

Do Some People Need Autonomy More Than Others? Implicit Dispositions Toward Autonomy Moderate the Effects of Felt Autonomy on Well-Being

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Abstract

The present studies examined whether implicit or explicit autonomy dispositions moderate the relationship between felt autonomy and well-being. Study 1 ($N = 187$ undergraduate students) presents an initial test of the moderator hypothesis by predicting flow experience from the interaction of autonomy need satisfaction and autonomy dispositions. Study 2 ($N = 127$ physically inactive persons) used vignettes involving an autonomy (un)supportive coach to test a moderated mediation model in which perceived coach autonomy support leads to well-being through basic need satisfaction. Again, the effects of need satisfaction on well-being were hypothesized to be moderated by an implicit autonomy disposition. Study 1 showed that individuals with a strong implicit autonomy (but not power or achievement) motive disposition derived more flow experience from felt autonomy than individuals with a weak implicit autonomy disposition. Study 2 revealed that perceived autonomy support from sports coaches, which we experimentally induced with a vignette method, leads to autonomy satisfaction, leading in turn to positive effects on well-being. This indirect effect held at high and average but not low implicit autonomy disposition. The results indicate that the degree to which people benefit from autonomy need satisfaction depends on their implicit disposition toward autonomy.

According to self-determination theory (SDT), all individuals need autonomy, competence, and relatedness, and they reap well-being benefits from the satisfaction of these basic psychological needs (Deci & Ryan, 1985a, 2000). The present research principally agrees with this assumption but refers to recent research that has extended this position by focusing on personality variables as moderators of the need satisfaction–well-being relationship. SDT researchers have already mentioned the potential moderating function of motives (e.g., Ryan & Deci, 2000, p. 329) but have yet to pay much empirical attention to them. In contrast, Schüler and colleagues conducted studies showing that the positive effects of competence and relatedness need satisfaction on well-being outcomes are stronger for individuals with a high implicit achievement and affiliation motive (as defined and measured by McClelland's [1985] dispositional motive approach) than for individuals with a weak corresponding motive (Schüler & Brandstätter, 2013; Schüler, Brandstätter, & Sheldon, 2013; Schüler, Sheldon, & Fröhlich, 2010). This research was predicated on the notion that implicit motive dispositions index the types of experiences that are particularly rewarding to people, and so

those experiences should also be particularly satisfying when they are encountered. It is still unclear, however, whether the effects of the third and arguably most important basic need proposed by self-determination theory—the need for autonomy—are similarly moderated by implicit motive dispositions. Our first research aim was to fill this empirical gap by conducting two studies examining whether an implicit autonomy disposition moderates the effects of autonomy need satisfaction on flow experience and well-being.

A second research aim was to test this moderator hypothesis in a more complex model that also allowed for stronger causal inferences. Research based on the theoretical framework of self-determination theory (Deci & Ryan, 1985a, 2000) has shown that autonomy support provided by coaches, superiors, teachers, or parents leads to basic need satisfaction in athletes, subordinates, students, and children, which in turn results in

greater well-being, intrinsic motivation, and performance (Adie, Duda, & Ntoumanis, 2008; Reinboth, Duda, & Ntoumanis, 2004; Sheldon & Krieger, 2007; for overviews about autonomy support effects, see, e.g., Ryan & Deci, 2008). To date, however, this research has not explored in any depth whether everyone reaps the well-being benefits of an autonomy-supportive context to the same extent. In other words, to date previous research has not tried to explain variance in the positive outcome effects via individual differences. Identifying these individual difference moderators may reveal that autonomy-supportive interventions in sports, at the workplace, and in schoolwork could be stronger for some persons and weaker for others, an important point to consider when designing and implementing interventions. Therefore, we tested whether an autonomy-supportive context produces greater well-being through felt autonomy *depending on one's* autonomy disposition. Below, we consider the relevant theories and issues in greater detail.

The SDT Model of the Causes and Effects of Basic Need Satisfaction

Self-determination theory (Deci & Ryan, 1985a, 2000) proposes three basic psychological needs, which are “innate psychological nutrients that are essential for ongoing psychological growth, integrity, and well-being” (Deci & Ryan, 2000, p. 229). These needs include the need for competence (i.e., the need to feel a sense of mastery through effective interaction with the environment) and the need for relatedness (i.e., the need to feel attached to significant others). The third need, which we focus on in the present research, is the need for autonomy, defined as the desire to experience choice and psychological freedom (Vansteenkiste, Niemiec, & Soenens, 2010). Self-determination theory draws on deCharms's (1968/1983) conceptualization of personal causation to define autonomy as “the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self” (Deci & Ryan, 2000, p. 231).

The three basic needs are assumed to be innate and their satisfaction a necessary condition for human flourishing. A convincing body of research confirms the important effects of basic need satisfaction on psychological and physiological well-being and behavioral change across numerous life domains (Adie et al., 2008; Jang, Reeve, Ryan, & Kim, 2009; Luyckx, Vansteenkiste, Goossens, & Duriez, 2009; Lynch, La Guardia, & Ryan, 2009; Reinboth & Duda, 2006; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005; Sheldon & Niemiec, 2006; Williams, Niemiec, Patrick, Ryan, & Deci, 2009).

Regarding the causes of basic need satisfaction, SDT researchers focus on social environments that hinder or facilitate need satisfaction. An important facet of the social environment is the autonomy support provided by people higher in social hierarchies to people who are lower (Ryan & Deci,

2008), such as superiors to subordinates in the workplace, teachers to students in schools, and doctors to patients in hospitals. Autonomy-supportive behavior is characterized by providing subordinates with choices for behaviors, taking subordinates' perspectives, providing plausible rationales for unavoidable rules and orders, and using a communication style that is not overly controlling (Deci, Eghrari, Patrick, & Leone, 1994). Previous research has shown that organizational contexts and leaders that support subordinates' experience of autonomy cause subordinates to experience higher levels of well-being, exhibit higher-quality motivation, and perform better (e.g., Ryan & Deci, 2008; Vansteenkiste et al. 2010; cf. Deci & Ryan, 1987), in line with some early research and theory by Lewin, Lippitt, and White (1939) on democratic versus autocratic or laissez-faire organizational climates. Further, autonomy support has been shown to produce these positive outcomes through the satisfaction of basic psychological needs (e.g., Adie et al., 2008; Reinboth et al., 2004; Sheldon & Krieger, 2007). For example, Reinboth et al. (2004) and Adie et al. (2008; Adie, Duda, & Ntoumanis, 2012) found that autonomy-supportive coaching behavior predicted basic need satisfaction, which in turn predicted high vitality among young athletes.

An important view of SDT on needs is that they are “universal, innate and essential for well-being” (Deci & Ryan, 2000, p. 232) and that everybody benefits from basic need satisfaction in terms of enhanced motivation, well-being, and psychological growth (Deci & Ryan, 2000; cf. Prentice, Halusic, & Sheldon, 2014). Such an emphasis on universality means that all people will receive some level of well-being benefit from need-satisfying experiences. The postulate that need satisfaction is beneficial for everyone does not preclude the possibility that for some, a particular need's satisfaction may be especially beneficial, whereas others may develop less of an orientation toward that need, despite still enjoying such experiences. Nonetheless, with its assumption of universal need satisfaction effects, Deci and Ryan do not encourage any focus on individual difference moderators of the effects of need satisfaction on well-being (Deci & Ryan, 2000).

