indirect SVO measure assesses *implicit* values or motives. Substantial research indicates that the two types of construct can have independent effects (McClelland, Koestner, & Weinberger, 1989).

---

6. Notably, there are other ways of measuring the SVO constructs of cooperator, individualist, and competitor (see Parks, 1994). It is possible that these other methods may have produced different results than were found in the current studies.

In addition to shedding new predictive light on behavior in resource dilemmas, these results also further extend the Extrinsic Values Model (Kasser & Ryan, 1993, 1996; Sheldon & Kasser, 1995, 1998). As discussed in the introduction, this model assumes that strong extrinsic value orientations evolve as a compensation for developmental insecurity or for deficiencies in psychological need-satisfaction (Kasser et al., 1995). The excessive search for external commodities such as attention, money, or admiration may represent the person's efforts to obtain missing feelings of self-worth. Previous research indicates that such efforts may be misguided, given that those who strongly endorse extrinsic values tend to show reduced adjustment and mood (Kasser & Ryan, 1993, 1996; Sheldon & Kasser 1995), and may fail to enhance their well-being even when they attain salient personal goals (Sheldon & Kasser, 1998). The current results expand this picture, by suggesting that besides falling behind in self-fulfillment, extrinsically oriented persons may also tend to fall behind in an *economic* sense, to the extent that they encounter others like themselves.

In terms of acquiring resources, what do these results suggest about the "best" approach to take in commons dilemmas? In accordance with the multilevel and inherently conflictual nature of social dilemmas, the message is mixed. Although intrinsic persons harvested more on average at a between-group level of analysis, their values were also a source of vulnerability in that they did not do as well within-groups. The *most* harvest was obtained by intrinsic types who were somewhat more extrinsically oriented than their intrinsic group-mates. Although basically self-restrained, they took mild advantage of their even more self-restrained companions. The *least* harvest was obtained by extrinsic types who were somewhat more intrinsically oriented than their extrinsic group-mates. Although basically acquisitive, they were unwilling to descend into a free-for-all with their even more acquisitive companions.

Although having intrinsic values did not impart a clear individual advantage for resource acquisition, results do indicate that the more intrinsically oriented people there are within a group, the more everybody in that group prospers (at least in the simple renewable resource paradigm we employed). The social policy implications of this finding seem straightforward—intrinsic values, and their intergenerational transmission, should be supported whenever possible. We also note that the beneficial effects of intrinsic value orientations might be even stronger were one to look beyond resource-acquisition to more intangible social

commodities, such as mentoring and caretaking. The latter contributions to the collective good, likely provided in the main by those with intrinsic values, doubtless supply a good portion of the intangible "glue" that holds societies together (Caporael, Dawes, Orbell, & Van de Kragt, 1989).

To speculate for a moment, we suggest that intrinsic values can be viewed as a set of "memes" (Dawkins, 1976; Du Preez, 1996) which exist alongside many other memes in the minds of the populace. This particular set of memes, when instantiated within many individuals within a group, can give that group an advantage compared to groups composed primarily of extrinsic acquisitors.[7] What is the functional advantage of having more intrinsic individuals within groups? We would argue that intrinsic individuals are more collectivistically oriented (Brewer, 1991; Markus & Kitayama, 1994), making them more likely to behave in ways that enhance the general welfare of all members of the groups to which they belong, including (at least to some extent) themselves. Intrinsic individuals may also feel greater moral commitment to ideals of self-restraint and fairness, helping them to "resist the temptation" to take excessive amounts for themselves (Van Lange, 1992), and influencing others to do the same.

From an evolutionary perspective, the current multilevel results illustrate a potentially promising new approach to the controversial group-selection issue (Wilson & Sober, 1994). Recent hierarchical conceptions of adaptive fitness (Caporael & Brewer, 1995; Sober & Wilson, 1998) suggest that individuals' overall level of fitness may be decomposed into two orthogonal components: that resultant from their behavior within groups, and that resultant from the aggregate behavior of the groups to which they belong. In the current research we have examined the simultaneous influence of a particular characteristic (EVO) at both a within- and a between-group level of analysis, and have shown that the characteristic can have very different effects at the two levels of analysis. By extension from these data, it appears that EVO could be simultaneously selected for (at the individual level) and selected against (at the group level).

