The index of autonomous functioning: Development of a scale of human autonomy

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ABSTRACT

A growing interest in the functional importance of dispositional autonomy led to the development and validation of the Index of Autonomous Functioning (IAF) across seven studies. The IAF provides a measure of trait autonomy based on three theoretically derived subscales assessing authorship/self-congruence, interest-taking, and low susceptibility to control. Results showed consistency within and across sub-scales, and appropriate placement within a nomological network of constructs. Diary studies demonstrated IAF relations with higher well-being, greater daily satisfaction of basic psychological needs, and more autonomous engagement in daily activities. Using an experimental approach, the IAF was shown to predict more positive interactions among dyads. The studies provided a systematic development and validation of a measure of autonomy that is brief and reliable.

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1. Introduction

A growing body of work suggests that the extent to which behavior is *autonomous*, or volitional and regulated by the self rather than by external contingencies, predicts a variety of positively experienced events and behaviors (for reviews see Ryan & Deci, 2, 2004). Behavior that is more autonomous has been associated with more creative learning and engagement (e.g., Roth, Assor, Kanat-Maymon, & Kaplan, 2007), greater energy and vitality (Ryan & Frederick, 1997), lower stress and higher well-being (Weinstein & Ryan, 2011), and more rewarding socialization and relationships (Knee, Lonsbary, Canevello, & Patrick, 2005; Niemiec et al., 2006), among other positive outcomes.

Because of its functional importance, there has been a long-standing interest in the propensity to act autonomously over time and across domains (e.g., Deci & Ryan, 1985b; Koestner & Losier, 2002). The purpose of the current research program was to further understanding and measurement of individual differences in autonomy by developing a theoretically-derived and empirically-based measure of individual differences in autonomy that is brief and efficient, that both supplements and improves upon some existing measures, and that allows for some differentiation of facets within this individual difference construct. We first detail the historical and theoretical background of the autonomy construct, highlighting some of its central characteristics or facets, and then review existing measures and research before moving into our own systematic efforts to develop a useful measure and validate it through multiple means.

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1.1. Theoretical Background and Definitions

According to self-determination theory (SDT; Deci & Ryan, 1985a; Ryan & Deci, 2000), *autonomy* is defined as regulation by the self. When autonomous, people experience their behavior as self-endorsed and congruent with their values and interests. Autonomy can be juxtaposed to control, in which one's behavior is regulated by forces experienced as alien to the self, such as external contingencies, social pressures, or self-esteem based and internally imposed contingencies (see Deci & Ryan, 2000; Ryan & Deci, 2000). Greater autonomy at the state level has been associated with a host of positive outcomes from improved performance to higher well-being (Vansteenkiste, Ryan, & Deci, 2008). Autonomy is distinguished from independence (self-reliance) in that individuals can be willingly or autonomously dependent, or sometimes forced or controlled to rely or depend on others (Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005).

Although the relative autonomy of an individual's situational motivation is often directly influenced by context specific factors (see La Guardia & Ryan, 2007), across time interpersonal and intra-personal experiences shape developmental trajectories, stabilizing into individual differences in the person's tendencies to be more or less autonomous (Deci & Ryan, 1985b). These individual differences, in turn, can pervasively influence behaviors and well-being across contexts, as a number of researchers have suggested (Cicchetti, 1991; Deci & Ryan, 2000; Kuhl & Kazen, 1994; Ryan & Deci, 2001; Ryan, Deci, Grolnick, & LaGuardia, 2006; Shapiro, 1981).

Dispositional autonomy has been specifically discussed and studied within SDT literature (Ryan & Deci, 2000). According to the SDT formulation, more autonomous individuals experience their actions as self-organized or initiated, that is, as either originating from or endorsed by the self. When behavior is fully

autonomous the person is wholeheartedly willing to act, or "stand behind" what he or she does, and experiences behavior as self-congruent and integrated (Deci & Ryan, 2000; Ryan, 1995). The autonomous individual is also open to and interested in self-exploration and can utilize awareness of his or her values, feelings, and needs to act in a congruent fashion. Low autonomy reflects a pervasive sense that one's behavior is regulated by controlling influences, and is characterized by attributions that one's behavior stems from external contingencies, including social pressures (de Charms, 1968; Ryan & Connell, 1989). In sum, individual differences in autonomy are a matter of degree, and the ongoing regulation of behavior can vary from typically being highly autonomous, or truly self-regulated, to typically being regulated by controlling influences (Deci & Ryan, 1985b).

Existing assessments of dispositional autonomy have not specifically articulated the central attributes or facets of this construct. Accordingly we elaborate on several aspects that are central to the definitions of autonomy as employed within SDT, and that were relevant to our measurement approach. As we argue below, theorists believe these attributes are central to autonomous functioning, but no research to date has shown their role in comprising dispositional autonomy, or systematically tested the correlates of these important underlying processes.

1.2. Authorship/self-congruence

A central and long recognized characteristic of autonomy (e.g., Pfander, 1911; Ricoeur, 1966) is that when autonomous, the individual experiences him or her self as the *author* of behavior, and fully assents to the actions he or she undertakes. The concept of authorship or self-congruence is similar to that of authenticity as described in the existential literatures (Ryan & Deci, 2004; Sartre, 1956; Wild, 1965). When autonomous, one's behavior is based on abiding values, needs, and interests (Deci & Ryan, 1985b; Koestner, Bernieri, & Zuckerman, 1992; Scherhorn & Grunert, 1988; Vallerand, Deci, & Ryan, 1987; Zuckerman, Gioioso, & Tellini, 1988). Empirical support has been found for authorship as a manifestation of autonomy; namely, past research has found that such individuals exhibit greater consistency between behaviors, attitudes, and traits (Koestner et al., 1992; Ryan & Connell, 1989; Ryan & Deci, 2006).