Motive Disposition Theory and the Moderation of Basic Need Effects

Another theoretical approach to human motivation shares some conceptual overlap with SDT but also has some divergent core assumptions. This is the dispositional motive approach developed by McClelland (1985), which is based on Murray's (1938) explorations in personality. Contemporary definitions of implicit motive dispositions hold that they are, essentially, the “capacity to experience the attainment of a certain type of incentive as rewarding” (Schultheiss & Hale, 2007, p. 13). A great deal of research from this tradition has focused on three implicit motive dispositions that are assumed to be crucial to describe and explain human behavior and

well-being. These are the implicit achievement motive (recurrent concern with surpassing standards of excellence; McClelland, Atkinson, Clark, & Lowell, 1953), the implicit affiliation motive (desire to build up and maintain stable and friendly interpersonal relations; French & Chadwick, 1956; McAdams & Bryant, 1987), and the implicit power motive (concern to influence and control other people; Winter, 1973). In the research tradition of McClelland (1985), it is assumed that people acquire implicit motive dispositions by learning processes in early childhood and differ in motive strength due to different learning experiences. In the case of the development of the implicit achievement motive, some children learn to associate successfully overcoming challenges with positive, rewarding feelings. Later in life, implicit achievement-motivated individuals dispositionally prefer tasks (e.g., at the workplace, in sports) in which they strive for excellence in order to obtain feelings of competence, such as through feedback about how well they are currently performing tasks (e.g., Brunstein & Schmitt, 2004).

As McClelland, Koestner, and Weinberger (1989) suggested, the affect-based implicit motives must be differentiated from consciously accessible values, or explicit motives. Explicit motives develop later in childhood than implicit motives, are responsive to social-extrinsic (rather than to task-inherent) incentives, predict consciously evaluated choices (rather than spontaneous behavior), and can be measured by self-reports (rather than by implicit motive measures, which we outline below). For greater detail about the differentiation of implicit and explicit motivational systems and further theoretical and methodological considerations, see McClelland et al. (1989) and Thrash, Maruskin, and Martin (2012).

In previous research, we have tested the hypothesis that implicit motive dispositions act as moderators of the effects of basic need satisfaction on domain-specific well-being (Schüler & Brandstätter, 2013; Schüler et al., 2013; Schüler et al., 2010). Following the implicit motive disposition characterization of needs, we assumed that because people can vary in their capacities to experience the attainment of certain types of incentives as rewarding, individuals with a strong motive to acquire a particular type of experience should react more strongly to basic need satisfaction that corresponds to that type of experience. We tested these moderation effects on flow experience, which is simultaneously a prototype of intrinsic motivation and a positive experiential quality (Csikszentmihalyi, 1990), and other facets of well-being. We found that, for example, people higher in the implicit achievement motive report greater well-being benefits from competence satisfaction in domains as diverse as sports, the workplace, and academic learning contexts (Schüler & Brandstätter, 2013; Schüler et al., 2013; Schüler et al., 2010). Likewise, the satisfaction of social-relatedness needs leads to stronger flow experience in sports for individuals with a stronger implicit affiliation motive (Schüler & Brandstätter, 2013). Together, these results support our hypothesis that the satisfaction of basic needs produces varying amounts of need satisfaction

for different people. Although the effects of the satisfaction of basic needs for competence and social relatedness have been shown to be moderated by corresponding implicit motives, it is still an open question whether autonomy need satisfaction effects are similarly moderated by a corresponding implicit disposition. This research question is interesting because the need for autonomy within self-determination theory is not as clearly operationalized in the implicit motive disposition literature as are the needs for competence and relatedness (cf. Sheldon, 2011). Further, it could be that autonomy does not follow the same dynamics as other needs because it is more fundamental to motivational processes than competence and relatedness and not subject to preference dynamics at the implicit level.

One obstacle facing the extension of our work to an implicit need for autonomy is that the three implicit motives whose measurement is most well validated are achievement, affiliation, and power. None of these implicit motives capture the essence of the need for autonomy, which is the need to experience one's behavior as reflecting core aspects of the self, such as interests, values, and personally endorsed goals. What is needed in order to answer our research question is an operationalization of the dispositional counterpart to the basic need for autonomy (i.e., a valid measure of an "implicit autonomy motive"). Next, we examine what an implicit measure of autonomy should measure and review the literature for efforts to do so.

Defining and Measuring the Implicit Autonomy Disposition

Interestingly, although motive researchers have discussed dispositional concerns for autonomy, this motive has rarely been empirically considered in contemporary motive disposition research (for exceptions, see Alsleben, 2008, and Burgess, 2004). This may be due, in part, to some lack of clarity around the construct in the disposition tradition. For example, Murray (1938) described the need for autonomy as a desire "To resist influence or coercion. To defy an authority or seek freedom in a new place. To strive for independence" (p. 82). McClelland (1975) and Schultheiss (2008) did not directly use the term *autonomy*, but differentiated "power over oneself" (a drive to determine one's own actions) from "power over others" (a drive to compel others; i.e., the core of the implicit power motive).

Despite these conceptual difficulties in the implicit motive disposition tradition, a scoring system exists that does seem capable of isolating an implicit preference for autonomy as it is described in self-determination theory. DeCharms articulated an individual difference in the preference for *origin experiences through personal causation* by stating that "the origin concept is describing a personal disposition when it is used to describe the extent to which some people (more than others) seek origin experiences (1968/1983, p. 326). DeCharms and

Plimpton (1992) developed an implicit measure of the need for origin experiences. Specifically, they developed six origin scoring categories for the picture story exercise (deCharms & Plimpton, 1992). The categories are (a) self-determined goal setting (a person independently determines his or her own goals), (b) instrumental activities to reach the goal (a person freely chooses the activity with which to pursue the goals), (c) reality perception (a person is realistic about his or her abilities and relationships with others), (d) personal responsibility (a person assumes personal responsibility for his or her own actions and the consequences thereof), (e) self-confidence (a person is self-confident about his or her ability to initiate successful behavior), and (f) personal causation (a person experiences himself or herself as the personal locus of causality of his or her behavior). The summarized scoring decisions are displayed in Table 1. As usual in motive content analyses, coders who were well trained in applying the scoring system independently scored stories for the origin categories, and inter-rater agreement was used to demonstrate test reliability (for more details about scoring procedures, see deCharms and Plimpton, 1992).

Only a few studies (mainly from the 1970s) tested the validity of the implicit origin score (e.g., deCharms, 1976) and addressed the development of individual differences in implicit origin disposition strength. With regard to the latter, Jackson (1973) found that implicit origin is related to the mother's parenting style (Jackson, 1973): The highest scorers on implicit origin disposition had mothers who gave moderate amounts of help without dominating the child. Notably, the results of Jackson (1973) are conceptually similar to findings from the SDT tradition that autonomy-supportive parenting is positively associated with an autonomous self-regulatory style in children (Grolnick & Ryan, 1989). A more recent validity study demonstrated that individuals who scored high in the implicit origin measure were less likely to comply with directives to discriminate against a disadvantaged group (Burgess, 2004).

Another candidate for measuring the implicit need for autonomy is provided by the "freedom motive" protocol (Kuhl

& Scheffer, 2012) for scoring the Operant Motive Test (OMT; Kuhl & Scheffer, 1999, 2012; Kuhl, Scheffer, & Eichstaedt, 2003). The OMT is a theoretical and methodological extension of picture story exercises such as Murray's Thematic Apperception Test (TAT; 1943) and shares the common feature that participants are presented with ambiguous pictorial stimuli (in the case of the OMT, 15 line drawings). However, rather than writing whole stories about the pictures, participants make up a story about a main character in each picture and then briefly answer four questions displayed along with each picture. The questions are as follows: "What is important for the person in this situation and what is the person doing?" "How does the person feel?" "Why does the person feel this way?" and "How does the story end?" The scoring categories for the freedom motive are (a) self-confidence (e.g., being open, enjoying new experiences), (b) status (conditional self-confidence; e.g., searching for recognition), (c) self-growth and self-regulation (e.g., learning about oneself), (d) self-protection (e.g., self-justification), and (e) devaluation of self (e.g., feeling unlike oneself). For further descriptions of the OMT procedure and its reliability and validity, see, for example, Baumann, Kaschel, and Kuhl (2005), Baumann, Kazén, and Kuhl (2010), Scheffer, Kuhl, and Eichstaedt (2003), and Kuhl et al. (2003).

