The Effect of Autonomous and Controlled Orientations on

Open versus Defensive Social Functioning

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Abstract

Previous research in the tradition of self-determination theory showed autonomous and controlled functioning to relate to open and defensive functioning in (close) personal relationships, respectively. The present study investigates whether autonomous and controlled orientations predict general open and defensive social functioning. Right-Wing Authoritarianism (RWA) and Social Dominance Orientation (SDO) were used as indicators of defensiveness and the empathy dimensions of perspective taking and empathic concern were used as indicators of openness. In a first, cross-sectional study, the autonomous causality orientation related positively to the openness indicators and negatively to the defensiveness indicators. The controlled causality orientation showed the opposite pattern of correlations. A longitudinal study replicated these findings, and showed that, whereas both causality orientations predicted over-time changes in SDO, for empathic perspective-taking, bidirectional cross-lagged relations were found. It is concluded that autonomous and controlled causality orientations do predict general open and defensive social functioning.

The Effect of Autonomous and Controlled Orientations on
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Some people readily explore and try to understand someone else's perspective on reality or show a warm concern for other's feelings. In contrast, other people perceive their social partners in preconceived and stereotyped ways, categorizing people exclusively through the lens of their own predefined schemes or ingroup values. Whereas the former display "openness" in their social interaction, the latter display a more "defensive" style in social interaction. Based on self-determination theory (Deci & Ryan, 2000; Vansteenkiste, Ryan, & Deci, in press), this study aims to examine whether individuals' dispositional tendency to function in an autonomous or controlled fashion (i.e., individual's general causality orientation) is predictive of openness versus defensiveness in social orientations relevant to prejudice. In doing so, this study aims to add to the literature examining associations between general causality orientations and social functioning in close relationships (Hodgins, Koestner, & Duncan, 1996; Knee, Lonsbary, Canevello, & Patrick, 2005; Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002) and interactions with somewhat more distant others (Deci & Ryan, 1987; Hodgins & Liebeskind, 2003; Hodgins, Liebeskind, & Schwartz, 1996). In one cross-sectional and one longitudinal study, we will examine the association between the causality orientations and open versus defensive social functioning. We expect an autonomous (resp. controlled) orientation to predict openness positively (resp. negatively) and to predict defensiveness negatively (resp. positively). The theoretical underpinnings of these predictions will be discussed in the next section.

Autonomous and Controlled Orientations

Within self-determination theory, two general modes of psychological functioning have been discerned (Deci & Ryan, 1985). When people function autonomously, they base their personal functioning primarily on personal interests or fully endorsed values. In contrast, people functioning in a controlled fashion typically orient themselves towards normative prescriptions, expectations from others or intrapersonal pressures (Deci & Ryan, 1985). Autonomous functioning is said to be associated with integrated self-structures and a sense of "true" or "secure" self-esteem (Deci & Ryan, 1995). Such integrated functioning provides one the required psychological energy to function without feeling immediately threatened (Hodgins & Knee, 2002), thus enabling one to

freely engage in ongoing events in an open and unpreserved fashion, that is, with "a readiness to perceive ongoing experience accurately" (Hodgins & Knee, 2002, p. 88). In contrast, controlled functioning is said to be associated with feeling pressured towards or "ego-invested" in certain modes of functioning and/or attaining particular outcomes. Reality is then more likely to be perceived through these pressures or "ego-invested" self-structures. Insofar that reality does not match these self-structures, reality might be approached in a conditional, preconceived, defensive way, and might be avoided, denied, or cognitively distorted as to maintain and protect one's ego-invested self-perceptions (Hodgins & Knee, 2002).

The notion that autonomous and controlled causality orientations would relate to open and defensive functioning respectively, has been empirically confirmed in both the social-cognitive and the interpersonal domain. In the social-cognitive domain, an autonomous causality orientation was found to relate to heightened private self-consciousness (i.e., awareness of one's own thoughts, feelings and standards; Deponte, 2004) as well as to an information-oriented identity style, which reflects an open-minded and active search for and evaluation of identity-relevant information (Soenens, Berzonsky, Vansteenkiste, Beyers, & Goossens, 2005). In contrast, a controlled causality orientation was found to relate to heightened self-monitoring (i.e., proneness to show "situation-appropriate" behavior and public self-consciousness; Deci & Ryan, 1985), as well as to a normative identity style, which reflects "a strong reliance on normative prescriptions and expectations from important authority figures" (Soenens, Berzonsky, et al., 2005, p. 432). In sum, an autonomous causality orientation seems to predict cognitive openness to self-relevant information, whereas a controlled causality orientation relates to viewing oneself through other's eyes and behaving in accordance with other people's expectations.

In the interpersonal domain, a controlled orientation was found to relate to a tendency to experience hostile feelings towards social partners (Deci & Ryan, 1985). Moreover, autonomy and control scores related positively and negatively, respectively, to openness and honesty in interaction with close others (Hodgins, Koestner, et al., 1996). Finally, in a series of scenario studies where participants imagined they had caused negative consequences to another person, Hodgins and Liebeskind (2003) found autonomous individuals to more readily take responsibility and offer excuses, while controlled individuals denied responsibility and even tended to use lies to conceal their responsibility (see also Hodgins, Liebeskind, et al., 1996). Research thus shows that an autonomous causality orientation predicts openness, respect and honesty in social relations,

whereas a controlled causality orientation relates to defensiveness towards social partners.

Most of these studies included indicators of open and defensive functioning in the interaction with close others (e.g., friends and romantic partners). Few studies, if any, examined how causality orientations relate to broader interpersonal attitudes and beliefs relevant to prejudice. Based on the ethnic prejudice literature in general and the work of McFarland (1998) in particular, we will consider the relation between causality orientations and three orientations relevant to prejudice (referred to by McFarland (1998) as the "Big Three"): empathic responses, right-wing authoritarianism, and social dominance orientation.

The "Big Three" of prejudice

Empathy. Davis (1983) distinguishes a cognitive component of empathic responses (i.e., perspective taking) from a more affective component (i.e., empathic concern). Both constructs entail openness towards others, whether it be towards the cognitive viewpoint or the emotional / affective experience of others. As such, Davis and Oathout (1987, 1992), for instance, found that people high on empathy convey a greater willingness to open themselves to other's thoughts and feelings. That is, both empathy dimensions predicted sensitivity and patience towards social partners, showing more understanding of and appreciation for others. Further, people scoring high on perspective taking have been found to perform better in estimating how other people think, feel or describe themselves (e.g., Bernstein & Davis, 1982; Kilpatrick, Bissonnette, & Rusbult, 2002).

Although no study has investigated the relationship between causality orientations and dimensions of empathy, some relevant indirect evidence does exist. Correlational and observational studies (e.g., Knee, et al., 2005) showed a more autonomous and less controlled orientation to relate to higher self-reported openness, as indexed by better understanding and greater exploration of other points of view, and lower interpersonal defensiveness, as indexed by withdrawal from the discussion, pretended agreement and blaming. Furthermore, in situations of conflict with a romantic partner, an autonomous orientation predicts less denial of the other's perspective (Knee, et al., 2002). In sum, some interpersonal attitudes that refer to aspects of interpersonal empathic responses could be positively predicted by an autonomous causality orientation and negatively predicted by a controlled orientation.