1.3. Interest-taking

A second facet of autonomy is *interest-taking*. Interest-taking is the spontaneous tendency to openly reflect on inner and outer events. Interest-taking facilitates awareness and ongoing insight into oneself and one's experiences, which in turn is important for the high level of self-governing involved in autonomy (Hmel & Pincus, 2002; Loevinger, 1976; Ryan & Deci, 2006; White, 1963). Interest–taking involves a motivated attention in which one is receptive to both positive experiences and those that might seem threatening (Hodgins & Knee, 2002; Weinstein, Deci, & Ryan, 2011). The autonomous individual is therefore engaged in a continuing process of learning more about him or herself (Mead, 1934; Ryan & Deci, 2006). This factor of interest-taking is central to the autonomy dimension of the General Causality Orientation Scale (GCOS) by Deci and Ryan (1985b), in which most autonomy responses to the scale's vignettes focus on taking interest in what is occurring and making reflective choices.

1.4. Susceptibility to control

Whereas authorship and interest-taking characterize positive features of autonomy, feelings of pressure and of control mark its absence. Thus a third facet of autonomy is the absence of external

and internal pressure as motivators for behaving (Deci, Eghrari, Patrick, & Leone, 1994). Individuals who are dispositionally low in autonomy should perceive a lesser degree of personal choice and initiative in situations, and instead see behavior as a response to pressure from others' expectations or from introjected pressures and self-imposed "have to's" (Meissner, 1988; Perls, 1973; Ryan & Connell, 1989). Empirical work also supports this assertion on a state level, showing that autonomous self-regulation is associated with lower experiences of pressure and tension, and that external and introjected forms of regulation are associated with high internal pressure (Ryan, 1982; Ryan & Connell, 1989; Vallerand, 1997).

1.5. The need for the present research

Although the classic and modern theoretical traditions reviewed above indicate that all three characteristics (i.e., authorship/congruence, interest-taking, and non-susceptibility to being controlled) are central to dispositional autonomy, no assessment to date has systematically assessed all three components and evaluated their interrelations as elements of one underlying construct. Instead, existing measures use operationalizations of autonomy that explicitly tap only some components. For example, the GCOS includes a broad autonomy subscale and a separate control subscale, with both comprised of various social and personal situations (Deci & Ryan, 1985b). Similarly, the self-determination scale (Sheldon, 1995) has choice and self-contact subscales, each with a diversity of items, but does not capture the wider construct. In this paper we aim to draw on SDT's rich theoretical treatment of autonomy and pair it with a strong data-driven approach to develop a systematic operationalization of autonomy as consisting of the experience of oneself as self-congruent, reflective and interested in one's own experiences, and resilient in the face of social pressure. Beginning the scale creation process by explicitly tapping into these three facets differentiates this assessment from existing autonomy measures. In other words, this paper re-examines the nature of dispositional autonomy by defining and measuring the characteristics that are theoretically central to it. Doing so can hopefully expand researchers' basic understanding of autonomy and provide a guide for future research on the psychological and behavioral antecedents and consequences of autonomy.

1.6. The present studies

Based on the foundation laid by SDT, in the present research we sought to develop a dispositional scale of autonomy that reflects its primary components. We aimed to pair a strong theoretical approach with a systematic empirical strategy to optimize coherence, validity, and brevity in measurement. Seven studies were conducted to achieve this end. The first four were designed to create a reliable and valid scale, the Index of Autonomous Functioning (IAF). Study 1 (comprised of two samples: Study 1a and 1b) was aimed at item selection and scale validation in a multi-step process that involved expert ratings, and both exploratory and confirmatory factor analyses. In Studies 2 and 3, we tested divergent and convergent validity to explore the scale's placement within a nomological net. The IAF is also distinguished from scales developed within the SDT tradition, as well as constructs derived from other theoretical perspectives (scales that also hold unique characteristics). For both types of scales, incremental validity was examined for expected correlates of autonomy such as well-being and personal growth. Because we anticipate the IAF to represent a personality level scale, in Study 4 we assessed test–retest reliability across 6 months along with a more conservative assessment of incremental validity that involved an assortment of positive and negative well-being outcomes. Studies 5 and 6 then examined people's daily experiences, focusing on important outcomes such as

daily and context-specific well-being, motivation, and need satisfactions. Finally, Study 7 explored the interpersonal effects of dispositional autonomy in a lab-based design.

Central to our view is that three subscales together represent dispositional autonomy, and comprise both an empirical and conceptual unity. Thus after establishing subscale relevance and overall subscale coherence in the initial dataset, we focus our presentation in the text on the total scale score. We believe the full scale should be a suitable measure for most purposes of measuring autonomy that provides a comprehensive assessment. However, on occasion researchers may find it more appropriate to their research to employ the subscales; we therefore present findings for these, separately, in the tables summarizing data for each study.

2. Study 1: developing an initial item pool

We identified subscales based on a review of both historical and current perspectives on autonomy (e.g., de Charms, 1968; Deci & Ryan, 1985a; Ryan & Deci, 2003, 2004), and after extensive discussion by a group of nine professionals familiar with self-determination theory. We drafted 198 potential items to reflect issues of authorship/self-congruence, interest-taking, and susceptibility to control. An international sample was then recruited to identify items with good scale properties that also fit conceptually with the underlying construct; these initial analyses were aimed at systematic item selection based on both empirical and theoretical considerations. The sample was intended to be representative of diverse respondents.