Both the picture story exercise using the origin scoring system (henceforth called PSE-autonomy) as well as the OMT operationalization of the freedom motive (henceforth called OMT-autonomy) seem to be appropriate implicit autonomy dispositional counterparts for the basic need for autonomy. Both represent stable concerns to "experience volition, choice, and psychological freedom" (according to the definition of the basic need for autonomy provided by Vansteenkiste et al., 2010, p.138), upon which individuals appear to differ. Neither implicit autonomy measure reviewed here has been previously employed within SDT research. In this study, we compare the potential for both PSE-autonomy and OMT-autonomy measures to moderate the autonomy satisfaction-well-being link.

Finally, we have previously hypothesized and empirically confirmed that explicit motives do not moderate the effects of felt competence and relatedness on domain-specific well-being

Table 1 Scoring Decisions for deCharms and Plimpton's (1992, p. 347) Origin Scoring System

Scoring Categories	Scoring Rules
Personal causation	Does a character in the story show strong evidence of experiencing personal causation in the whole story in a freely chosen goal-setting sequence or in perceiving the situation as a challenge, or showing self-investment or engaging in noncompetitive play?
Goal setting	Does a major character in the story freely set a nonphysical-need goal that is explicitly stated and followed by some indication of activity or personal involvement in attaining the goal?
Instrumental activity	Does a major character in the story engage in a present, personally chosen activity to reach a goal?
Reality perception	Does a major character in the story show evidence of reality perception; that is, does he realistically talk about causes in the environment, motives in self and others, or blocks to reaching goals and plans to overcome them?
Personal responsibility	Does the character or the author show evidence explicitly stated of taking personal responsibility?
Self-confidence	Does a character in the story show self-confidence in his or her ability to attain a goal, state a positive outcome to a goal-setting sequence, or show emotion related to his or her originship?

(Schüler et al., 2010; Sheldon & Schüler, 2011). The reason is that explicit motives are conscious reflections about what a person needs that are moreover influenced by often inaccurate self-theories and the changing demands of the social environment. They do not capture the affect-based ingrained preferences that are implicit motives and do not represent the capacity to experience certain kinds of experiential-based incentives (e.g., feeling competent, experiencing oneself as close to others, and feeling autonomous) as rewarding. In the present research, we predict that the explicit autonomy disposition (e.g., as measured by the General Causality Orientations Scales, Deci & Ryan, 1985b, or by the Index of Autonomous Functioning, Weinstein, Przybylski, & Ryan, 2012) will not moderate the effects of autonomy satisfaction on domain-specific motivation and well-being.

Present Research

The major aim of the present research is to further highlight the role of individual differences by examining whether the moderation of basic need satisfaction effects by corresponding implicit motive dispositions, established for the competence and relatedness needs (Schüler & Brandstätter, 2013; Schüler et al., 2013; Schüler et al., 2010), also holds for the implicit autonomy need.

We hypothesized that the implicit autonomy disposition (but not the explicit autonomy disposition or the traditional implicit power or achievement motive dispositions) moderates the effects of autonomy need satisfaction on well-being such that the domain-specific well-being of people high in the implicit autonomy need will be particularly responsive to autonomy need satisfaction (or dissatisfaction). Further, in Study 2, we take the perception of authority autonomy support into account and examine whether the well-replicated effect in which autonomy satisfaction mediates the autonomy support–well-being link (Sheldon & Krieger, 2007) is also moderated by the implicit autonomy disposition. To be more precise, we hypothesized that there is a stronger indirect effect of autonomy support via need satisfaction among individuals high than among individuals low in implicit autonomy disposition (the conceptual model of this moderated mediation is illustrated in Figure 1).

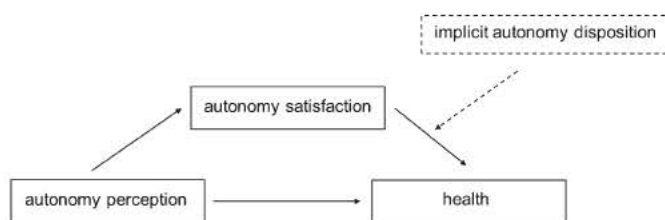


Figure 1 Conceptual model of the hypothesized moderated mediation model tested in Study 2 (solid and dashed lines). The moderation analysis (tested in Study 1 and Study 2) is presented in dashed lines.

STUDY 1: TESTING THE MODERATION HYPOTHESIS

Past research has shown that psychological need satisfaction leads to greater flow experience to the extent that people have matching implicit motives (i.e., motive–need satisfaction matching; see Schüler & Brandstätter, 2013; Schüler et al., 2010). This matching has been borne out for the implicit achievement motive and the implicit affiliation motive, but it has yet to be demonstrated for autonomy, perhaps in part because identifying appropriate implicit autonomy disposition measures is less straightforward than for more mainstream implicit motive constructs like needs for achievement and affiliation. Thus, the goal of Study 1 was to examine whether we could demonstrate implicit motive–need satisfaction matching effects on flow by employing two candidate measures of implicit autonomy disposition (PSE-autonomy and OMT-autonomy). Further, if it is the case that the implicit autonomy disposition in particular is responsive to the reward of autonomy satisfaction, then we expect to be able to demonstrate specificity such that the implicit power motive and implicit achievement motive will not moderate the satisfaction–flow relation.

Method

Participants and Procedure. We invited undergraduate students to take part in an Internet survey of creativity and goal striving by advertising in lectures and classes. Participants received extra course credit in return for their participation. One hundred sixty-three women and 24 men with a mean age of 21.6 years ($SD = 5.76$) completed the Web survey. Participants indicated their age and gender, filled in the implicit autonomy, power, and achievement measures (PSE and OMT);¹ and rated their autonomy satisfaction and flow experience while learning. The survey contained other variables that were collected to answer research questions unrelated to the present ones.

Measures

Picture Story Exercise. The picture story exercise is a valid and long-standing method to assess implicit motive dispositions (McClelland et al., 1989; Murray, 1943). We followed the guidelines by Schultheiss and Pang (2007) and asked participants to write imaginative stories about six pictures (i.e., boxer, women in a laboratory, ship captain, couple by the river, trapeze artists, nightclub scene). In our Web survey, we displayed a picture on the computer screen for 15 seconds, and then participants wrote a story about the picture within 4 minutes. We repeated this procedure for the following five pictures and stories.

We then applied deCharms and Plimpton's (1992) origin scoring system in order to code for participants' implicit autonomy disposition, as outlined in the Introduction (see also Table 1). Additionally, we used the power and achievement

categories of Winter's (1994) scoring system to assess the implicit power and achievement motives. A story is scored for power, for example, when participants write about "attempts to influence, persuade, convince, make or prove a point, argue" (Winter, 1994, p. 16). Achievement is scored when participants indicate a standard of excellence (e.g., mention of winning, unique accomplishment; Winter, 1994, p. 8). We summed up all subcategories across all pictures to compute implicit autonomy (PSE-autonomy), power (PSE-power), and achievement (PSE-achievement) motive scores.

One well-trained rater scored all stories of the whole sample, with a one-month interval between PSE-autonomy and PSE-power and PSE-achievement scoring. A second rater scored a subsample of 50 participants and also observed the one-month interval between autonomy and power and achievement scorings. The inter-rater reliabilities were high (intra-class correlation [ICC] coefficients: .85 for autonomy, .87 for power, and .73 for achievement). Disagreements between the raters were resolved through discussion. Because the motive scores were significantly correlated with the number of words written by the participants, we corrected the scores for word count. As suggested by Schultheiss and Pang (2007), we used regression analysis to residualize the implicit motive scores for word count and used the residual scores in the analyses reported below.