Obviously, a crucial factor determining the "net" effect of these two processes would be the distribution of individuals across groups. In the

---

7. Of course, in this view extrinsic values also would be cultural "memes," which it may be advantageous to possess at certain times—for example, in times of hardship when resource acquisition truly becomes a zero-sum game.

current research we (the experimenters) formed the groups, attempting to create a reasonable representation of different possible group combinations. Of course, in the real world individuals typically assort *themselves* into groups (Sober & Wilson, 1998). Interestingly, the fact that both extrinsic and intrinsic types do better to the extent they are matched with intrinsic types suggests that the ability to detect and then associate oneself with intrinsically oriented people is an important skill for *anyone* to have. Intrinsic types would need the skill to find cooperative partners to rely on, and extrinsic types would need the skill to find trusting partners to exploit (Frank, 1990). This suggests that it would be desirable to assess the relative disposition and ability of intrinsically and extrinsically oriented people to recognize and assort with each other.

One plausible hypothesis currently being researched is that intrinsic people are, on average, better than extrinsic persons at identifying and associating themselves with intrinsic persons. Since they are at a disadvantage within-groups, intrinsic persons would need to have such a group-level skill in order to survive and thrive. Intrinsic types may achieve this via the feelings of belongingness (Baumeister & Leary, 1995), relatedness (Deci & Ryan, 1991), or communion (Bakan, 1966) that they quickly feel in each other's presence—that is, such shared feelings might be used by intrinsically oriented persons as a guide for selecting themselves into benign groups (Frank, 1990). In contrast, extrinsically oriented persons may be less capable of generating or responding to such feelings.

A final issue worth discussing concerns the interactionist approach to personality. As noted earlier, this approach attempts to identify important situational variables which moderate the effect of personality dispositions upon various outcomes (Higgins, 1990; Kenrick & Dantchik, 1983). In the current research we have explored a new type of situational moderator variable, specifically, *the extent to which an individual is grouped with others like him/herself,* examining its effect on individuals' economic outcomes within an iterated social dilemma. We believe this type of multilevel approach may afford a new way of considering the long-term viability or broader social implications of a personality trait, by revealing what might happen if those with a given trait became predominant in the population. Thus the approach may hold promise for helping to integrate group, personality, and evolutionary psychologies.

REFERENCES

Allison, S. T., & Messick, D. M. (1985). Effects of experience on performance in a replenishable resource trap. *Journal of Personality and Social Psychology*, **49**, 943–948.

Amabile, T., Hill, K., Hennessey, B., & Tighe, E. (1994). The Work Preference Inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology*, **66**, 950–967.

Angyal, A. (1941). *Foundations for a science of personality.* New York: Commonwealth Fund.

Axelrod, R. (1984). *The evolution of cooperation*. New York: Basic Books.

Bakan, D. (1966). *The duality of existence.* Boston: Beacon Press.

Baumeister, R., & Leary, M. (1995). The need to belong: Desire for interpersonal attachment as a fundamental human motivation. *Psychological Bulletin*, **117**, 497–529.

Brewer, M. B. (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin*, **17**, 475–482.

Brewer, M. B., & Kramer, R. M. (1986). Choice behavior in social dilemmas: Effects of social identity, group size, and decision framing. *Journal of Personality and Social Psychology*, **50**, 543–549.

Bruins, J. J., Liebrand, W. B., & Wilke, H. A. (1989). About the salience of fear and greed in social dilemmas. *European Journal of Social Psychology*, **19**, 155–161.

Bryk, A. S., & Raudenbush, S. (1992). Hierarchical linear models for social and behavioral research: Applications and data analysis methods. Newbury Park, CA: Sage Publications.

Caporael, L. R., & Brewer, M. B. (1995). Hierarchical evolutionary theory: There is an alternative, and it's not creationism. *Psychological Inquiry*, **6**, 31–34.