*Right-Wing Authoritarianism.*Right-Wing Authoritarianism (RWA) is conceived of as a social attitude involving rigid adherence to social conventions of the in-group, a high degree of

submission to perceived authorities of the in-group and authoritarian aggression towards those who do not submit to ingroup norms and established authorities (Altemeyer, 1988). Both conceptually and empirically, RWA can be interpreted as a stance of generalized defensive functioning. Conceptually, only behaviors or cognitions in line with social conventions or approved of by ingroup authorities are perceived valuable and any deviation from these conventions is warded off. Hence, individuals perceived to oppose ingroup norms will be approached with a defensive attitude and will be rejected, as entailed in the component of authoritarian aggression.

Empirically, associations have been found between RWA and various indices of defensive functioning, such as a normative identity style, low openness to experience (Duriez & Soenens, 2006) and various other indices of cognitive rigidity, including dogmatism, need for cognitive closure and low need for cognition (Van Hiel, Pandelaere, & Duriez, 2004). Given that RWA entails a strong orientation towards following socially imposed norms or values, we expect a positive association between a controlled causality orientation and RWA. Because individuals high on an autonomous orientation will disregard social norms when these do not fit one's personal beliefs or needs, we expect a null or even negative relation between autonomous orientation and RWA.

Social Dominance Orientation. Social Dominance Orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994) is defined as a general attitudinal preference for hierarchical (versus egalitarian) intergroup relations and the desire that one's ingroup is dominant and superior to the perceived outgroup. Research has shown strong associations between SDO and ethnic prejudice, nationalism, and cultural elitism (e.g., Duriez, Van Hiel, & Kossowska, 2005; Pratto, et al., 1994) and negatively to a pro-social orientation as shown in altruism, empathy, and agreeableness (e.g., Duriez & Soenens, 2006; Pratto et al., 1994). It is clear then that people high on SDO display a generally defensive and biased attitude towards outgroup members.

Herein we argue that the tendency of people high on SDO to approach others in a defensive and hierarchy-maintaining fashion results at least partly from a controlled orientation. That is, people functioning high on a controlled orientation are known to have a fragile sense of self-esteem and to feel internally pressured to protect their sense of self-worth (Deci & Ryan, 1985). As such, people high on a controlled orientation are likely to make sharp distinctions between their ingroup and outgroups and to evaluate their ingroup favorably in comparison to outgroups. These pressures are likely to lead one to adopt a socially aggressive attitude towards outgroups, as such an attitude would help them to protect their fragile ego and to derive a sense of

self-worth. In contrast, an autonomous orientation involves self-structures that are strongly anchored in one's core sense of self (Deci & Ryan, 1985). This firm base provides one with the necessary energy to approach others in an open-minded fashion. Others might be viewed as potentially enriching one's own views rather than as threatening for one's ego. For these reasons, autonomous functioning is expected to relate negatively to SDO, while a controlled orientation will be positively related to SDO.

Present Research

The main goal of this study is to examine associations between autonomous and controlled orientations and RWA, SDO, and empathy. We hypothesize that an autonomous causality orientation will be positively related to dimensions of empathy and negatively to RWA and SDO. In contrast, we hypothesize that a controlled causality orientation will relate negatively to the empathy dimensions and positively to RWA and SDO. These hypotheses will be addressed both in a cross-sectional (Study 1) and a longitudinal study (Study 2).

Deci and Ryan (1985, 1987) conceptualized causality orientations as personality characteristics, implying that causality orientations are conceptualised as antecedents of the social outcomes studied here. Indeed, according to several authors, both empathy (e.g., Soenens, Duriez, Vansteenkiste, & Goossens, 2005) and RWA/SDO (e.g., Duckitt, 2001) represent relatively malleable social orientations that are likely influenced by personality and socialization processes. According to this view, causality orientations are seen as predictors of empathy, RWA, and SDO. Few studies, however, directly assessed the direction of effects involved in associations between personality characteristics (such as causality orientations) and the Big Three of prejudice. Therefore, in Study 2, we will examine whether causality orientations predict over-time changes in empathy, RWA and SDO. Simultaneously, we will examine whether reciprocal effects exist, with causality orientations and indicators of social functioning mutually influencing each other.

STUDY 1

Method

Participants

Data were collected from 513 first and second year bachelor students in psychology from a large university in Belgium. Students participated in a group testing session and received course

credit for their participation. The final sample consisted of 438 women (85%) and 75 men (15%). Mean participant age was 18.90 (SD = 1.40) ranging between 17 and 31 years. Given the large sample size of 513 participants, we only consider p-levels smaller than .01 as significant.

Measures

All measures were presented in Dutch, the participant's mother tongue, and all items were answered on 5-point Likert scales ranging from 1 *(completely disagree)* to 5 *(completely agree)*.

Causality orientations. Participants' autonomous and controlled causality orientations were assessed using the Dutch version of the shortened General Causality Orientations Scale (GCOS; Soenens, Berzonsky, et al., 2005), which consists of 12 vignettes briefly describing specific situations, (e.g., "You have been offered a new position in a company where you have worked for some time."). Each vignette or situation is followed by two responses, reflecting the autonomous orientation (e.g., "I wonder if the new work will be interesting.") and the controlled orientation (e.g., "Will I make more at this position?"). Participants were asked to indicate the extent to which each response reflected how they would act, feel, or think in this situation. The GCOS yielded two reliable 12-item scale-scores: Autonomous orientation (Cronbach's alpha = .76, M = 4.18; SD = 0.37) and controlled orientation (Cronbach's alpha = .70, M = 2.87; SD = 0.46).

Empathy. Participants rated the perspective taking and empathic concern subscales from the Dutch version of Davis' (1983) Interpersonal Reactivity Inventory (Duriez, 2004; Soenens, et al., 2007). Perspective taking measures the tendency to adopt the cognitive viewpoint of others in everyday life (7 items, e.g., "I sometimes find it difficult to see things from the other person's point of view" – reverse coded; Cronbach's alpha = .66; M = 3.65; SD = 0.48). Empathic concern measures the tendency to experience compassion and concern for others (7 items, e.g., "I often have tender, concerned feelings for people less fortunate than me"; Cronbach's alpha = .69; M = 3.78; SD = 0.50).

RWA. Participants rated a Dutch version of Altemeyers (1988) shortened 11-item RWA scale (Meloen, Van der Linden, & De Witte, 1996; e.g., "Obedience and respect for authority are among the most important virtues children should learn"). This scale assesses the extent to which individuals adhere to societal norms and rules, uncritically submit to authority figures, and display signs of hostility towards norm violators, and has been used in various previous studies (e.g., Duriez et al., 2005). After reversing the negatively worded items, Cronbach's alpha was .71 (M = 2.67; SD = 0.51).

SDO. Participants completed the Dutch version of Pratto, et al.'s (1994) 14-item balanced SDO-scale (Van Hiel & Duriez, 2002), measuring the extent to which individuals prefer intergroup relations to be hierarchical versus egalitarian (e.g., "Some people are inferior to others."). This translated scale has been used in various previous studies (e.g., Duriez & Van Hiel, 2002; Soenens, Duriez, & Goossens, 2005). After reversing the negatively worded items, Cronbach's alpha was .87 (*M* = 2.20; *SD* = 0.58).