Operant Motive Test. We also derived measures of implicit autonomy and power and achievement motives from the OMT. Specifically, the OMT freedom categories were used to score for the implicit autonomy disposition (for a detailed description of the categories, see above). The OMT's power categories (e.g., "guidance, prosocial leadership," "status, having prestige and authority") and achievement categories (e.g., "flow," "internal standard of excellence") were used to assess the implicit power and achievement motive, respectively. Again, one rater scored the full set and one rater scored a subsample of 50 participants. The inter-rater agreements were high (ICCs: .88 for freedom, .90 for power, and .78 for achievement).

Autonomy Satisfaction. We measured autonomy satisfaction during the learning process using the Basic Psychological Needs Scale (Gagné, 2003; Kashdan, Julian, Merritt, & Uswatte, 2006). The Autonomy subscale consists of seven items (e.g., "I generally feel free to express my ideas and opinions") that partly were slightly adapted to the context of the study (e.g., "I feel pressured in my study" rather than "I feel pressured in my life"). Participants responded to the items using a rating scale ranging from 1 (*not at all true*) to 7 (*very true*; Cronbach's $\alpha = .75$).

Flow. We used the Flow Short Scale (FSS; Rheinberg, Vollmeyer, & Engeser, 2003) to measure flow experience. It consists of two subscales, one for Flow-Absorption (four items; e.g., "I am totally absorbed in what I am doing") and Flow-Automaticity (six items; e.g., "I feel that I have everything under control"). We asked participants to apply the statements to their typical learning activities and to use a 7-point scale to rate how strongly they agree with them (1 = *no agreement* to 7 = *full agreement*). We computed an overall flow score (Cronbach's $\alpha = .90$).

Results and Brief Discussion

Preliminary Analyses and Descriptive Statistics. Neither participant's age nor sex were significantly associated with any of the relevant variables, and they did not influence the results reported below. Table 2 shows means, standard deviations, and correlations between the assessed variables. The correlation between the implicit PSE- and OMT-autonomy disposition scores was significant ($r = .27, p < .001$). Implicit PSE-autonomy was unrelated to implicit PSE-power ($r = -.02, p = .761$), but related to implicit PSE-achievement ($r = .42, p < .001$), whereas implicit OMT-autonomy shared common variance with implicit OMT-power ($r = .18, p = .010$), but not with implicit OMT-achievement ($r = -.02, p = .757$). Table 2 also shows that autonomy satisfaction was positively correlated with flow ($r = .39, p < .001$).

Table 2 Study 1: Correlations Between Variables

		1	2	3	4	5	6	7	8	M	SD
1.	PSE-AUT	—	-.02	.42***	.27***	-.03	.19*	.11	-.01	8.81+	3.81
2.	PSE-POW		—	-.01	.15*	.13	-.05	-.12	-.13	5.68+	4.00
3.	PSE-ACH			—	.14*	-.01	.09	.07	-.09	6.25+	2.91
4.	OMT-AUT				—	.18*	-.02	.01	.04	2.33+	1.27
5.	OMT-POW					—	-.24**	.01	-.07	6.78+	2.00
6.	OMT-ACH						—	.05	.02	2.61+	1.10
7.	AUT sat							—	.39***	5.38	.94
8.	Flow								—	4.96	.73

Note. + values are unstandardized raw scores. PSE-AUT = implicit autonomy disposition measured using origin scoring system (deCharms & Plimpton, 1992); PSE-POW(/ACH) = implicit power (/achievement) dispositions measured using Winter's (1994) scoring system; OMT-AUT = implicit autonomy disposition measured using freedom categories of the OMT (Kuhl & Scheffer, 2012); OMT-POW(/ACH) = implicit power (/achievement) dispositions measured using OMT (Kuhl & Scheffer, 2012); AUT sat = autonomy satisfaction measured using the Basic Psychological Needs Scale (Gagné, 2003).

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

Moderation Analyses. In order to test the effects of the Implicit Autonomy Disposition \times Autonomy Satisfaction interaction on flow experience, we conducted separate hierarchical regression analyses for both implicit autonomy disposition scores (PSE, OMT). We first predicted flow from implicit PSE-autonomy, autonomy satisfaction, and their interaction. The main effects were entered as a first step (z -transformed variables), and the multiplicative interaction of both variables was entered in the second step. This analysis revealed a significant main effect of autonomy satisfaction on flow, $b = .19$, $se_b = .05$, $p < .001$, 95% CI [.091, .291], whereas implicit autonomy disposition was not a direct predictor of flow, $b = .02$, $se_b = .05$, $p = .770$; R^2 of Model 1 = .06, $p = .002$, 95% CI [-.085, .115]. In accordance with the hypothesis, the Implicit Autonomy Disposition \times Autonomy Satisfaction interaction was significant, $b = .12$, $se_b = .05$, $p = .029$, 95% CI [.013, .227]; ΔR^2 of Model 2 = .024, $p = .029$. We illustrate the nature of the interaction in Figure 2 using a procedure proposed by Cohen, Cohen, West, and Aiken (2003). Whereas participants with a low implicit autonomy disposition only slightly benefited from need for autonomy satisfaction (see dotted line), participants with a high implicit autonomy disposition were highly affected (see solid line). Supplementary analyses (employing a variant of the Johnson-Neyman

technique; see Aiken & West, 1991, p. 132) supported this descriptive result pattern by revealing that the difference between high and low need for autonomy satisfaction was not significant for individuals low in the implicit PSE-autonomy disposition (one standard deviation below the mean), $b = .072$, $se_b = .069$, $p = .297$, 95% CI [-.064, .207], but significant for individuals high in the implicit PSE-autonomy disposition (one standard deviation above the mean), $b = .311$, $se_b = .079$, $p < .001$, 95% CI [.154, .467].

The analysis using the implicit OMT-autonomy score also supported our hypothesis. We again found a main effect of autonomy satisfaction, $b = .19$, $se_b = .05$, $p < .001$, 95% CI [.091, .291], but no direct effect of implicit OMT-autonomy, $b = -.02$, $se_b = .05$, $p = .707$, 95% CI [-.120, .089]; R^2 of Model 1 = .06, $p = .002$. The OMT-Autonomy Disposition \times Autonomy Satisfaction interaction was significant, $b = .12$, $se_b = .06$, $p = .034$, 95% CI [.010, .238]; ΔR^2 of Model 2 = .022, $p = .034$. We displayed the pattern of the interaction in the lower part of Figure 2. Again, supplementary analyses showed that the difference between high and low need for autonomy satisfaction was not significant for individuals low in the implicit OMT-autonomy disposition (one standard deviation below the mean), $b = .068$, $se_b = .073$, $p = .355$, 95% CI [-.076, .212], but was significant for individuals high in the implicit OMT-autonomy disposition (one standard deviation above the mean), $b = .314$, $se_b = .081$, $p < .001$, 95% CI [.155, .473].

In order to test the specificity of the interaction effects, we then repeated the analyses reported above using the implicit PSE- and OMT-power and achievement motive scores, respectively, rather than the implicit autonomy scores. None of the analyses showed a significant interaction effect to predict flow. This supports our assumption that the interaction effect is specific for the implicit autonomy disposition (“power over oneself”), which corresponds better to the concept of need for autonomy.

Summing up the results of Study 1, the implicit PSE- and OMT-autonomy scores were significantly but weakly related, which is often the case for implicit motive measures (e.g., McClelland et al., 1989; Schüler, Brandstätter, Wegner, & Baumann, 2014; Spangler, 1992). In accordance with our moderation hypothesis, implicit PSE-autonomy and implicit OMT-autonomy but not the implicit power and achievement motive scores interacted with need for autonomy satisfaction in the prediction of flow.