2.1. Method

2.1.1. Study 1a participants

Participants were 890 men and 542 women (*n* = 1432 total), ages 17–58 (*M* = 26 years). Of these, 731 were single, 471 were dating, and 230 were married. Participants identified 21 native countries, including the US, European nations including England and Germany, and Asian countries including Japan and China. Of the participants, 1326 spoke English fluently, while 106 spoke adequate English; 1052 identified as Caucasian, 223 as Asian, 50 as Black, and 35 as Hispanic; and the rest as another ethnicity. Incomes ranged from under $12,000 (or equivalent) to above $300,000 per year (or equivalent); mean income was in the range of $24,000–$36,000. Education was higher than average: less than 6% had not received a high-school degree, 12% received a high-school degree, 51% had some college, 21% had a college degree, and 11% had an above college degree. Participants were recruited online (in response to advertising on a social networking site) and were compensated with an opportunity to win a $50 raffle prize.

2.1.1.1. Dispositional Index of Autonomous Functioning scale (IAF). Participants completed all 198 items proposed for the IAF online. Instructions stated: "Below is a collection of statements about your general experiences. Please indicate how true each statement is of your experiences on the whole. Remember that there are no right or wrong answers. Please answer according to what really reflects your experience rather than what you think your experience should be." Items were paired with a Likert-type scale with 1 = "*not at all true*", 2 = "*a bit true*", 3 = "*somewhat true*", 4 = "*mostly true*", and 5 = "*completely true*." Items were designed to represent each of the three subscales: authorship/self-congruence (example items from the initial item pool include: "I genuinely affirm the decisions I make", and "generally, my decisions are informed by values important to me"), interest-taking ("I am deeply interested in the reasons for my emotions", and "I am inter-

ested in exploring my feelings"), and susceptibility to control (reversed; e.g., "I feel pushed around by other people in my life", and "I frequently feel pressured to do certain things").

2.2. Results

2.2.1. Study 1a scale development
2.2.1.1. Step 1: Empirical item support. As a first step we ensured that all items met basic criteria for sufficient variability, such that they were able to discriminate sensitively between individuals on the underlying construct (Clark & Watson, 1995). The 198 initial items were thus subjected to descriptive analyses and stem and leaf type plots, and items that were highly skewed (skew >±1.4) or that had highly invariant responses (varying by three units out of five or less – for example with a range of 3–5) were excluded from the item pool. See Fig. 1 for examples of such items, including items rejected because of poor distributions and/or skew (top panel) and items with adequate distribution and skew that were accepted (bottom panel). Ninety items did not meet these requirements, leaving 108 with adequate variability distributions.

2.2.1.2. Step 2: Conceptual item support. Having identified items with sufficient variability, we next sought to find support for the remaining 108 items as appropriately reflecting the underlying construct. A panel of five experts in the field (which did not include the three authors) was provided with the 108 remaining items and, separately, a list of the three proposed subscales (authorship/self-congruence, interest-taking, susceptibility to control). Experts were asked to rate the extent to which each item reflected the underlying construct of autonomy using a scale of 1(*not at all reflective*) to 5(*perfectly reflective*). In addition, raters were asked to guess into which of the three categories the items fit. Items were retained that were rated to be either a '4' or '5' (well-reflective) on the five-point scale, and which were categorized into the subscale for which they were intended by all five raters (either authorship/self-congruence, interest-taking, or susceptibility to control). A total of 68 items met criteria, and were retained for further analyses.

2.2.1.3. Step 3: Scale structure with exploratory factor analyses. Exploratory factor analyses were conducted on the 68 remaining items, using best practices of participant to item ratio of above 10:0 (Comrey & Lee, 1992; Everitt, 1975). Results from these analyses were promax-rotated to account for non-independence between the subscales (Costello & Osborne, 2005) and used a maximum likelihood analysis. Three subscales achieved eigenvalues substantially higher than the rest, and were consistent with our expectations: authorship/self-congruence (eigenvalue = 19.6, accounting for 29% of the variance in the items), interest-taking (eigenvalue = 10.9, 16% of variance), and susceptibility to control (eigenvalue = 4.0; 5.8% of variance). Four other components were identified with eigenvalues of >1.0, but fell below the "elbow" of the scree plot (Floyd & Widaman, 1995), ranging in eigenvalues from 1.0 to 2.0 and contributing a total of 5.3% additional variance. Moreover these additional components did not seem conceptually distinct from our three central dimensions, and did not represent additional core features. Component 4, eigenvalue = 2.0 was a specific form of susceptibility to control, and included four public self-consciousness items such as "I do things just to look good to others," component 5, eigenvalue = 1.56 consisted of 1 item: "I feel that I can endorse my decisions," component 6, eigenvalue = 1.27 included 2 items with cross-loadings above .60 including as "I frequently pressure myself to do certain things", and component 7, eigenvalue = 1.14, had no loadings above .60, and consisted of items such as "I identify important reasons for my day-to-day behaviors".
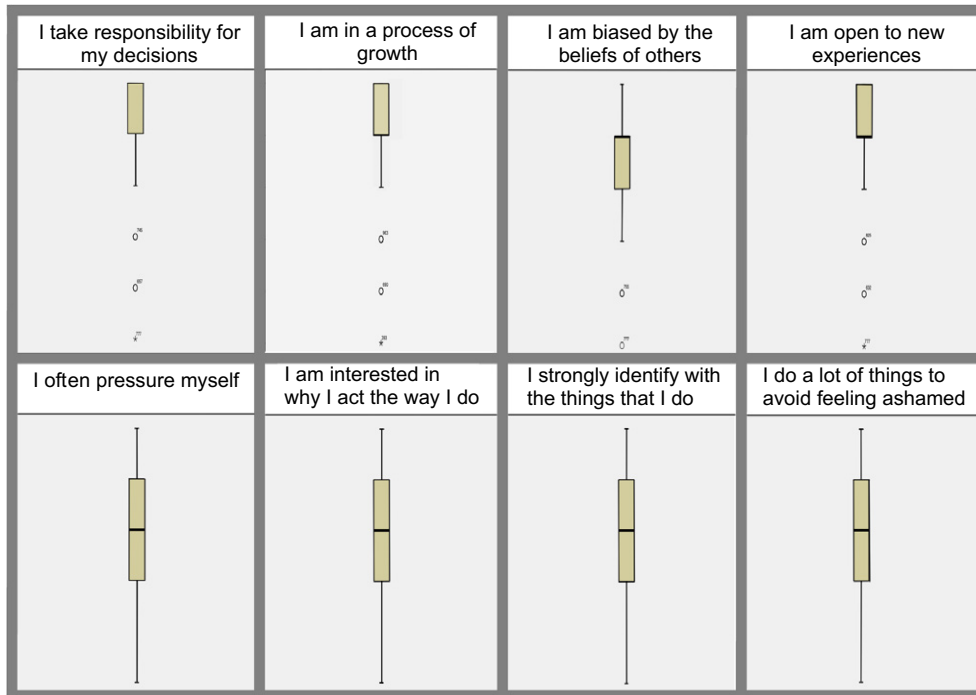
Fig. 1. Top panel provides examples of rejected items with poor distributions, whereas items on the bottom panel provide examples of final items with adequate distributions.