Results

Preliminary Analyses

Preliminary analyses were performed to examine gender and age differences. A multivariate analysis of variance (MANOVA) revealed a significant gender effect [Pillai's Trace = 0.99, $F(6, 506)$ = 13234.54, $p < .001$]. Separate One-way ANOVAs showed that, in comparison to males, females scored higher on autonomous orientation (females: *M* = 4.20, *SD* = 0.37; males: *M* = 4.05, *SD* = 0.35; $F(1,511)$ = 10.81, $p < .01$), empathic concern (females: *M* = 3.84, *SD* = 0.47; males: *M* = 3.42, *SD* = 0.55; $F(1,511)$ = 50.41, $p < .001$) and RWA (females: *M* = 2.70, *SD* = 0.50; males: *M* = 2.53, *SD* = 0.55, $F(1,511)$ = 7.08, $p < .01$). In addition, empathic concern correlated negatively with age (*r* = -.13, $p < .01$). Given these gender and age differences, we decided to control for gender and age in the primary analyses.

Primary Analyses

Table 1 shows the correlations between all study variables. The autonomous orientation showed a positive relation with both empathy dimensions and a negative relation with RWA and SDO, whereas the controlled causality orientation showed the opposite correlation pattern. To test our main hypotheses more accurately, we used structural equation modeling with latent variables in which two predictors (autonomous and controlled orientation) simultaneously predicted the four criterion variables (perspective taking, empathic concern, RWA, and SDO). In this way, we (a) controlled for shared variance in both the predictor variables and the criterion variables, and (b) controlled for measurement error. In total, eight latent constructs were modelled, that is, gender, age, autonomy, control, perspective-taking, empathic concern, RWA, and SDO. Gender and age were each represented by one manifest indicator (with the loading of the indicator set to 1 and the error variance set to 0). The other latent variables were represented by item parcels. Specifically, three parcels were created for each latent variable. For example, the latent variable autonomy was

constructed using three parcels, each consisting of four randomly selected autonomy items. In estimating all models, manifest indicators were allowed to relate only to their intended latent variable (i.e., without cross-loadings). We used several fit indices to evaluate the different structural equation models: Chi-square (χ^2), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). A combined cut-off of .06 for RMSEA and .09 for SRMR suggests good model fit (Hu & Bentler, 1999).

The primary analyses proceeded in two steps. First, we tested the quality of the measurement model by means of Confirmatory Factor Analysis (Model 1). We estimated the measurement model using 20 observed variables (i.e., 18 parcels, gender and age) to indicate 8 latent variables (autonomy, control, perspective-taking, empathic concern, RWA, SDO, gender, and age). Estimation of this model suggested good fit, $\chi^2(144) = 331.654$; RMSEA = .045; SRMR = .044. All parcels had a strong loading on their latent factor (all *p*s < .001; mean λ = .70). In a second structural model, we examined the direct effects of both autonomy and control orientation on perspective-taking, empathic concern, RWA, and SDO. This model had the same fit indices as the measurement model. Figure 1 displays the standardized path coefficients. In line with our hypotheses, autonomous orientation was positively related to both empathy dimensions and negatively to RWA and SDO. The control orientation showed the expected opposite pattern of associations.

<center>Brief Discussion</center>

The findings from this cross-sectional study confirmed our hypotheses. The autonomous causality orientation was positively related to openness in social relations, as indexed by perspective taking and empathic concern, and was negatively related to defensiveness in social relations, as indexed by RWA and SDO. The controlled causality orientation showed the opposite pattern of correlations, negatively relating to both empathy dimensions and positively relating to RWA and SDO. These findings are in line with Hodgins' and Knee's (2002) reasoning that autonomous and controlled orientations are related differentially to measures of open versus defensive functioning. To the best of our knowledge, the present results are among the first to confirm this reasoning in the domain of prejudice dispositions. The results show that the relations that were previously found in relations with primarily close others can be extended to people that fall beyond the scope of one's social network (i.e., to people with whom one has not necessarily already interacted). It appears that autonomously functioning individuals are more empathic

towards others, stick to their ingroup norms less rigidly and are less likely to approach members of other groups that hold different norms aggressively, whereas the opposite is true for controlled functioning individuals.

STUDY 2

An important shortcoming of Study 1 is its cross-sectional design, which does not allow us to draw any conclusions regarding direction of effects. To overcome this weakness, we conducted a second longitudinal study. The main question of this study is whether autonomous and controlled causality orientations predict over-time changes in the indicators of open and defensive social functioning or whether, conversely, changes in causality orientations are predicted by the social orientations. Such a longitudinal design enables us to examine the potential dynamic interplay between causality orienations and social orientations. Although causality orientations are conceived as broader personality characteristics (Deci & Ryan, 1987) that predict interpersonal empathic functioning and relatively malleable social attitudes such as RWA and SDO (Duckitt, 2001; Duriez, Van Hiel, & Kossowska, 2003; Van Hiel, Pandelaere, & Duriez, 2004), it is also plausible that interpersonal functioning and social attitudes would predict surface-personality causality orientations over time for the following reasons.

First, empathy might lead to more autonomous and less controlled functioning. Whereas the natural exploratory tendency inherent in autonomous functioning (Deci & Ryan, 1985) can entail a curiosity in other people's emotions and thoughts, an open-minded exploration of other people's perspective may also broaden the perspective on one's own experiences. In line with this, Deci, La Guardia, Moller, Sheiner, and Ryan (2006) reported that receiving and providing autonomy-support (which entails being empathic) in friendships was positively related, suggesting a mutuality effect, and that both the experience of receiving and giving autonomy-support yielded an unique positive association to ones own autonomous functioning. Hence, the provision of empathy seems to elicit autonomy-support from others, which may facilitate one's own autonomous functioning.

Regarding RWA and SDO, Roccas, Sagiv, Schwartz, and Knafo (2002) have noted that, although personality traits are more likely to influence attitudes, the other causal direction might also be possible. A stronger emphasis on submission to ingroup norms and values (i.e., a higher score on RWA) can lead to a stronger focus on controlled adherence to these social expectations, as exhibited in a controlled causality orientation. Moreover, both RWA and SDO entail a one-sided view on social partners, who are either viewed in terms of (not) meeting ingroup norms, values or

expectations, or as potential competitive in a struggle over status, money, and resources. Perceived "agitators" or (potential) competitors are disregarded in an a priori, stereotyping fashion, which could lead to less satisfying interactions. The latter less-than-optimal interactions may result in less autonomous and more controlled personal functioning (Deci et al., 2006).

To get a better view on these alternative points of view, Study 2 aims to take a closer look at the direction of effects between causality orientations and perspective taking, empathic concern, RWA and SDO, thereby examining the possibility of both unidirectional and bidirectional associations between both sets of constructs. As we do not have any strong hypotheses on uni- and/or bidirectionality between causality orientations and the four indicators of social functioning, the second study is more exploratory in nature.

Method

Participants

The first wave of data collection was conducted at the end of November 2006 (= Time 1) and consisted of 193 first year bachelor students in psychology from a large university in Belgium (*Mean age* = 18.20; SD = 0.80; 20 % male). Students participated in a group testing session and received course credit for their participation. The second wave was conducted in the beginning of March 2007 (= Time 2). Approximately 81% of the initial sample participated in the second wave (N = 156; *Mean age* = 18.30; SD = 0.80; 15 % male). A logistic regression analyses tested if sample attrition (drop-out = 0; retention = 1) was predicted by age, gender (male = 0; female = 1), and all study variables at Time 1. Age and gender were entered in Step 1, and autonomy, control, perspective-taking, concern, RWA, and SDO were entered in Step 2. Model χ^2 for Step 1 was significant ($\chi^2(2)$ = 20.46, p<.001). Retention was predicted by being older (odds ratio = 2.80, $p < .01$) and by being female (odds ratio = 5.13, $p < .001$). The predictors in Step 2 added significantly to the prediction ($\chi^2(6)$ = 14.84, $p < .05$). More specifically, retention was predicted by scoring higher on RWA (odds ratio = 4.20, $p < .01$), which is an interesting finding in its own right. Apparently, individuals who rigidly comply with ingroup norms and values were also more compliant in filling out a follow-up questionnaire. The results need to be interpreted against the background of this finding.