STUDY 2: TESTING THE MODERATED MEDIATION HYPOTHESIS

In Study 2, we sought to test a moderated mediation model according to which autonomy support by coaches (which we introduced using vignettes) transmits its effects to well-being via autonomy need satisfaction. This indirect effect is assumed to be conditional: It should hold true among individuals high

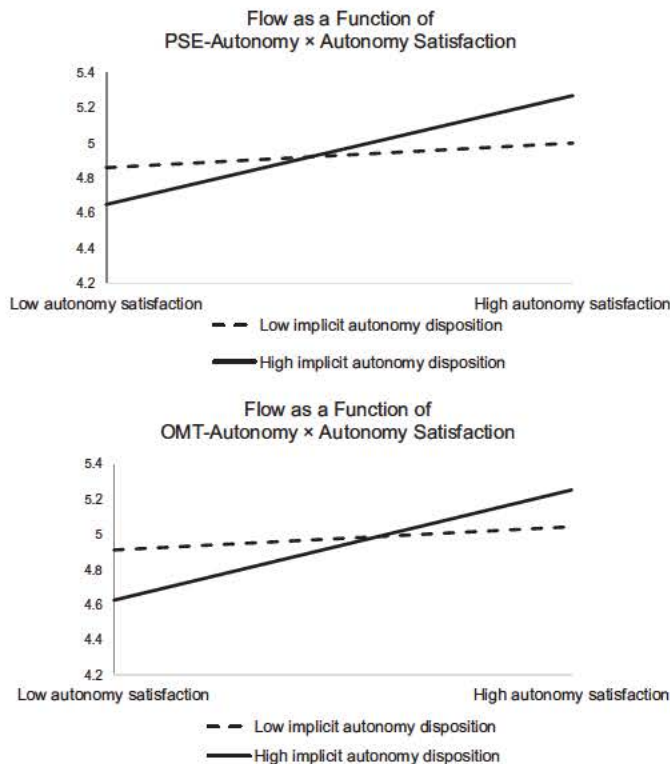


Figure 2 Study 1: The interaction effect of autonomy satisfaction and implicit autonomy disposition on flow experience with implicit autonomy disposition measured using PSE-autonomy (upper part) and OMT-autonomy (lower part).

but not low in implicit autonomy disposition. Stated differently, we expect people high in implicit need for autonomy in particular to benefit from the autonomy need satisfaction that comes from autonomy support. We used the implicit PSE-autonomy measure and also measured the autonomy disposition explicitly to test for specificity.

In order to test our hypotheses, we used a sample of physically inactive persons. This is due to the following rationale. Physical inactivity presents serious health risks, whereas engaging in sports has a broad range of positive health consequences (Biddle, Fox, & Boutcher, 2000; Bouchard, Shepard, Stephens, Sutton, & McPherson, 2000; Katzmarzyk, 2006; Mutrie, 2000). Past research has shown that low autonomy support from coaches and trainers leads to poorer forms of sports motivation (e.g., less self-determined, extrinsically motivated), which are known to predict dropout from sports (Amorose & Anderson-Butcher, 2007; Standage, Duda, & Ntoumanis, 2006). Understanding how sports-related well-being and motivation are impacted by personal and environmental factors may help health-related researchers and practitioners better design interventions to prevent physical inactivity and boost physical activity. Because physically inactive persons do not have (current) experiences with sports settings, we used a vignette method to experimentally induce perceived coach autonomy (un)support.

Summarizing our hypotheses for Study 2, we expected autonomy satisfaction to mediate the effect of perceived autonomy support on psychological well-being, replicating known findings (Adie et al., 2008; Reinboth et al., 2004). Furthermore, we expected implicit autonomy disposition (but not explicit autonomy disposition) to moderate the mediational effect of autonomy satisfaction such that the indirect effect is stronger for individuals with a strong implicit autonomy disposition.

Method

Participants and Procedure. Our sample consisted of 127 participants (45 males) with a mean age of 29.9 years ($SD = 13.9$, range: 15–64 years). We recruited participants by advertising (through email lists and in an Internet forum about health-oriented exercise) for a study on “sport climate and sport interest,” which was allegedly conducted to figure out the reasons why people may or may not perform sports on a regular basis. The inclusion criteria were that participants were not performing sports on a regular basis yet had the intention to do so. We gained a mixed sample of students at high school and university (39.5%), employees of the service sector (28.3%), employees of technical professions (11.0%), employees of social professions (10.2%), homemakers (4.7%), and other occupation groups (4.7%). Three respondents did not give information about their occupation.

Participants were randomly assigned to either an autonomy-supportive or an autonomy-unsupportive group and were provided booklets containing all study materials to be filled out at

home. Participants first completed the picture story exercise, followed by questionnaires unrelated to the research question (lasting about 5 minutes) in order to separate the implicit from the explicit autonomy disposition measure. They then filled out the explicit dispositional autonomy measure. Afterward, participants read general instructions about a vignette. It stated that coaches can have very different styles of how they coach their athletes and that all styles are good in their own ways. We then asked participants to vividly imagine that they already take part in a sports course (a course of their choice) and that they were actually experiencing the scenes the vignette described. They were encouraged to read the scenes, visualize them, and focus on their own thoughts and feelings. Then participants read the coach autonomy-(un)supportive vignette to which they were assigned. The scenes were created by taking seven items from the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996) and adapting them to the sports context (e.g., “I feel that my coach provides me choices and options”). Then to create the vignettes, each item was developed into a scene that represented the item well. For example, participants read, “Please imagine the following scene vividly: Your coach explains that there are different ways to carry out an exercise in your sport.” Participants in the autonomy-supportive coach group then read, “Your coach lets you choose the way you want to carry out the exercise,” whereas participants of the autonomy-unsupportive coach group read, “Your coach takes a decision without giving a rationale and determines the way you have to carry out the exercise.” Another example is “Your coach informs you that there is some money to buy sport equipment.” The autonomy-supportive coach group read, “Your coach informs you about the possibilities and involves you in decision making”; the autonomy-unsupportive coach group reads, “Your coach informs you about the possibilities, but decides by himself without involving you in decision making.”

We then asked participants to try to hold the scenes in memory while they completed the Basic Psychological Needs Scale (Sheldon & Hilpert, 2012), the Positive and Negative Affect Scale (German version; Krohne, Egloff, Kohlmann, & Tausch, 1996), and the Subjective Vitality Scale (Ryan and Frederick, 1997). Participants either personally handed the questionnaires in or mailed them in (both anonymized in a closed envelope). All participants were debriefed via mail and received a detailed description of the study procedure and the intention of measurement.

Measures

Implicit Autonomy Disposition. Implicit autonomy disposition was measured using the PSE with origin scoring system (deCharms & Plimpton, 1992) from Study 1. Because participants filled in the questionnaire at home, they received thorough written instructions for how to precede with the PSE. We asked them to set a timer for 4 minutes, look at each picture displayed on a separate page for about 15 seconds, and then start the clock and turn the page to start writing their story for

the allotted time. If they were still writing when the time was up, they were instructed to quickly finish the part of the story they were working on and move on. Participants were less incentivized and in a less structured environment than the student sample in Study 1, so we used only four pictures (i.e., boxer, ship captain, bicycle race, trapeze).

Two coders who independently scored the stories evidenced sufficient inter-rater agreement ($ICC = .85$). They resolved disagreements through discussion. We again corrected the implicit autonomy disposition raw score for word count, as in Study 1.

Explicit Autonomy Disposition. We measured explicit autonomy disposition using the Index of Autonomous Functioning (IAF; Weinstein et al., 2012). The IAF assesses the extent to which people do and desire to regulate themselves autonomously (e.g., “My decisions are steadily informed by things I want or care about”). The IAF is composed of three subscales—Authorship/Self-Congruence, Interest-Taking, and Susceptibility to Control (reversed)—and respondents rate the items using a 5-point scale ranging from 1 (*not at all true*) to 5 (*completely true*). The first author translated the scales into German. We computed an overall index of autonomous functioning by summing up the Authorship/Self-Congruence and Interest-Taking scales and subtracting the Susceptibility to Control scale. Cronbach’s alpha of the overall IAF was .65 (α for the subscales varied between .64 and .84).