Caporael, L. R., Dawes, R. M., Orbell, J. M., & Van de Kragt, A. J. (1989). Selfishness examined: Cooperation in the absence of egoistic incentives. *Behavioral and Brain Sciences*, **12**, 683–699.

Cohen, J. & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences.* Hillsdale, NJ: Erlbaum.

Dawes, R. M., van de Kragt, A. J., & Orbell, J. M. (1990). Cooperation for the benefit of us: Not me, or my conscience. In J. J. Mansbridge (Ed.), *Beyond self-interest* (pp. 97–110). Chicago: University of Chicago Press.

Dawkins, R. (1976). *The selfish gene.* New York: Oxford University Press.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, **19**, 109–134.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on motivation* (pp. 237–288). Lincoln, NE: University of Nebraska Press.

Du Preez, P. (1996). The evolution of altruism: A brief comment on Stern's "Why do people sacrifice for their nations?" *Political Psychology*, **17**, 563–567.

Edney, J. J. (1980). The commons problem: Alternative perspectives. *American Psychologist*, **35**, 131–150.

Frank, R. H. (1990). A theory of moral sentiments. In J. J. Mansbridge (Ed.), *Beyond self-interest* (pp. 71–96). Chicago: University of Chicago Press.

Goldstein, K. (1939). *The organism*. New York: American Book Company.

Hardin, G. (1968). The tragedy of the commons. *Science*, **162**, 1243–1248.

Higgins, E. T. (1990). Personality, social psychology, and person-situation relations: Standards and knowledge activation as a common language. In L. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 301–338). New York: Guilford Press.

Higgins, E. T., & Kruglanski, A. W. (Eds). (1996). *Social psychology: Handbook of basic principles*. New York: Guilford Press.

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

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Well-being correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin*, **22**, 281–288.

Kasser, T. , Ryan, R. M., Zax, M., & Sameroff, A. J. (1995). The relations of maternal and social environments to late adolescents' materialistic and prosocial values. *Developmental Psychology*, **31**, 907–914.

Kenny, D. A., Kashy, D., & Bolger, N. (1998). Analysis strategies for multi-level data: An overview and evaluation of approaches. In D. T. Gilbert, S. T. Fiske, & L. Gardner (Eds.), *The handbook of social psychology* (Vol. 2, 4th ed). Boston: McGraw-Hill.

Kenrick, D. T., & Dantchik, A. (1983). Interactionism, idiographics, and the social psychological invasion of personality. *Journal of Personality*, **51**, 286–307.

Kenrick, D. T., & Funder, D. C. (1988). Profiting from controversy: Lessons from the person-situation debate. *American Psychologist*, **43**, 23–34.

Knapp, A., & Clark, M. (1991). Some detrimental effects of negative mood on individuals' ability to solve resource dilemmas. *Personality and Social Psychology Bulletin*, **17**, 678–688.

Komorita, S., & Parks, C. (1994). *Social dilemmas.* Madison, WI: Brown & Benchmark.

Komorita, S., & Parks, C. (1995). Interpersonal relations: Mixed-motive interaction. *Annual Review of Psychology*, **46**, 183–207.

Kramer, R. M., McClintock, C. G., & Messick, D. M. (1986). Social values and cooperative response to a simulated resource conservation crisis. *Journal of Personality*, **54**, 576–592.

Kuhlman, D. M., Brown, C., & Teta, P. (1992). Judgments of cooperation and defection in social dilemmas: The moderating role of judge's social orientation. In W. B. Liebrand, D. M. Messick, & H. A. Wilke (Eds.), *Social dilemmas* (pp. 111–132). Tarrytown, NY: Pergamon.

Kuhlman, D. M., & Marshallo, A. (1975). Individual differences in game motivation as moderators of preprogrammed strategy effects in prisoner's dilemma. *Journal of Personality and Social Psychology*, **32**, 922–931.

Kuhlman, D. M., & Wimberley, D. L. (1975). Expectation of choice behavior held by cooperators, competitors, and individualists across four classes of experimental game. *Journal of Personality and Social Psychology*, **32**, 922–931.