Measures

The same measures as in Study 1 were used. Descriptive statistics and Cronbach's alphas

of the study variables at both measurement moments are as follows: Autonomous causality orientation [Time 1: *M* = 4.14, *SD* = 0.38, alpha = .74; Time 2: *M* = 4.12, *SD* = 0.33, alpha = .66], controlled causality orientation [Time 1: *M* = 2.98, *SD* = 0.40, alpha = .60; Time 2: *M* = 2.85, *SD* = 0.46, alpha = .71], perspective taking [Time 1: *M* = 3.61, *SD* = 0.54, alpha = .75; Time 2: *M* = 3.71, *SD* = 0.53, alpha = .75], empathic concern [Time 1: *M* = 3.76, *SD* = 0.59, alpha = .80; Time 2: *M* = 3.76, *SD* = 0.62, alpha = .80], RWA [Time 1: *M* = 2.89, *SD* = 0.48, alpha = .72; Time 2: *M* = 2.80, *SD* = 0.49, alpha = .74], and SDO [Time 1: *M* = 2.26, *SD* = 0.58, alpha = .86; Time 2: *M* = 2.10, *SD* = 0.60, alpha = .89]. Stability coefficients range from .50 to .81 (See Table 2).

Results

Preliminary Analyses

Several repeated measures ANOVAs with measurement time as within-subjects variable and the respective study variables as dependent variables were run to investigate mean-level changes in the study variables. A significant mean-level increase was observed in perspective taking [*M*(T1)= 3.61, *SD* = 0.54; *M*(T2) = 3.71, *SD* = 0.53; $F(1,155)$ = 8.74, $p < .01$, partial η^2 = .05], while significant mean-level decreases were observed for controlled orientation [*M*(T1)= 2.98, *SD* = 0.40; *M*(T2) = 2.85, *SD* = 0.46; $F(1,155)$ = 15.07, $p < .001$, partial η^2 = .09], RWA [*M*(T1)= 2.89, *SD* = 0.48; *M*(T2) = 2.79, *SD* = 0.49; $F(1,155)$ = 10.98, $p = .001$, partial η^2 = .07], and SDO [*M*(T1)= 2.26, *SD* = 0.58; *M*(T2) = 2.10, *SD* = 0.60; $F(1,155)$ = 27.99, $p < .001$, partial η^2 = .15]. Significant gender differences were revealed using a multivariate analysis of variance (MANOVA) with gender as between subjects-variable and the study variables at both measurement moments as dependent variables [Wilk's Λ = 0.77, $F(12,143)$ = 3.49, $p < .001$, partial η^2 = .23]. Univariate ANOVAs at Time 1 indicated gender differences for concern ($F(1, 154)$ = 20.90, $p < .001$, partial η^2 = .12) and SDO ($F(1, 154)$ = 8.01, $p < .01$, partial η^2 = .05). Females scored higher on concern (females: *M* = 3.86, *SD* = 0.55; males: *M* = 3.29, *SD* = 0.59), and lower on SDO (females: *M* = 2.20, *SD* = 0.55; males: *M* = 2.56, *SD* = 0.65). Similarly, at Time 2, females scored higher on concern (females: *M* = 3.85, *SD* = 0.58; males: *M* = 3.24, *SD* = 0.63; $F(1, 154)$ = 20.07, $p < .001$, partial η^2 = .13), and lower on SDO (females: *M* = 2.05, *SD* = 0.57; males: *M* = 2.37, *SD* = 0.66; $F(1, 154)$ = 5.86, $p < .05$, partial η^2 = .04). In addition, at Time 2, females scored lower on controlled orientation (*M* = 2.81, *SD* = 0.46) than males [*M* = 3.02, *SD* = 0.41; $F(1, 154)$ = 4.35, $p < .05$, partial η^2 = .03]. At Time 1, age was significantly negatively related with a controlled orientation ($r = -.18$, $p < .05$) and RWA ($r = -$

.24, *p* < .01). Given these age and gender differences, we decided to control for gender and age in all subsequent structural equation analyses. Table 2 shows the correlations between all study variables. Correlations generally confirm our hypotheses, although, compared to Study 1, empathic concern and SDO were mainly related to autonomous causality orientation, while RWA was mainly related to controlled causality orientation.

Primary Analyses

Two sets of structural equation analyses were conducted. First, we investigated the replicability of the cross-sectional model of Study 1. Second, we ran unidirectional and bidirectional models estimating over-time relations between causality orientations and the social orientations. The same fit indices as in Study 1 are used in these analyses, i.e., χ^2, RMSEA and SRMR.

Cross-sectional Model. At Time 1, we investigated the replicability of the cross-sectional model obtained in Study 1. Estimation of the measurement model, using 20 observed variables (i.e., 18 parcels, gender and age) to indicate 8 latent variables (autonomy, control, perspective-taking, empathic concern, RWA, SDO, gender, and age), suggested acceptable fit, $\chi^2(144) = 264.232$; RMSEA = .073, SRMR = .066. All parcels had a strong loading on their latent factor (all *p*s < .001; mean λ = .71, range between .43 and .86). Subsequently, in Model 1, we tested whether autonomy and control orientation were significant predictors of perspective-taking, concern, RWA and SDO. Fit indices of this model are identical to the fit-indices of the measurement model. Generally, our Study 1 model was replicated, although some of the relations were somewhat less strong compared to Study 1. Standardized path coefficients and significance levels are displayed in Figure 1.

Longitudinal Measurement Models. Initially, we estimated a measurement model including 16 latent constructs (i.e., autonomy orientation, controlled orientation, perspective-taking, concern, RWA, and SDO at both measurement points, gender and age). However, due to our sample size being smaller than the number of estimated parameters, estimates were unreliable. Hence, to reduce the ratio of number of estimated parameters versus number of participants, it was deemed most appropriate to run four separate longitudinal models rather than one encompassing model. Each of the four measurement models consisted of 8 latent constructs: gender, age, the two causality orientations (T1 and T2) and one of the social orientation dimensions (T1 and T2). In each model, the measurement errors of the same indicators at both measurement points were

allowed to covary (Burkholder & Harlow, 2003). To examine whether the factor loadings in the measurement models were invariant across time, we initially allowed the factor loadings in each measurement model to vary by measurement point and next compared each initial model to a model in which the factor loadings were set equivalent across the two measurement points. In each of the model comparisons, we did not find significant increases in χ^2 when constraining the factor loadings to be equal across time, attesting to the over-time invariance of our measurement models. Each measurement model showed adequate fit to the data, as shown in Table 3. In each model, all factor loadings were highly significant ($p < .001$), overall ranging between .46 and .94. Mean lambdas were .66, .67, .65 and .71 for perspective-taking, empathic concern, RWA, and SDO, respectively. Over all four models, the mean lambda for autonomy was .67 (ranging between .61 and .72), for controlled orientation .60 (ranging between .46 and .88).