Well-Being Measures. The instructions for the well-being measures, which are described in the following, asked participants to apply the statements to their sport.

Basic need satisfaction was assessed using a German version of the Basic Psychological Need Scale (BPNS; Sheldon & Hilpert, 2012; translation into German by the first author). Here, the three basic needs were measured using six items each. Examples for need for autonomy satisfaction are “I was free to do things my own way” and “I had to do things against my will” (reversed). Participants answered the items with reference to their sport using a 7-point rating scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

We measured *positive and negative affect* using a German version of the Positive and Negative Affect Schedule (PANAS; German version: Krohne, Egloff, Kohlmann, & Tausch, 1996). Participants rated 10 positive (e.g., interested, strong) and 10 negative adjectives (e.g., distressed, nervous) using a 7-point rating scale in order to indicate how strongly the statements refer to themselves (1 = *not at all* to 7 = *very much*).

We used Ryan and Frederick’s (1997) Subjective Vitality Scale (SVS; translation into German by the first author) to measure participants’ feelings of *vitality*. Participants used a 7-point rating scale (1 = *no agreement* to 7 = *full agreement*) to indicate their agreement with each of the seven items. Some items were slightly adapted to the domain of sport (e.g., “At this moment, I feel alive and vital” was changed to “In my sport, I feel alive and vital”).

Results and Brief Discussion

Preliminary Analyses and Descriptive Statistics. There were no differences between participants of the two experimental groups with regard to age, sex, and implicit and explicit autonomy disposition. Neither age nor gender influenced the results reported below. We observed a mean of 5.82 ($SD = 2.64$) for implicit autonomy disposition, a mean of 4.60 ($SD = 1.39$) for explicit autonomy disposition (Cronbach’s $\alpha = .76$), and a mean of 4.28 ($SD = 1.21$) for autonomy satisfaction (Cronbach’s $\alpha = .87$). Reliabilities of the dependent variables positive affect ($M = 3.43$, $SD = .83$), negative affect ($M = 1.87$, $SD = .76$), and vitality ($M = 4.31$, $SD = 1.26$) were high (Cronbach’s $\alpha = .90$, $.89$, and $.86$, respectively).

Group Differences. We first tested for main effects of experimental groups. Participants of the autonomy-supportive coach group reported significantly higher need satisfaction, $M = 5.27$, $SD = .96$, $t(125) = 10.31$, $p < .001$; higher positive affect, $M = 3.75$, $SD = .60$, $t(125) = 5.12$, $p < .001$; higher vitality, $M = 4.72$, $SD = .96$, $t(125) = 4.49$, $p < .001$; and lower negative affect, $M = 1.54$, $SD = .48$, $t(125) = -5.90$, $p < .001$, than participants in the autonomy-unsupportive coach groups (need satisfaction: $M = 3.27$, $SD = 1.21$; positive affect: $M = 3.05$, $SD = .90$; vitality: $M = 3.79$, $SD = 1.35$; negative affect: $M = 2.26$, $SD = .84$).

Mediation. We then tested a model in which autonomy satisfaction mediates from autonomy support to well-being, which has been found in previous research (e.g., Adie et al., 2012), using PROCESS (Preacher and Hayes, 2004, Model 4). The three analyses included positive affect, negative affect, and vitality as well-being outcome variables, respectively, and revealed significant indirect effects, which are described in detail in Table 3. The relationship was as expected: The experimental manipulation influenced autonomy satisfaction in such a way that participants of the autonomy-supportive group reported higher autonomy satisfaction than participants of the autonomy-unsupportive group. Autonomy satisfaction in turn predicted more positive affect and vitality positively and less negative affect.

Moderation. We conducted hierarchical regression analyses as in Study 1 (Step 1: Implicit Autonomy Disposition, Autonomy Satisfaction; Step 2: Implicit Autonomy Disposition \times Autonomy Satisfaction) for each of the three dependent variables (i.e., positive affect, negative affect, vitality) in order to test whether autonomy satisfaction had stronger positive effects for individuals with a strong implicit autonomy disposition than for individuals with a weak implicit autonomy disposition. In all analyses, autonomy satisfaction predicted well-being significantly (positive affect: $b = .43$, $se_b = .07$, $p < .001$, 95% CI [.301, .566]; vitality: $b = .61$, $se_b = .10$, $p < .001$, 95% CI [.412, .811]; negative affect: $b = -.40$, $se_b = .06$, $p < .001$, 95% CI [-.519, -.274]), whereas the implicit autonomy disposition was not a significant predictor

Table 3 Study 2: Results of Mediation Analyses

	Indirect Effect	X → M	M → Y	Direct Effect
Positive affect	$b = .44, se_b = .14$ 95% CI [.18, .73]	$b = 2.00, se_b = .19$ CI [1.61, 2.38]	$b = .22, se_b = .06$ CI [.10, .34]	$b = .25, se_b = .18$ CI [-.09, .60]
Negative affect	$b = -.34, se_b = .16$ 95 CI% [-.69, -.06]	$b = 2.00, se_b = .19$ CI [1.61, 2.38]	$b = -.17, se_b = .05$ CI [-.28, -.06]	$b = -.37, se_b = .16$ CI [-.69, -.06]
Vitality	$b = .64, se_b = .23$ 95 CI% [.16, 1.09]	$b = 2.00, se_b = .19$ CI [1.61, 2.38]	$b = .32, se_b = .09$ CI [.14, .50]	$b = .31, se_b = .27$ CI [.29, .27]

Note. X = predictor: perceived autonomy support; M = mediator: autonomy satisfaction; Y = outcome variable: well-being.

(positive affect: $b = .03, se_b = .08, p = .702, 95\% \text{ CI } [-.122, .181]$; vitality: $b = .12, se_b = .11, p = .298, 95\% \text{ CI } [-.108, .349]$; negative affect: $b = .01, se_b = .07, p = .995, 95\% \text{ CI } [-.139, .140]$). Most importantly, the Implicit Autonomy Disposition \times Autonomy Satisfaction interactions were significant in all three analyses (positive affect: $b = .15, se_b = .08, p = .050, 95\% \text{ CI } [.001, .304]$; vitality: $b = .28, se_b = .12, p = .019, 95\% \text{ CI } [.047, .507]$) or marginally significant (negative affect: $b = -.12, se_b = .07, p = .089, 95\% \text{ CI } [-.263, .019]$).

The result patterns were comparable to the results revealed by Study 1. Participants with a high implicit autonomy disposition were much more affected by strength of autonomy satisfaction than participants with a low implicit autonomy disposition. The former strongly benefited from autonomy satisfaction in terms of affect and experienced vitality and showed reduced well-being when autonomy satisfaction was thwarted. Supplementary analyses revealed that the difference between high and low need for autonomy satisfaction was significant for individuals high in the implicit autonomy disposition (positive affect: $b = .58, se_b = .10, p < .001, 95\% \text{ CI } [.378, .792]$; vitality: $b = .89, se_b = .16, p < .001, 95\% \text{ CI } [.576, 1.21]$; negative affect: $b = -.52, se_b = .10, p < .001, 95\% \text{ CI } [-.709, -.327]$). As in Study 1, the differences between high and low need for autonomy satisfaction were again weaker for individuals low in the implicit autonomy disposition, but this time they also reached statistical significance (positive affect: $b = .28, se_b = .10, p = .005, 95\% \text{ CI } [.086, .478]$; vitality: $b = .33, se_b = .15, p = .028, 95\% \text{ CI } [.037, .631]$; negative affect: $b = -.27, se_b = .09, p = .003, 95\% \text{ CI } [-.456, -.093]$).