The goal of item selection informed by the exploratory factor analysis was to identify items that would consistently load onto their respective subscales in future research, and as such we used strict criteria to identify suitable items. Items were retained that loaded at .70 or above onto one of the three factors (a conservative approach to item selection, Kline, 1994); and that did not load .30 or above on any other identified factor. Twenty-one items failed this test by loading lower than .70 on one of the three identified factors (e.g., the item: "I am interested to hear other people's critical feedback on me" loaded .80 on an extraneous factor and .21 onto the interest-taking factor). Twenty-nine additional items loaded highly onto their expected scale, but also loaded highly onto a second scale (e.g., the item: "my values and my actions most often go hand in hand", which loaded .85 onto the authorship/self-congruence factor, but also loaded −.41 onto the susceptibility to control subscale).

Fifteen items (see Table 1) met our strict criteria, and these comprised the three subscales, with five items representing each of the three subscales. To ensure consistency in item loadings, we once again conducted factor analyses. This time we included only the 15 items, and found that the scale retained its structure: three factors emerged as before, and the 15 items loaded onto their respective factors at .70 or above and did not cross-load.

Finally, we conducted a higher order factor analysis to test the overall structure of the scale, and found one factor emerged with the subscales loading: Authorship/Self-Congruence = .79, Interest-Taking = .63, and Susceptibility to Control = −.71.

2.2.1.4. Step 4: Item relations. Additional analyses showed *internal reliabilities* were satisfactory, $\alpha = .89$ for authorship/self-congruence, $\alpha = .83$ for interest-taking, and $\alpha = .84$ for susceptibility to control. The total scale α (lower-order) was .81, supporting our view of their interrelatedness in comprising dispositional autonomy. Inter-factor correlations were conducted to test the relation between the three subscales and showed low but significant correlations between authorship/self-congruence and interest-taking,

$r = .27$, $p < .001$, authorship/self-congruence and susceptibility to control, $r = −.32$, $p < .001$, and interest-taking and susceptibility to control, $r = −.16$, $p < .001$. Additional analyses correlated the items, separately, to test basic relations within as well as between subscales, and found significant relations across all item pairing, with within-subscale correlations ranging from $r = .50$ to .81, $ps < .001$, and inter-subscale item correlations ranging from .09 to .32, $ps < .001$.

2.2.2. Study 1b confirmatory factor analysis

Having identified an initial scale structure, we tested the usefulness of the three-factor structure proposed for the IAF by confirming whether three discrete subscales would comprise one underlying construct. A second dataset was collected in order to test a confirmatory model that supported the basic scale structure identified in Study 1a. Two models were conducted, testing a three-factor model and a one-factor model, separately.

Study 1b participants ($n = 1005$) were recruited online with an offer for a raffle prize (887 men, aged 18–58, $M = 33.02$). Participants identified 16 native countries, including North American, European, and Asian countries, but 938 reported English as their first language.

Confirmatory factor analyses were conducted to test the three-factor structure with the AMOS 4.0 program (Arbuckle & Wothke, 1999). Results showed that all items loaded onto their respective latent constructs. Loadings ranged from .64 to .90 for authorship/self-congruence; .53–.89 for interest-taking; and .57–.83 for susceptibility to control, all $ps < .001$ (Fig. 2). The fit of the three-factor model to the data was satisfactory, goodness of fit (GFI) = .96; root-mean-square error of approximation (RMSEA) = .06; comparative fit index (CFI) = .95. According to these findings, a three-subscale structure is suitably descriptive for the data.

We conducted a second model using a single factor solution. To do this, all items were loaded jointly on a single latent construct. This model showed significant loadings for all items (ranging from .30 to .82, $ps < .01$), as was the case for the three-factor model.

Table 1
Scale items and exploratory factor analyses.