Uni- and bidirectional models. In a next set of analyses, we tested and compared four models for each of the four social orientation constructs. In each model, factor loadings were set equivalent across measurement times, and latent constructs were allowed to covary within time. First, a baseline autoregressive model specified only autoregressive effects and within-time correlations between the latent constructs. Second, two unidirectional cross-lagged models were tested: One allowing paths from the T1 causality orientations to the respective T2 social orientation construct, the other allowing paths from the respective T1 social orientation construct to the T2 causality orientations. In a third step, we estimated a reciprocal model specifying cross-lagged paths from causality orientations to the social orientation construct and vice versa. Fit indices of the 16 estimated models are displayed in Table 3. We will now provide detailed results for each examined model.

The baseline autoregressive model for perspective taking showed acceptable fit. Compared to this model, both the unidirectional model including paths from causality orientations to perspective taking (Model 1a) and the unidirectional model including paths from perspective taking to causality orientations (Model 1b) showed evidence for a better fit to the data [$\Delta\chi^2(2) = 6.19$ and 4.99, $p < .05$ and $p = .08$, respectively]. The bidirectional model had a marginally better fit than Model 1a [$\Delta\chi^2(2) = 5.00$, $p = .08$] and clearly significantly better fit than Model 1b [$\Delta\chi^2(2) = 6.21$, $p < .05$]. The bidirectional model thus appeared to be the best fitting model and is shown in Figure 2. The autonomous causality orientation predicted increases in perspective taking ($\beta = .23$, $p < .05$), while the controlled orientation predicted decreases in perspective taking ($\beta = -.19$, $p < .05$).

Conversely, perspective taking tended to predict increases in autonomous orientation (β = -.18, p < .08) and predicted decreases in controlled orientation (β = -.15, p = .05).

The baseline autoregressive model for empathic concern showed acceptable fit. Neither the unidirectional model including paths from causality orientations to empathic concern (Model 2a) nor the unidirectional model including paths from empathic concern to causality orientations (Model 2b) showed better fit to the data than the baseline model [$\Delta\chi^2(2)$ = 0.10 and 0.99, ns, respectively]. No significant χ^2-decreases were observed comparing the bidirectional model to Model 2a [$\Delta\chi^2(2)$= 0.98, ns] and Model 2b [$\Delta\chi^2(2)$= 0.10, ns]. Thus, no longitudinal associations between causality orientations and concern or vice versa were observed.

The baseline autoregressive model for RWA showed acceptable fit. Neither the unidirectional model including paths from causality orientations to RWA (Model 3a) nor the unidirectional model including paths from RWA to causality orientations (Model 3b) fitted the data better than the baseline model [$\Delta\chi^2(2)$ = 0.75 and 0.17, ns, respectively]. No significant χ^2-decreases were found comparing the bidirectional model to Model 3a [$\Delta\chi^2(2)$ = 0.15, ns] and Model 3b [$\Delta\chi^2(2)$ = 0.72, ns]. No longitudinal associations between causality orientations and RWA or vice versa were thus obtained.

The baseline autoregressive model for SDO showed acceptable fit. Compared to this model, the unidirectional model including paths from causality orientations to SDO (Model 4a) showed a better fit to the data [$\Delta\chi^2(2)$ = 6.89, p < .05]. The unidirectional model including paths from SDO to causality orientations (Model 4b) did not fit the data better compared to the baseline model [$\Delta\chi^2(2)$ = 1.47, ns]. Although the bidirectional model did fit the data better than Model 4b [$\Delta\chi^2(2)$ = 6.54, p < .05], the bidirectional model did not show fit the data better than Model 4a [$\Delta\chi^2(2)$= 1.39, ns]. The best fitting model (Model 4a) is shown in Figure 3. In this model, the autonomous causality orientations predicted over-time decreases in SDO (β = -.14, p < .05), while the controlled causality orientation predicted increases in SDO (β = .15, p < .05).

Brief Discussion

Study 2 replicated the findings of Study 1, showing reliable cross-sectional relations between causality orientations and the social orientation constructs. Regarding the novel aspect of Study 2, that is, the longitudinal relations, results varied by the social orientation involved. For perspective-taking, the bidirectional model showed the best fit to the data, while analyses suggested

unidirectional effects from causality orientations to SDO. For both empathic concern and RWA, no longitudinal associations were observed above and beyond the auto-regressive coefficients.

GENERAL DISCUSSION

Autonomous versus controlled causality orientations were found to reliably predict open versus defensive social functioning. Study 1 yielded a clear pattern of results. Essentially the autonomous causality orientation positively predicted openness in social functioning (as indexed by perspective taking and empathic concern) and negatively predicted general defensiveness in social functioning (as indexed by RWA and SDO). The controlled causality orientation showed the opposite pattern: It negatively predicted empathic functioning, and positively predicted RWA and SDO. Study 2 generally replicated these findings and extended them by examining the longitudinal interplay between causality orientations and the social orientations relevant to prejudice.

First, longitudinal analyses showed cross-lagged relations between the causality orientations and perspective taking. That is, the autonomous and controlled causality orientations at Time 1 predicted increases and decreases, respectively, in perspective taking. Being oriented towards self-endorsed and volitional goals thus seems to promote increases in individual's openness to other people's perspective. Conversely, people who function on the basis of internally and externally controlling cues seem to increasingly shut themselves off from the perspective of others. Both findings are in line with Hodgins' and Knee's (2002) reasoning that autonomous and controlled functioning relate differentially to openness versus defensiveness in social relationships. From the perspective of self-determination theory, acting in an autonomous fashion engenders vitality and energy (Moller, Deci, & Ryan, 2006) which might enable one to take the perspective of others more openly. Indeed, trying to take the internal frame of reference of others requires psychological energy, which is more likely to be available when one acts upon one's core interests and values. In contrast, living up to externally or internally pressuring demands is likely to be energy draining, such that one has no energy left anymore to take the perspective of others. At the same time, perspective taking predicted a decrease in controlled causality orientation and tended to predict an increase in autonomous causality orientation. In other words, the capacity to take the others perspective seems to foster a more volitional orientation in one's own (motivational) functioning. Through the recognition of others' opinions, one may become more aware of one's own preferences and attitudes, thus increasing the possibility to act upon those self-endorsed preferences and decreasing the tendency to be governed by internal or external controls. Through

the opinion of others, one might gain greater insight in the ego-invested structures that co-determine one's own functioning, subsequently allowing one to turn away from these controlling behavioural guidances.

Second, we found unidirectional paths from the causality orientations to SDO. That is, autonomous and controlled causality orientations predicted decreases and increases in SDO, respectively. The psychological freedom underlying autonomous orientation enhanced an honest, unprejudiced perception of social partners perceived to belong to another social group. In contrast, clinging to ego-invested self-perceptions (as in a controlled causality orientation, Hodgins, Shiffman, Adair, Gordon, Wozniak, & Saavedra, 2006) seems to enhance the tendency to draw firm distinctions between one's ingroup and outgroups and to perceive a competition between both types of groups. These findings are in line with Hodgins' and Knee's reasoning that the tendency to hierarchically categorize social gropus (as is typical of people high on SDO) may be driven by attempts to protect and/or enhance one's fragile self-esteem.

Third, we did not find any cross-lagged relations between causality orientations and empathic concern nor RWA. Earlier research showed that heritability accounts for large portions of phenotypic variance in both empathic concern and RWA (Davis, Luce, & Kraus, 1994; McCourt, Bouchard, Lykken, Tellegen, & Keyes, 1999). Given their possibly genetic origins, changes in empathic concern and RWA may be less strongly driven by personality and socialization processes (see also Soenens et al., 2007). This reasoning is highly speculative, however, and more research is needed to confirm and replicate the current findings.