Liebrand, W. B. (1984). The effect of social motives, communication and group size on behavior in a *N*-person multi-stage mixed-motive game. *European Journal of Social Psychology*, **14**, 239–264.

Magnusson, D., & Endler, N. S. (Eds.). (1977). *Personality at the crossroads: Current issues in interactional psychology.* Hillsdale, NJ: Erlbaum.

Markus, H. R., & Kitayama, S. (1994). A collective fear of the collective: Implications for selves and theories of selves. *Personality and Social Psychology Bulletin*, **20**, 568–569.

Maslow, A. (1970). *Motivation and personality* (2nd ed.). New York: Harper & Row.

McAdams, Dan P. (1996). Personality, modernity, and the storied self: A contemporary framework for studying persons. *Psychological Inquiry*, **7**(4), 295–321.

McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review*, **96**, 690–702.

Messick, D. M., Allison, S. T., & Samuelson, C. D. (1988). Framing and communication effects on groups members' responses to environmental and social uncertainty. In S. Maital (Ed.), *Applied behavioral economics* (pp. 677–700). New York: New York University Press.

Messick, D. M., & McClintock, C. G. (1968). Motivational bases of choice in experimental games. *Journal of Experimental Social Psychology*, **4**, 1–25.

Parks, C. D. (1994). The predictive ability of social values in resource dilemmas and public goods games. *Personality and Social Psychology Bulletin*, **20**, 431–438.

Patchen, M. (1987). Strategies for eliciting cooperation from an adversary. *Journal of Conflict Resolution*, **31**, 164–185.

Poppe, M., & Utens, L. (1986). Effects of greed and fear of being gypped in a social dilemma situation with changing pool size. *Journal of Economic Psychology*, **7**, 61–73.

Pruitt, D. G., & Kimmel, M. J. (1977). Twenty years of experimental gaming: Critique, synthesis and suggestions for the future. *Annual Review of Psychology*, **28**, 363–392.

Rapaport, A., & Orwant, C. (1962). Experimental games: A review. *Behavioral Science*, **7**, 1–37.

Rogers, C. (1963). The actualizing tendency in relation to "motives" and to consciousness. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation* (Vol. 11, pp. 1–24). Lincoln: University of Nebraska Press.

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality*, **63**, 397–427.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, **57**, 749–761.

Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology*, **68**, 531–543.

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress but not all progress is beneficial. *Personality and Social Psychology Bulletin*, **24**, 546–557.

Sheldon, K. M., Ryan, R. M., & Reis, H. R. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin*, **22**, 1270–1279.

Smith, J. M. (1982). *Evolution and the theory of games*. Cambridge, UK: Cambridge University Press.

Sober, E., & Wilson, D. S. (1998). *Unto others: the evolution and psychology of unselfish behavior*. Cambridge, MA: Harvard University Press.

Van Lange, P. A. (1992). Rationality and morality in social dilemmas: The influence of Social Value Orientations. In W. B. Liebrand, D. M. Messick, & H. A. Wilke (Eds.), *Social dilemmas* (pp. 133–146). Tarrytown, NY: Pergamon.

Van Lange, P. A., & Kuhlman, D. M. (1994). Social value orientations and impressions of partner's honesty and intelligence: A test of the might versus morality effect. *Journal of Personality and Social Psychology*, **67**, 126–141.

Van Lange, P. A., Liebrand, W. B., Messick, D. M., & Wilke, H. A. (1992). Introduction and literature review. In W. B. Liebrand, D. M. Messick, & H. A. Wilke (Eds.), *Social dilemmas* (pp. 1–19). Tarrytown, NY: Pergamon.

Van Lange, P. A., Otten, W., De Bruin, E. M. N., & Joireman, J. A. (1997). Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence. *Journal of Personality and Social Psychology*, **73**, 733–746.

Wilson, D. S., & Sober, E. (1994). Reintroducing group selection to the human behavioral sciences. *Behavioral and Brain Sciences*, **17**, 585–654.