	Congruence	Control	Interest
Authorship/self-congruence			
1. My decisions represent my most important values and feelings	.81	−.03	.16
2. I strongly identify with the things that I do	.80	−.17	.08
3. My actions are congruent with who I really am	.79	−.10	.06
4. My whole self stands behind the important decisions I make	.76	−.22	.06
5. My decisions are steadily informed by things I want or care about	.70	.06	.16
Susceptibility to control			
1. I do things in order to avoid feeling badly about myself	−.03	.81	.02
2. I do a lot of things to avoid feeling ashamed	−.17	.80	.05
3. I try to manipulate myself into doing certain things	−.10	.79	.12
4. I believe certain things so that others will like me	−.22	.76	−.04
5. I often pressure myself	.06	.70	.13
Interest-taking			
1. I often reflect on why I react the way I do	.13	.04	.91
2. I am deeply curious when I react with fear or anxiety to events in my life	.08	.06	.90
3. I am interested in understanding the reasons for my actions	.11	.11	.89
4. I am interested in why I act the way I do	.12	.13	.86
5. I like to investigate my feelings	.11	.11	.81
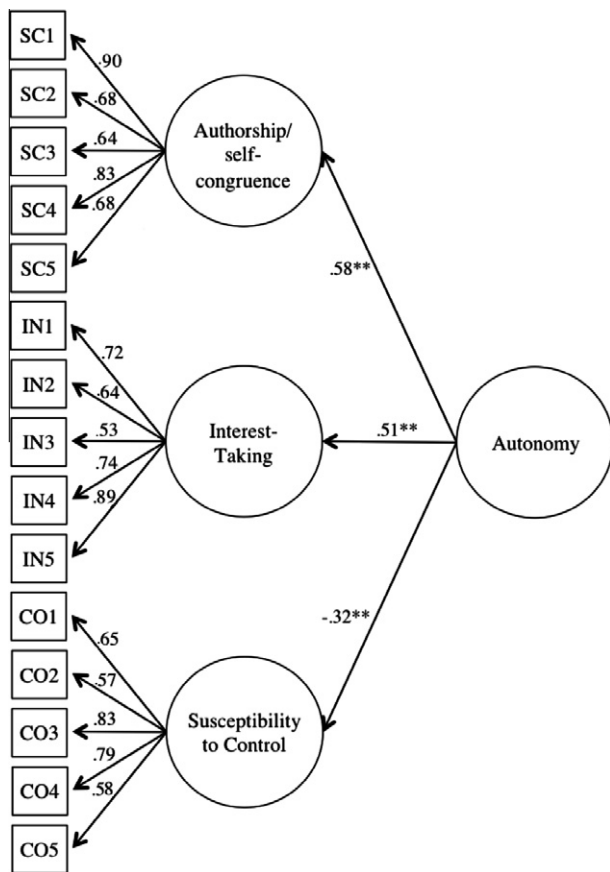
Fig. 2. Confirmatory factor analyses for a three-factor model. All items loaded significantly onto their respective latent constructs in each of the two models.

However, this model showed poor fit for the data overall, goodness of fit (GFI) = .62; root-mean-square error of approximation (RMSEA) = .16; comparative fit index (CFI) = .63.

2.3. Discussion

Study 1 used theory-driven and data-driven strategies to identify five reliable items for each of three subscales (authorship/self-congruence, interest-taking, susceptibility to control), which showed robust and discriminating loadings onto their respective subscales, as well as evidence of representing an underlying construct. The three-factor structure was supported by a confirmatory factor analysis tested using a separate sample.

3. Study 2: basic antecedents and outcomes of autonomy

Study 1 identified 15 items across three subscales representing autonomy. Studies 2–4 sought to explore the placement of these items within a broader nomological net by testing their relations with other personality constructs. Personality constructs that were expected to relate highly to the IAF items (providing convergent validity) and those that were not expected to relate (providing divergent validity) were included. For convenience, we assume that certain correlates were antecedent or resultant of the IAF, but in actuality Study 2 was a cross-sectional design that did not permit firm conclusions about causality.

As a first test of convergent validity, we focused on constructs we theorized would be linked to dispositional autonomy; specifically autonomy-supportive parenting styles, an antecedent, and general need satisfaction, a consequence. Because interpersonal environments that are thwarting are thought to lead to failures in developing an autonomous orientation (Deci & Ryan, 1985b, 2002), parenting styles have been suggested as particularly important in impacting development of autonomous personality (Grolnick, Deci, & Ryan, 1997). Further, dispositional autonomy is essential characteristic for facilitating basic satisfaction of basic needs for competence (perceiving oneself as capable), autonomy (perceiving one's behavior as volitional and self-endorsed), and relatedness (feeling a sense of belonging, caring for and by others) because it encourages individuals to identify and pursue choices and behaviors that then promote satisfaction of needs (Ryan, 1995).

As a test of divergent validity, we assessed the IAF in relation to the Big-5 personality traits (McCrae & Costa, 1997). Though both our dispositional autonomy measure and Big-5 subscales were expected to represent temporally stable orientations, autonomy was thought to be a distinct construct measuring motivational orientation (Olesen, 2011).

3.1. Method

3.1.1. Participants

Ninety-one undergraduates (22 men and 69 women) from a northeastern US university, ages 18–23 (*M* = 20), participated in

Table 2
Descriptive and reliabilities for the IAF and its subscales.