The current findings extend earlier research investigating the relations between general autonomous or controlled functioning and interpersonal interactions by showing that causality orientation not only affect social functioning in close and personal social interactions but also modes of social functioning that have broader implications for attitudes towards others and prejudice in particular. This research can be a first step to enrich the extant literature on the origins of dispositions to prejudice such as empathy, RWA and SDO theoretically and to infuse this literature with a theoretically strong motivational perspective. In this respect, self-determination theory, a broad macro-theory of motivation and personality, can prove its merit in the analysis of the development of prejudice dispositions (e.g., Duckitt, 2001).

Future Research

Further research is needed to explore the processes underlying these relations between the

causality orientations and general openness versus defensiveness in social relations. Following self-determination theory and Hodgins and Knee (2002), we think that a true, genuine versus fragile self-esteem might be responsible for the obtained results (see also Hodgins, Brown, & Carver, 2007). In a similar vein, Hodgins (2008) pointed to the level of integrity of self-structures, that is, less ego-invested and more integrated, as an important explanatory mechanism. Given a natural tendency towards integration of new experiences (Deci en Ryan, 1985), that is, recognizing the other's perspectives and experiencing other's emotions, one will be lead towards more autonomous and less controlled functioning. Another related variable that might mediate the relation between the causality orientations and our constructs of openness and defensiveness is basic psychological need satisfaction. For example, autonomous functioning entails an orientation towards elements that are in accordance with the basic psychological need for autonomy. One's need for autonomy is more likely to be satisfied when one's true interests or desires are guidelines for decisions or behavior. Furthermore, given a strong relation between self-determination theory's posited needs for autonomy, competence and relatedness (e.g., Vansteenkiste, Lens, Soenens, & Luyckx, 2006), general psychological need satisfaction enables the person to functioning more energetic. This provides extra energy to open one's mind to other's perspectives. We strongly urge researchers to include measures approximating different forms of self-esteem, ego-integrity, basic need satisfaction or vitality in follow-up research.

Limitations

This research has several limitations. First, results were obtained in samples of psychology students, with a typical majority of female students. Psychology students and especially females tend to have a more 'liberal' view on socio-political views, as can be witnessed in low scores on RWA or SDO (Duckitt, 2001). Hence these findings await further generalization in samples with more variation in terms of gender, age, and political views. Second, socially desirable answering could have biased participant's scores on the researched variables, influencing our results. The inclusion of a measure for desirable responding could allow us to statistically control for these effects. Third, a longitudinal research design is only a first indication of directionality in the relations. Experimental research might enable researchers to more stringently test the degree to which autonomy versus control leads to openness versus defensiveness, or vice versa. It was recently shown that motivational orientations can be manipulated by written instructions (e.g., Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005). Moreover, priming autonomy and control

by word-sentence tasks (e.g., Hodgins, Yacko, & Gottlieb, 2006) offers another possibility to manipulate autonomy and control. Priming autonomous and controlled functioning and examining analogous issues with respect to openness versus defensiveness in approaching more distal others, manipulated to differ from ingroup conventions or belonging to a perceived outgroup would constitute an interesting next step. Conversely, future research might attempt to prime or manipulate empathy, RWA, and SDO and examine the effects of such manipulations. For example, experimental manipulations encouraging participants to take the viewpoint of others in several situations, could have its effects on subsequent autonomous versus controlled functioning.

Conclusion

This study represents a twofold elaboration of Hodgins' and Knee's (2002) idea that autonomous and controlled functioning relates to respectively an attitude of openness versus defensiveness in close relations. In this study, openness was operationalized in terms of generalized interindividual differences in empathic functioning, and defensiveness was operationalized in terms of social-cognitive attitude dimensions that are known to predict more prejudiced attitudes and behaviors (i.e., RWA and SDO). Both cross-sectionally and longitudinally, findings support the hypothesis that autonomous (in contrast to controlled) functioning predicts an open, empathic orientation, and negatively predicts a defensive social attitude, as particularly reflected in the tendency to hierarchically categorize social groups (i.e., SDO).

References

Altemeyer, B. (1988). *Enemies of freedom: Understanding right-wing authoritarianism.* San Francisco: Jossey-Bass.

Bernstein, W. M., & Davis, M. H. (1982). Perspective taking, self-consciousness, and accuracy in person perception. *Basic and Applied Social Psychology, 3*, 1-19.

Burkholder, G. J., & Harlow, L. L. (2003). An illustration of longitudinal cross-lagged desing for structural equation models. *Structural Equation Modeling, 10*, 465-486.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology, 44*, 113-126.

Davis, M. H., Luce, C., & Kraus, S. J. (1994). The heritability of characteristics associated with dispositional empathy. *Journal of Personality, 62*, 369-391.

Davis, M. H., Luce, C., & Kraus, S. J. (1994). The heritability of characteristics associated with dispostional empathy. *Journal of Personality, 62*, 369-391.

Davis, M. H., & Oathout, H. A. (1987). Maintenance of satisfaction in romantic relationships: Empathy and relational competence. *Journal of Personality and Social Psychology, 53*, 397-410.

Davis, M. H., & Oathout, H. A. (1992). The effect of dispositional empathy on romantic relationship behaviors: Heterosexual anxiety as a moderating influence. *Personality and Social Psychology Bulletin, 18*, 76-83.

Deci, E. L., La Guardia, J. G., Moller, A. C., Scheiner, M. J., & Ryan, R. M. (2006). On the benefits of giving as well as receiving autonomy support: Mutuality in close friendships. *Personality and Social Psychology Bulletin, 32,* 313-327.

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. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, *53*, 1024-1037.

Deci, E. L., & Ryan, R. M. (1995). Human autonomy: The basis for true self-esteem. In M. Kernis (Ed.), *Efficacy, agency, and self-esteem* (pp. 31-49). New York: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227-268.

Deponte (2004) Linking motivation to personality: causality orientations, motives and self-descriptions, *European Journal of Personality,14*, 31-44.

Duckitt, J. (2001). A cognitive-motivational theory of ideology and prejudice. In M.P. Zanna (Ed.), *Advances in Experimental Social Psychology*. (Vol. 33, pp. 41-113). San Diego: Academic Press.

Duriez, B. (2004). Taking a closer look at the religion-empathy relationship: Are religious people nicer people? *Mental Health, Religion & Culture, 7*, 249-254.

Duriez, B., & Soenens, B. (2006). Personality, Identity Styles, and Authoritarianism: An integrative study among late adolescents. *European Journal of Personality, 20*, 397-417.

Duriez, B. & Van Hiel, A. (2002). The march of modern fascism. A comparison of Social Dominance Orientation and Authoritarianism. *Personality and Individual Differences, 32*, 1999-1213.

Duriez, B., Van Hiel, A, & Kossowska, M. (2005). Authoritarianism and social dominance in Western and Eastern Europe: The importance of the socio-political context and of political interest and involvement. *Political Psychology, 26*, 299-320.

Hodgins, H. S. (2008). *Autonomy and self-integration.* Manuscript under revision.

Hodgins, H. S., Brown, A. B., & Carver, B. (2007). Autonomy and control motivation and self-esteem. *Self and Identity, 6*, 189-208.

Hodgins, H. S. & Knee, C. R. (2002). The integrating self and conscious experience. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 87-100). Rochester, NY: University of Rochester Press.

Hodgins, H.S., Koestner, R., & Duncan, N. (1996). On the compatibility of autonomy and relatedness. *Personality and Social Psychology Bulletin, 22*, 227-237.