Repeating the moderation analyses with the explicit autonomy disposition (Step 1: Explicit Autonomy Disposition, Autonomy Satisfaction; Step 2: Explicit Autonomy Disposition \times Autonomy Satisfaction) revealed no significant interaction effect (positive affect: $b = -.05, se_b = .07, p = .509, 95\% \text{ CI } [-.186, .093]$; vitality: $b = .11, se_b = .10, p = .273, 95\% \text{ CI } [-.090, .317]$; negative affect: $b = -.06, se_b = .06, p = .316, 95\% \text{ CI } [-.186, .060]^2$).

Moderated Mediation. We next tested whether the implicit and explicit autonomy dispositions moderate the mediation effects on well-being using Hayes's (2013) PROCESS macro for SPSS (Model 14; for the conceptual moderated mediation model, see Figure 1). We constructed moderated mediation

models testing each indicator of well-being with the implicit and explicit measures of autonomy disposition.

The analyses including the implicit autonomy disposition again showed significant Implicit Autonomy Motive \times Autonomy Satisfaction moderation effects, which we have already elaborated in detail above. Furthermore, the analyses of conditional indirect effects showed a consistent result pattern across all three dependent variables. In Table 4, the low and high levels of the moderator indicate one standard deviation below and above the mean level of implicit need for autonomy, respectively. As can be seen, the indirect effects for individuals with a weak implicit autonomy disposition were not significant, whereas they were significant for individuals with moderate and strong implicit autonomy disposition (Table 4). In other words, autonomy support has a positive effect on well-being through autonomy satisfaction only for those people who have at least an average score of implicit need for autonomy.

Repeating the moderated mediation analyses with the explicit autonomy disposition again revealed no significant Explicit Autonomy Disposition \times Autonomy Satisfaction moderation effects (see also moderation analyses above). The analyses of conditional indirect effects showed for all three dependent variables that autonomy satisfaction mediates the relationship between perceived coach autonomy support (experimentally induced by vignettes) and the outcome variables across all values of explicit autonomy dispositions tested. Thus, the explicit autonomy disposition did not function as a moderator of the mediation.

Supplementary Analyses. Theoretically, the implicit and explicit autonomy dispositions could also have their effects at another place in our mediation model: They could moderate the consequences of perceived autonomy support on basic need for autonomy satisfaction. We repeated the moderated mediation analyses reported above separately for the implicit and explicit autonomy disposition, with the exception that we defined implicit and explicit autonomy disposition as a moderator of the first link between the dependent variable (perceived autonomy support) and the mediator (autonomy satisfaction). Neither set of analyses revealed a significant Autonomy Perception \times Implicit/Explicit Autonomy Disposition effect on autonomy satisfaction.

Table 4 Study 2: Conditional Indirect Effects at Low, Average, and High Levels of Implicit Autonomy Disposition and of Explicit Autonomy Disposition

	Low				Average				High			
	Effect	SE	LL 95% CI	UL 95% CI	Effect	SE	LL 95% CI	UL 95% CI	Effect	SE	LL 95% CI	UL 95% CI
Implicit Autonomy												
Positive affect	-.27	.17	-.62	.07	-.44	.14	-.75	-.21	-.61	.15	-.93	-.37
Negative affect	.20	.20	-.21	.57	.34	.15	.01	.64	.48	.13	.26	.80
Vitality	-.33	.30	-.92	.29	-.64	.22	-1.13	-.27	-.96	.20	-.41	-.62
Explicit Autonomy	Low				Average				High			
	Effect	SE	LL 95% CI	UL 95% CI	Effect	SE	LL 95% CI	UL 95% CI	Effect	SE	LL 95% CI	UL 95% CI
Positive affect	-.63	.17	-.91	-.21	-.46	.13	-.74	-.19	-.40	.16	-.74	-.10
Negative affect	.23	.21	.18	.61	.35	.14	.08	.62	.47	.13	.23	.74
Vitality	-.54	.29	-1.6	-.04	-.66	.22	-1.06	-.23	-.76	.22	-1.27	-.39

Note. LL = lower level; UL = upper level. Conditional indirect effects revealed by the moderated mediation analyses. Significant indirect effects are boldfaced.

GENERAL DISCUSSION

Self-determination theory researchers have long argued that the human need for autonomy expresses a universal human struggle: to achieve enhanced volition and greater self-ownership in life. To become more self-determined means to become more mature, responsible, agentic, and psychologically integrated (Deci & Ryan, 1991). In this light, Deci and Ryan (2000) have suggested that there are few meaningful individual differences in the need for autonomy because achieving autonomy reflects the main developmental life task of all of us. The current research questioned this idea from a motive disposition perspective and found that some people may “need” autonomy more than other people do.

What do we mean by the term *need* in the previous sentence? There, we define it in the motive disposition theory sense, of “wanting” to have certain types of experiences more than others, and thus getting more positive feelings when those feelings occur (for the distinction between “wanting” and “needing,” see also Prentice et al., 2014; Ryan & Deci, 2000; Sheldon & Schöler, 2011). But wanting is not necessarily needing, and thus this definition is quite different from the SDT definition, which views psychological needs as “experiential nutrients necessary for human thriving.” Our data partly support this view by revealing typical main effects of felt autonomy upon well-being and thriving outcomes and by also showing that individuals low in the implicit autonomy motive benefited from felt autonomy at least on a descriptive level (e.g., see the slight increase of dotted lines in Figure 2). However, for individuals low in implicit autonomy disposition, the benefits of felt autonomy were much weaker in terms of well-being (Study 2, affect and vitality) and especially in terms of flow experience (Study 1; see Supplementary Analyses). We suggest that this does not principally contradict SDT’s “needing” perspective, but rather extends it. We agree that without a good amount of felt autonomy, people cannot truly

thrive. (This is also supported by our moderation analyses that showed that well-being and motivation is low for everybody if autonomy satisfaction is low.) However, a person’s learning history can also add further variance to this equation and—as our data suggest—it may be very informative to take these individual differences into account. Somebody whose volitional efforts were strongly supported in childhood may acquire an additional component of “wanting” as well as “needing” the target experience. Getting what we want (or characteristically orient to) feels good in its own way, which significantly adds to the prediction of positive outcome variables beyond the fact that what we want is also what we need.

Indeed, taking a closer look at the similarities between SDT (Deci & Ryan, 1985a) and motive disposition theory (MDT; McClelland, 1985) shows that the two approaches partly overlap with regard to the nature and development of individual differences. Both approaches, for example, assume that individuals can differ in their desire to feel socially related, competent, and autonomous. SDT, for example, considers “an unusual strong desire to be with other people not be a reflection of a strong innate need for relatedness, but instead to be a result, in part at least, of previous experiences in which the basic needs were thwarted” (Deci & Ryan, 2000, p. 232). This is mainly in accordance with the MDT conceptualization of implicit motives as desires that are learned through social interactions. SDT and MDT researchers might also agree that if parents put much pressure on a child to perform well and strictly punish failure with withdrawal of love, this may lead to the development of an overly strong desire to feel competent that might elicit unbalanced achievement strivings, which might even impair rather than improve one’s emotional and social well-being (e.g., overly high investment in career goals that conflict with other goals). SDT and MDT might also agree that if children are socially rejected and feel unloved by significant others (i.e., parents, siblings), they may develop a strong desire to feel socially related. In SDT terms, these

processes reflect compensations for basic need thwarting that often have negative consequences (e.g., for one's health; Strauss & Ryan, 1987), and in MDT terms, they reflect the development of strong fear motives (i.e., fear of failure, fear of rejection), which are also associated with impairment of well-being (Baumeister & Leary, 1995). Thus, SDT and MDT might agree that strong desires for certain kinds of incentives (e.g., feeling competent, socially related, autonomous) can have their origin in the *thwarting* of basic and even innate needs to be loved and to be effective in dealing with one's environment.