	M	SD	Range	Alpha
Study 1				
Congruence	3.90	0.66	1.20–5.00	.89
Interest	3.87	0.62	1.20–5.00	.83
Control	2.65	0.78	1.00–4.80	.84
Total IAF	5.07	1.60	−0.40 to 9.00	.81
Study 2				
Congruence	4.01	0.60	1.40–5.00	.89
Interest	3.86	0.68	1.20–5.00	.79
Control	2.71	0.86	1.20–4.60	.87
Total IAF	5.16	1.67	−0.20 to 9.00	.82
Study 3				
Congruence	3.92	0.72	1.60–5.00	.86
Interest	3.82	0.69	1.80–5.00	.87
Control	2.80	0.86	1.00–5.00	.81
Total IAF	4.95	1.65	−0.40 to 9.00	.81
Study 4				
Congruence	3.98	0.68	2.20–5.00	.84
Interest	3.84	0.67	1.60–5.00	.86
Control	2.62	0.84	1.00–4.80	.83
Total IAF	5.02	1.71	−0.20 to 9.00	.82
Study 5				
Congruence	3.96	0.64	1.20–5.00	.83
Interest	3.89	0.67	1.40–5.00	.88
Control	2.74	0.79	1.00–4.60	.85
Total IAF	5.11	1.62	−0.20 to 9.00	.83
Study 6				
Congruence	4.03	0.68	1.40–5.00	.83
Interest	3.82	0.64	1.20–5.00	.81
Control	2.74	0.81	1.00–4.80	.86
Total IAF	5.11	1.61	−0.00 to 9.00	.81
Study 7				
Congruence	4.01	0.67	1.20–5.00	.85
Interest	3.87	0.66	1.00–5.00	.83
Control	2.84	0.80	1.00–4.80	.84
Total IAF	5.04	1.66	−0.40 to 9.00	.82

Notes: Congruence reflects the authorship/self-congruence subscale, interest reflects interest-taking, and control reflects susceptibility to control. Total IAF = congruence + interest − control.

exchange for extra credit in their Psychology courses. Twenty-one percent were Freshmen, 35% Sophomores, 22% Juniors, and 14% Seniors. Eighty (88%) spoke English as a first language, 11 did not (12%). Most were Caucasian (71%), 6% were African–American, 6% Hispanic, 16% Asian–American, and 2% other ethnicities.

3.1.2. Measures

To assess autonomous personality, the 15-item IAF created in the prior study was used.

3.1.2.1. Perceptions of parents scale (POP). The POP (Robbins, 1994) assesses perceptions of parents' provision of warmth, involvement, and autonomy support, all parenting styles thought to facilitate dispositional autonomous functioning (e.g., Grolnick et al., 1997). The scale involves 21 items designed to assess these parental behaviors using a scale ranging from 1(*not at all true*) to 7(*very true*). Items included "my parents try to tell me how to run my life" (reversed: autonomy), "my parents spend a lot of time with me" (involvement), and "my parents clearly convey their love for me" (warmth). Reliabilities were acceptable, αs averaged .74.

3.1.2.2. Trait need satisfaction. Trait need satisfaction was assessed with the 21-item Basic Psychological Needs Scale (Ilardi, Leone, Kasser, & Ryan, 1993). Used in much prior research (e.g., Gagné, 2003), the scale assesses the extent to which participants experienced satisfaction of the psychological needs for autonomy, com-

petence, and relatedness over the past month, using a 7-point scale from 1(*not at all true*) to 7(*very much true*). Sample items include: "I am free to decide for myself how to live my life" (autonomy); "People I know tell me I am good at what I do" (competence); and "I really like the people I interact with" (relatedness), Subscale αs = 81–.84.

3.1.2.3. Big-5 traits. We used the 60-item NEO Five Factor Inventory to assess Big-5 traits (NEO-FFI: Costa & McCrae, 1992). The NEO-FFI provides scores for trait extraversion (α = .85; engagement with the external world, enjoying others, and presence of energy), neuroticism (α = .80; emotional reactivity; tendency to frustration and threat), openness (α = .75; Imagination and creativity), conscientiousness (α = .71; reflection before impulsive actions), and agreeableness (α = .82; concern with cooperation and social harmony).

3.2. Results

3.2.1. Preliminary analyses

As in Study 1, reliabilities for each subscale were adequate (αs = .79–.89). Factor analyses were also consistent with the previous study: Authorship/self-congruence showed an eigenvalue of 5.18, accounting for 34.54% of the unique variance, susceptibility to control had an eigenvalue of 2.97 (19.79% unique variance), and interest-taking was 1.81 (12.08% unique variance). See Table 2 for descriptive data and reliabilities for this and subsequent studies.

3.2.2. Nomological net explorations

Results of correlations are presented in Table 3. Consistent with theoretical expectations, analyses showed high relations of the IAF with relatedness need satisfaction, r = .51, p < .001 and competence need satisfaction, r = .54, p < .001. The highest association was with autonomy need-satisfaction, r = .64, p < .001, indicating that those who were dispositionally high in autonomy tended to perceive themselves as receiving more autonomy support.

On the other hand, correlations with the Big-5 traits were more modest, ranging from .11 to .44. Notably, the IAF did not relate to agreeableness or conscientiousness (ps > .05), a result consistent with expectations because these traits are most distinct from dispositional autonomy. The scale correlated most highly with extraversion (r = .44), a result that was understandable given that extraversion taps into the amount of energy and enthusiasm for

Table 3
Study 2 correlations of the IAF and its subscales with stable characteristics.

	Congruence	Interest	Control	Total IAF
Autonomy[a]				
Relatedness	.51[**]	.24[*]	−.34[**]	.51[**]
Autonomous	.53[**]	.42[**]	−.43[**]	.64[**]
Competence	.46[**]	.27[**]	−.42[**]	.54[**]
Parent autonomy	.25[*]	.24[*]	−.26[*]	.29[**]
Parent involve	.22[*]	.14	−.24[*]	.21[*]
Parent warmth	.19	.03	−.22[*]	.21[*]
Non-autonomy[a]				
Extraversion	.37[**]	.26[*]	−.19	.44[**]
Agreeable	−.18	−.05	.18	−.20
Conscientious	.20	.13	.05	.11
Neuroticism	−.29[**]	.09	.34[**]	−.28[**]
Openness	.29[**]	.25[*]	−.11	.29[**]

[*] p < .05.
[**] p < .01.
[a] Non-autonomy refers to measures that were expected to be conceptually distant from the IAF, whereas the autonomy heading refers to measures that were expected close or linked with the IAF. Congruence is the authorship/self-congruence subscale, interest is the interest-taking subscale, and control is the susceptibility to control subscale.

life experiences, constructs that may be expected to relate to autonomous functioning (Olesen, 2011).