Hodgins, H.S., & Liebeskind, E. (2003). Apology versus defense: Antecedents and consequences. *Journal of Experimental Social Psychology, 39*, 297-236.

Hodgins, H.S., Liebeskind, E. & Schwartz, W. (1996). Getting out of hot water: Facework in social predicaments. *Journal of Personality and Social Psychology, 71*, 300-314.

Hodgins, H. S., Shiffman, S., Adair, K., Gordon, R., Wozniak, K., & Saavedra, Y. (2006). Clinging to positive feedback as a function of autonomy and control motivation. Poster presented at Society for Personality and Social Psychology Conference, Palm Springs, CA.

Hodgins, H. S., Yacko, H. A., & Gottlieb, E. (2006). Autonomy and nondefensiveness. *Motivation*

and Emotion, 30, 283-293.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criterai versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Kilpathick, S. D., Bissonnette, V. L., & Rusbult, C. E. (2002). Empathic accuracy and accommodative behavior among newly married couples. *Personal Relationships, 9*, 369-393.

Knee, C. R., Lonsbary, C., Canevello, A., & Patrick, H. (2005). Self-determination and conflict in romantic relationships. *Journal of Personality and Social Psychology, 89*, 997-1009.

Knee, C.R., Patrick, H., Vietor, N.A., Nanayakkara, A., & Neighbors, C. (2002). Self-determination as growth motivation in romantic relationships. *Personality and Social Psychology Bulletin, 28*, 609-619.

McCourt, K., Bouchard, T. J. Jr., Lykken, D. T., Tellegen, A., & Keyes, M. (1999). Authoritarianism revisited: genetic and environmental influences examined in twins reared apart and together. *Personality and Individual Differences, 27*, 985-1014.

McFarland, S. G. (1998). *Towards a typology of prejudiced persons.* Paper presented at the annual convention of the International Society for Political Psychology, Amsterdam, July.

Meloen, J. D., Van der Linden, G., De Witte, H. (1996). A Test of the Approaches of Adorno et al., Lederer and Altemeyer of Authoritarianism in Belgian Flanders: A Research Note. *Political Psychology*, 17, 643-656.

Moller, A. C., Deci, E. L., & Ryan, R. M. (2006). Choice and ego-depletion: The moderating role of autonomy. *Personality and Social Psychology Bulletin, 32,* 1024-1036.

Pratto, F., Sidanius, J., Stallworth, L.M., & Malle, B.F. (1994). Social Dominance Orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology, 67*, 741-763.

Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). Basic values and the Five Factor Model of Personality Traits. *Personality and Social Psychology Bulletin, 28*, 789-801.

Soenens, B., Berzonsky, M. D., Vansteenkiste, M., Beyers, W., & Goossens, L. (2005). Identity styles and causality orientations: In search of the motivational underpinnings of the identity exploration process. *European Journal of Personality, 18*, 1-16.

Soenens, B., Duriez, B., & Goossens, L. (2005). Social-psychological profiles of identity styles: Attitudinal and social-cognitive correlates in late adolescence. *Journal of Adolescence, 28*, 107-125.

Soenens, B., Duriez, B., & Goossens, L. (2005). Social-psychological profiles of identity styles: Attitudinal and social-cognitive correlates in late adolescence. *Journal of Adolescence, 28*, 107-125.

Soenens, B., Duriez, B., Vansteenkiste, M, & Goossens, L. (2007). The Intergenerational Transmission of Empathy-Related Responding in Adolescence: The Role of Maternal Responsiveness. *Personality and Social Psychology Bulletin, 33*, 299-311.

Van Hiel, A. & Duriez, B. (2002). Een meetinstrument voor individuele verschillen in Sociale Dominantie Oriëntatie [A scale to measure individual differences in Social Dominance Oriëntation]. *Nederlands Tijdschrift voor Psychologie en haar Grensgebieden, 57*, 114-116.

Van Hiel, A., Pandelaere, M., & Duriez, B. (2004). The impact of need for closure on conservative beliefs and racism: Differential mediation by authoritarian submission and authoritarian dominance. *Personality and Social Psychology Bulletin, 30*, 824-837.

Vansteenkiste, M., Lens, W., Soenens, B., & Luyckx, K. (2006). Autonomy and relatedness among Chinese Sojourners and Applicants: Conflictual or independent predictors of well-being and adjustment? *Motivation and Emotion, 30*, 273-282.

Vansteenkiste, M., Ryan, R. M., & Deci, E. L. (in press). Self-Determination Theory and the Explanatory Role of Psychological Needs in Human Well-being. in L. Bruni, F. Comim, & M. Pugno (Eds.), *Capabilities and happiness*. Oxford, UK: Oxford University Press.

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 2,* 483-501.

Table 1   *Correlations among manifest variables in Study 1*

	1.	2.	3.	4.	5.
1. Autonomy					
2. Control	.10				
3. Perspective Taking	.21 ***	-.24 ***			
4. Empathic Concern	.23 ***	-.18 ***	.28 ***		
5. RWA	-.15 **	.31 ***	-.21 ***	-.05	
6. SDO	-.28 ***	.27 ***	-.31 ***	-.32 ***	.44 ***

* *p* < .05; ** *p* < .01; *** *p* < .001

Table 2   *Correlations among manifest variables in Study 2 at Time 1 (T1) and Time 2 (T2)*

	01.	02.	03.	04.	05.	06.	07.	08.	09.	10.	11.
01. Autonomy (T1)											
02. Autonomy (T2)	.66 ***										
03. Control (T1)	.12	.03									
04. Control (T2)	-.09	-.04	.50 ***								
05. Perspective Taking (T1)	.31 ***	.32 ***	-.16 *	-.19 *							
06. Perspective Taking (T2)	.34 ***	.37 ***	-.23 **	-.19 *	.68 ***						
07. Empathic Concern (T1)	.27 **	.21 **	-.13	-.18 *	.26 **	.34 ***					
08. Empathic Concern (T2)	.21 **	.26 **	-.09	-.14	.20 *	.34 ***	.81 ***				
09. RWA (T1)	-.11	-.15	.26 **	.20 *	-.17 *	-.10	-.01	-.04			
10. RWA (T2)	-.07	-.09	.24 **	.19 *	-.09	.01	.08	.10	.70 ***		
11. SDO (T1)	-.33 ***	-.32 ***	.13	.11	-.32 ***	-.34 ***	-.46 ***	-.40 ***	.28 ***	.19 *	
12. SDO (T2)	-.34 ***	-.36 ***	.22 **	.11	-.28 ***	-.30 ***	-.44 ***	-.46 ***	.29 ***	.18 *	.80 ***