A difference between SDT and MDT is that the latter also highlights that individual differences in the desire to strive for competence, social relatedness, and autonomy can result from need *satisfaction* in early childhood. For example, if a child effectively deals with his or her environment and therefore is rewarded by his or her parents (e.g., parents pay attention, are proud, signal acceptance and love), then the child learns to associate competence with positive consequences and a strong positive desire to achieve competence develops. This component of the achievement motive is called hope-of-success. Similarly, if a child learns that the experience of being surrounded by important others is rewarding (e.g., providing feelings of being loved, having fun, being accepted), then this leads to the development of a strong desire for affiliation, which is the hope component of the affiliation motive. Thus, MDT explains the development of the fear and hope components of implicit motives by thwarting *and* satisfaction of essential experiences, respectively. It would be interesting to test in future research whether the negative effects of basic need *thwarting* are moderated by the *fear* motives (e.g., fear of failure, fear of rejection), whereas the positive effects of basic need *satisfaction* are moderated by the hope motives (e.g., hope of success, hope of affiliation).

Another issue warrants discussion. In our previous research (Schüler & Brandstätter, 2013; Schüler et al., 2013; Schüler, et al., 2010), we have shown that implicit motive dispositions for achievement and affiliation moderate the effects of competence and relatedness satisfaction upon positive outcomes, including flow states and positive mood. Our failure thus far to examine the third implicit need, autonomy, has been due largely to the fact that no consensually accepted coding system for scoring individual differences in implicit autonomy from story imagery existed. A primary contribution of the present research was to “dust off” two existing but rarely applied measures of implicit autonomy disposition to show that they are associated with each other, and also to show that they moderate the effects of corresponding satisfying experiences in the same way that measures of implicit achievement and affiliation motives have moderated corresponding need satisfaction effects.

More precisely, we tested the freedom category of the OMT (OMT-autonomy; Kuhl & Scheffer, 2012) and applied the origin scoring system (deCharms & Plimpton, 1992) to a picture story exercise in the first study (PSE-autonomy). In

accordance with previous research (Schüler et al., 2010) and further supporting the discriminant validity of our implicit PSE-autonomy measure, the explicit autonomy measure (Index of Autonomous Functioning; Weinstein et al., 2012) was not a moderator of the need satisfaction effects on well-being.

Even though the results suggest that we used adequate implicit autonomy disposition measures, we need to know more about them. One issue involves explaining the statistical overlap of implicit autonomy disposition with other motives (which is not unusual for implicit motive measures). Another important issue concerns whether the dispositional concern for autonomy shares further characteristics of an implicit motive, such that it can be aroused by corresponding incentives, influence information processing (memory, attention), and predict motive-congruent behavior. Furthermore, with regard to the development of the implicit autonomy disposition, it might be interesting to analyze stages in a person's life in which autonomy is a crucial development task, such as during age 2–4 years and adolescence (Erikson, 1959). A detailed analysis of how the social environment (supporting need satisfaction, adding to need thwarting) interacts with the person during a critical period might provide deeper insight into the development of a stable desire to feel autonomous.

Another important future research task will be to test our implicit motive–need satisfaction matching assumption in more detail. Previous research has shown that the implicit achievement motive interacts with the basic need for competence when predicting *domain-specific* well-being and flow, but not when predicting *general* well-being and flow (Schüler et al., 2013). Thus, two apparently opposite approaches—the matching assumption (derived by motive disposition theory; McClelland, 1985) and the universality assumption (self-determination theory; Deci & Ryan, 1985a)—are both (partly) true. In the present studies, we employed domain-specific measures by asking participants to apply their flow and well-being ratings to their learning activity and sports situations, respectively. Future research will have to test whether the Implicit Autonomy Disposition \times Autonomy Satisfaction interaction disappears or remains when predicting general flow and well-being.

Future research should also pay more attention to the explicit measurement of the autonomy disposition. We used the IAF (Weinstein et al., 2012) in our second study, which might be suboptimal due to two reasons. For one thing, the reliability of the IAF overall score was low, and this fact may account for the null effect when testing the moderation analysis. Although supplementary analyses showed that the interaction effect also does not occur when using more reliable IAF subscales (e.g., Interest-Taking with $\alpha = .84$) and therewith weakens this potential explanation, it seems an important aim of future research to test other existing explicit autonomy disposition measures (e.g., General Causality Orientations Scale; Deci & Ryan, 1985b). For another thing, the IAF authors did not conceptualize the IAF as an autonomy *motive*

measure in McClelland and colleagues' (1989) sense, but as a broader dispositional autonomy orientation. Because the meaning of "explicit motive" is much more specific than the broader conceptualization, it would be sensible to (develop and) use an explicit measure that is more theoretically tailored to the concept of explicit motives.

Another issue that warrants discussion is the use of the vignette method in Study 2. Our aim was to understand how physically inactive people can be motivated to become more engaged in sports activities. We already know from previous research that perceived autonomy support by coaches accounts for autonomy satisfaction and therewith for engagement for individuals who are already physically active (Adie et al., 2008, 2012). But is this mechanism also relevant for physically inactive individuals? By asking people to imagine an autonomy-(un)supportive coach (rather than rating their perceptions of real coach behavior, which these people cannot do), we could begin to address this question. The vignette method has repeatedly been shown to be a valid procedure in order to mentally simulate situations that are not easy to create or are unethical (Alexander & Becker, 1978; Munday, 2013). However, future research is needed to empirically test whether our study results can be replicated in "real" applied sports settings with actual sports beginners.

Another point of criticism of the vignette method that is concretely related to our study results is that one might assume that the moderation effect in Study 2 can be traced back to differences in imagination: If individuals high in implicit autonomy are able to envision the presence of autonomy more concretely than individuals low in implicit autonomy (which is not implausible due to a perceptual advantage for motive-congruent material already shown for other motives; Atkinson & Walker, 1956; Schultheiss & Hale, 2007), then individuals high in the implicit autonomy disposition would be expected to be more emotionally responsive in terms of flow experience and well-being. However, if this alternative interpretation is true, we would have also found that individuals with a high implicit autonomy disposition are more responsive in terms of experienced autonomy satisfaction in Study 2. However, the implicit autonomy disposition did not moderate the effect of coach autonomy perception on felt autonomy satisfaction. This militates against the interpretation that the moderation finding could be an artifact of differences in imagination. However, in order to fully rule out this alternative, future empirical research is needed in which autonomy support is operationalized independently from the participants' perception (e.g., by experimentally inducing autonomy support or by objective coach autonomy ratings by a third party).

A methodological strength of these studies was that we not only tested students, but we could also confirm our hypothesis in a "mixed" sample consisting of men and women of different ages, educational levels, and occupations. Future research attempts could fruitfully extend the range of outcome variables to examine how these processes impact objective work or sports performance, which may provide

insight into the prediction of important outcomes in organizational settings.

CONCLUSION

Together, our results suggest that the feelings of autonomy derived from the autonomy support of teachers, coaches, and parents may produce domain-specific well-being for everyone, but not to the same extent for all people. Rather, benefits are likely to be felt particularly keenly by people with a strong implicit need for autonomy. As in the cases of competence and relatedness, well-being following from autonomy satisfaction is the result of a complex process including characteristics of the person's environment (e.g., autonomy-supportive teachers/coaches) and characteristics of the person (e.g., implicit autonomy disposition). In this way, our proposition of and support for the matching hypothesis highlights the importance of individual differences and complements SDT's universality assumption by adding to it this empirical and theoretical nuance.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Notes

1. For half of the participants, the PSE comes first and the OMT comes second, and for the other half of the sample it was vice versa. The order of the implicit motive measure administration did not influence the reported results.
2. We have repeated the moderation analyses with the IAF subscales in order to exclude that the missing moderation effect is caused by the low reliability of the IAF overall score ($\alpha = .65$; α s for subscales: Authorship: $\alpha = .77$; Interest-Taking: $\alpha = .84$; Susceptibility to Control: $\alpha = .64$). None of the IAF subscales revealed a significant interaction effect.

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