3.2.3. Developmental influences

Perceived parent involvement, autonomy, and warmth were assessed to explore their effects with the three subscales. Correlations showed parents who were perceived to be more involved, $r = .21$, $p < .05$, warm, $r = .21$, $p < .05$, and autonomy-supportive, $r = .29$, $p < .01$ were more likely to have children who reported a high level of autonomy.

3.3. Discussion

Findings generally supported our expectation that the current scale taps into dispositional autonomous functioning. Need satisfactions and parenting style expected to facilitate the development of dispositional autonomy were found to relate to the IAF. Some relations were found with Big-5 traits, which, though they share some characteristics with autonomy, are theoretically distinct. However, the subscales of the Big-5 that are theoretically most distinct from autonomy, namely agreeableness and conscientiousness, did not correlate, demonstrating some level of divergent validity.

4. Study 3: expanding the nomological net and incremental validity

Study 3 was designed to build on the second study by further exploring the scale's standing in the nomological net. The IAF was expected to relate to existing measures of autonomy (as both reflect the same underlying construct), and we tested whether it would show incremental validity over such existing scales. We examined incremental validity in predicting outcomes of autonomy suggested in previous research, namely acceptance of one's positive and negative experiences (Koestner, Losier, Vallerand, & Carducci, 1996), prosociality (Weinstein & Ryan, 2010), and valuing intrinsic aspirations that move people toward building relationships rather than toward selfish pursuits (Kasser & Ryan, 1996). In addition, we evaluated the extent to which the IAF would predict these positive outcomes above and beyond positively biased responding, testing the extent these links are a measurement artifact that reflects a tendency to self-present in a positive light.

4.1. Method

4.1.1. Participants and procedures

Participants were 115 university students, ages 18–54 ($M = 20$ years) recruited in exchange for course credit. Thirty-three men and 82 women participated; 18% were in their Freshman year, 36% were Sophomores, 26% were Juniors, 20% were Seniors. One-hundred and students (87%) spoke English as a first language, 15 did not (13%). Ethnicity distributions were 71% Caucasian, 4% African–American; 4% Hispanic, 15% Asian–American, and 6% another ethnicity. Participants completed a series of surveys, including the IAF, personality measures close to our scale (GCOS, intrinsic aspirations), and distinct characteristics (biased responding).

4.1.2. Materials

The index of autonomous functioning and basic psychological need satisfaction scale were used as in the previous study. In addition, we included the following measures:

4.1.2.1. The General Causality Orientation Scale (GCOS). The GCOS (Deci & Ryan, 1985b) assessed autonomy and control using 17 vignettes with three items each (7-point scale) describing interper-

sonal situations. Autonomous orientation reflects a tendency to be interested and self-initiating, whereas controlled orientation refers to the tendency to feel compelled by external contingencies and internally imposed imperatives. Impersonal orientation is the extent to which individuals feel unmotivated and unable to influence desired outcomes. The GCOS has shown adequate internal reliability ($\alpha \approx .80$) in past (Deci & Ryan, 1985b) and present research (α: control = .83, autonomy = .85, impersonal = .80).

4.1.2.2. Acceptance. Acceptance of one's own good and bad qualities was measured using a scale adapted from the Unconditional Self-Acceptance Questionnaire (USAQ: Chamberlain & Haaga, 2001). Twelve items (6 good; 6 bad) were paired with a 1–7 scale ranging from "*almost always untrue*" to "*almost always true*." Items included "I accept flawed aspects of myself" and "I celebrate positive characteristics I have." In addition, acceptance of stressful life events was assessed using the COPE inventory (Carver, Scheier, & Weintraub, 1989). Four items including "I accept the reality of the fact that it happened" were rated on a scale from 1(*I don't do this at all*)–4(*I do this a lot*); $\alpha = .69$. The two scales correlated, $r = .55$, $p < .01$, and thus we standardized and averaged them to create one measure of acceptance.

4.1.2.3. Prosociality. Tendencies toward prosocial behavior were measured using a 16-item scale with items including "I am pleased to help my friends/colleagues in their activities", using a 1(*not at all*)–5(*very much*) scale. Internal reliability was acceptable, $\alpha = .72$.

4.1.2.4. Aspiration Index (Kasser & Ryan, 1993). Participants responded to items assessing the personal importance of four life aspirations on a five-point scale, ranging from *not at all important* to *very important*. The scale measured intrinsic aspirations, including those for relationships, community, growth, and health; and extrinsic aspirations including those for wealth, fame, and beauty (four items each). Alphas ranged from .72 to .84. A relative aspirations index was constructed by subtracting extrinsic from intrinsic aspirations (higher scores reflect more intrinsic aspirations).

4.1.2.5. Balanced inventory of desirable responding (BIDR; Paulhus, 1988). Biased responding was assessed using the BIDR. Using a scale of 1(*no true*) to 7(*very true*), participants responded to the 20-item impression management subscale of the BIDR ($\alpha = .78$).

4.2. Results

4.2.1. Analytic strategy

Main effects were examined using Pearson correlations and partial correlations when appropriate (see Table 4). Incremental validity analyses utilized hierarchical regression analyses entering the GCOS at step 1, and the IAF entered at step 2 of these models.