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3   *Fit Indices of the Different Cross-lagged Models*

	df	X^2	ΔX^2	RMSEA	SRMR
Perspective taking					
Model 2	141	262.061	$\Delta X^2(6) = 6.87$, n.s.	.0744	.0810
Autoregressive	147	277.051		.0755	.0852
Unidirectional GCO > PT	145	270.856	$\Delta X^2(2) = 6.19$, $p < .05$	.0748	.0850
Unidirectional PT > GCO	145	272.064	$\Delta X^2(2) = 4.99$, $p = .08$	.0752	.0812
Bidirectional	143	265.858	$\Delta X^2(2) = 5.00$, $p = .08$ / $\Delta X^2(2) = 6.21$, $p < .05$	.0745	.0810
Empathic concern					
Model 2	141	239.074	$\Delta X^2(6) = 12.26$, $p < .06$	.0670	.0743
Autoregressive	147	247.685		.0665	.0758
Unidirectional GCO > EC	145	247.581	$\Delta X^2(2) = 0.10$, n.s.	.0676	.0758
Unidirectional EC > GCO	145	246.699	$\Delta X^2(2) = 0.99$, n.s.	.0673	.0758
Bidirectional	143	246.599	$\Delta X^2(2) = 0.98$, n.s. / $\Delta X^2(2) = 0.10$, n.s.	.0684	.0759
RWA					
Model 2	141	236.347	$\Delta X^2(6) = 12.24$, $p < .06$	.0661	.0704
Autoregressive	147	243.509		.0651	.0729
Unidirectional GCO > RWA	145	242.763	$\Delta X^2(2) = 0.75$, n.s.	.0660	.0723
Unidirectional RWA > GCO	145	243.336	$\Delta X^2(2) = 0.17$, n.s.	.0661	.0726
Bidirectional	143	242.613	$\Delta X^2(2) = 0.15$, n.s. / $\Delta X^2(2) = 0.72$, n.s.	.0670	.0721
SDO					
Model 2	141	235.414	$\Delta X^2(6) = 11.73$, $p < .07$	.0657	.0794
Autoregressive	147	248.827		.0669	.0831
Unidirectional GCO > SDO	145	241.940	$\Delta X^2(2) = 6.89$, $p < .05$	.0657	.0808
Unidirectional SDO > GCO	145	247.090	$\Delta X^2(2) = 1.47$, n.s.	.0674	.0825
Bidirectional	143	240.550	$\Delta X^2(2) = 1.39$, n.s. / $\Delta X^2(2) = 6.54$, $p < .05$	.0663	.0805

Note: Model 2 = Measurement model with invariance constraints. GCO = General Causality Orientations; PT = persective taking; EC = empathic concern. For the bidirectional models, the first ΔX^2 results from contrasting the model with the first unidirectional model and the second ΔX^2 results from contrasting the model with the second unidirectional model.

Figure Captions

Figure 1 Cross-sectional model representing autonomous and controlled causality orientations as predictors of perspective taking, empathic concern, RWA and SDO. Coefficients are standardized path coefficients. First coefficients refer to Study 1, second coefficients refer to Study 2 (Time 1). For sake of clarity, gender and age effects are not shown. + *p* < .10; * *p* < .05; ** *p* < .01; *** *p* < .001

Figure 2. Cross-lagged model representing relations between autonomous and controlled causality orientations and perspective taking. Coefficients are standardized path coefficients. For sake of clarity, gender and age effects are not shown. + *p* < .08; * *p* =< .05; ** *p* < .01; *** *p* < .001

Figure 3 Unidirectional model 4a representing cross-lagged relations between autonomous and controlled causality orientations and SDO. Coefficients are standardized path coefficients. For sake of clarity, gender and age effects are not shown. * *p* =< .05; ** *p* < .01; *** *p* < .001
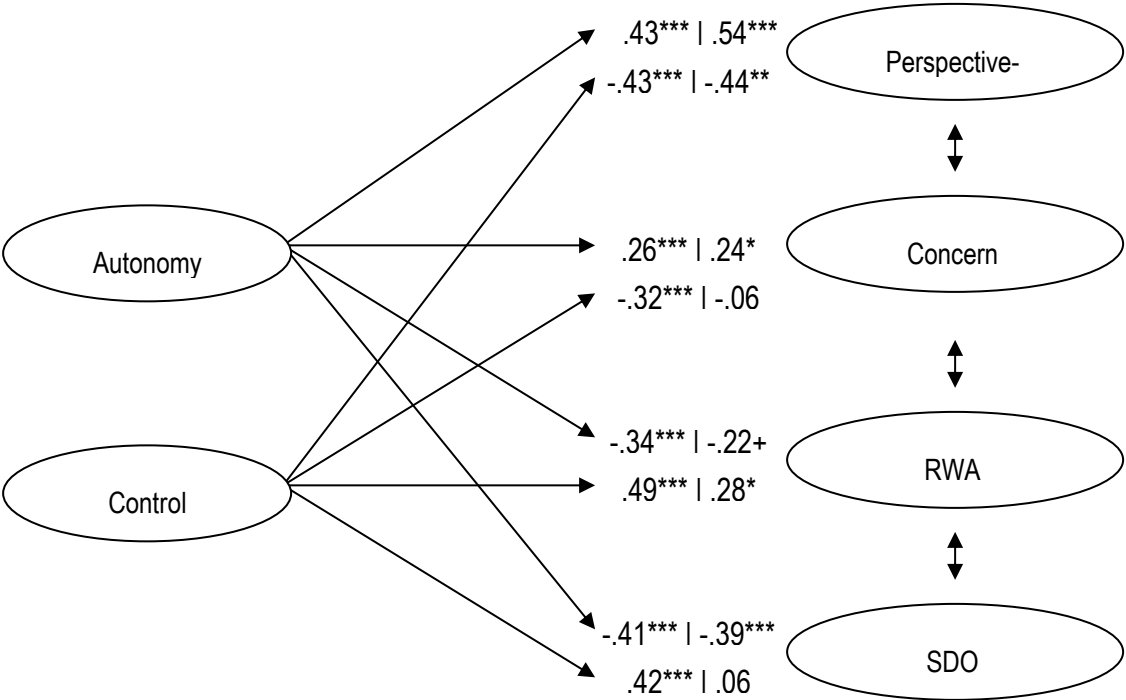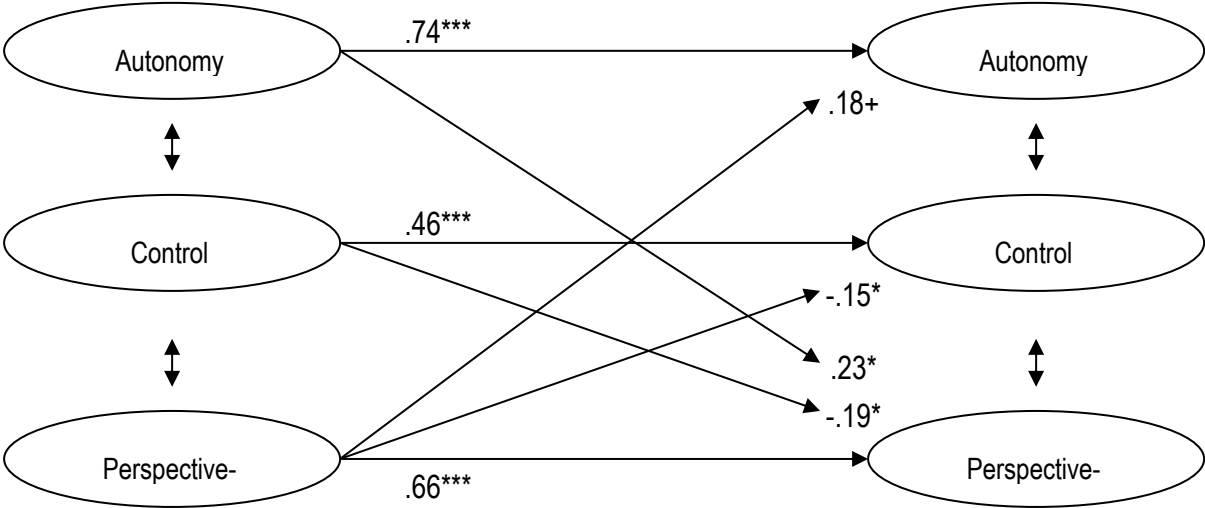
Figure 1

Figure 2

Figure 3