4.2.2. Trait need satisfactions

Overall, individuals higher on the IAF were more likely to report having their needs for competence, $r = .52$, $p < .01$, autonomy, $r = .67$, $p < .01$, and relatedness, $r = .49$, $p < .01$, satisfied, with moderate and high correlations.

4.2.3. Trait autonomy

We had expected the IAF would show moderate relations with the presently most widely used measure of trait autonomy, the GCOS, which employs hypothetical scenarios to gauge how people tend to respond as autonomous, controlled, or impersonal (with helplessness and amotivation) internally and with relation to other people. Indeed, IAF scores correlated highly with the autonomy subscale of the GCOS, $r = .57$, $p < .01$, and negatively related to

Table 4
Study 3 correlations with stable characteristics.

	Congruence	Interest	Control	Total IAF
Basic relations				
Competence NS	.46**	.19*	−.44**	.52**
Autonomy NS	.57**	.29**	−.58**	.67**
Relatedness NS	.45**	−.19*	−.41**	.49**
GCOS impersonal	−.24**	.03	.51**	−.36**
GCOS control	−.14	−.09	.39**	−.25**
GCOS autonomy	.55**	.20*	−.45**	.57**
Biased responding	.31**	.04	−.37**	.33**
Outcomes of interest				
COPE accept	.28**	.16	−.09	.24*
Accept good	.41**	.31**	−.26**	.45**
Accept bad	.33**	.28**	−.32**	.44**
Prosociality	.26**	.31**	−.09	.29**
Intrinsic aspirations	.19*	.29**	−.32**	.37**

Notes: Congruence is the authorship/self-congruence subscale, interest is the interest-taking subscale, and control is the susceptibility to control subscale. Relations with outcomes of interest are reflective of the Pearson correlations – partial relations controlling for the GCOS are presented in the text.
* $p < .05$.
** $p < .01$.

the control, $r = -.25$, $p < .01$, and impersonal, $r = -.36$, $p < .01$, subscales.

4.3. Incremental validity

4.3.1. Acceptance

Hierarchical analyses regressed acceptance onto the GCOS subscales at step 1, and the total IAF score at step 2. At step 1, the autonomy subscale of the GCOS related to acceptance, $B = .33$, $t(109) = 3.52$, $p < .01$, and the control subscale marginally related to lower acceptance, $B = -.16$, $t(109) = -1.71$, $p < .08$ (GCOS impersonal, $p > .10$). Together, the GCOS subscales accounted for 17% of the variance in acceptance. Above and beyond these effects, the IAF total score related to more acceptance, $B = .36$, $t(108) = 3.63$, $p < .01$, accounting for 26% of additional variance.

4.3.2. Prosociality

The GCOS autonomy subscale related to prosociality, $B = .29$, $t(109) = 2.54$, $p < .01$ (no relation with GCOS control and impersonal subscales, $ps > .10$), accounting for 5% of the variance. At step 2, the AFI total score linked to more prosociality, $B = .28$, $t(108) = 2.57$, $p < .01$, accounting for 14% additional variance.

4.3.3. Intrinsic aspirations

The GCOS control and impersonal subscales related to lower reports of intrinsic aspirations, $B = -.52$, $t(109) = -5.84$, $p < .01$; $B = -.26$, $t(109) = -2.35$, $p < .05$, respectively (GCOS autonomy did not relate, $B = .17$, $t(109) = 1.82$, $p > .05$). Together, the GCOS subscales accounted for 22% of the variance in intrinsic aspirations. At the second step, the IAF related to higher valuing of intrinsic aspirations, $B = .30$, $t(108) = 3.08$, $p < .01$, accounting for 28% of additional variance.

4.3.4. Biased responding

A similar series of analyses explored the effects of the IAF in predicting each of the outcomes presented above, holding variability in both the GCOS and biased responding constant. Controlling for the GCOS scores, biased responding related to reports of acceptance, $B = .43$, $t(108) = 3.69$, $p < .01$, and intrinsic aspirations, $B = .32$, $t(108) = 2.83$, $p < .01$ (no relation with reports of prosociality, $B = .14$, $t(108) = 1.08$, $p > .05$). Importantly, at the second step, relations with the IAF remained significant: acceptance, $B = .26$,

$t(107) = 2.56$, $p < .05$; prosociality, $B = .28$, $t(107) = 2.42$, $p < .05$; intrinsic aspirations, $B = .28$, $t(107) = 2.25$, $p < .05$.

4.4. Discussion

Study 3 showed moderate to high relations with the GCOS, particularly the GCOS autonomy subscale, an expected finding because these scales reflect the same underlying construct. Most importantly, results from this study demonstrated that the IAF predicted variability in acceptance, prosociality, and valuing intrinsic aspirations (as expected based on previous research, Ryan & Deci, 2002) above and beyond the effects demonstrated by the GCOS. A final set of analyses also indicated the IAF predicted outcomes controlling for the effects of biased responding, suggesting that relations were not due merely to a positivity bias that affected both the IAF and the study outcomes.

5. Study 4: incremental validity with well-being and test–retest analyses

Study 4 expanded on the previous studies by testing how the IAF relates to well-being directly, using a number of positive and negative well-being indicators. In addition, we sought to further examine incremental validity over scales measuring autonomy from other theoretical approaches, namely the Emotional autonomy (Steinberg & Silverberg, 1986) and the Sociotropy-autonomy (Beck, Epstein, Harrison, & Emergy, 1983) scales, both of which tap issues more associated with independence (non-reliance on others) rather than autonomy as currently defined (see, e.g., Ryan & Lynch, 1989; Ryan et al., 2005) as well as widely used scales arising out of the SDT tradition (the GCOS as in the previous study and the self-determination scale, which is new to this study).

Whereas Study 3 focused on kindness to oneself (acceptance) and others (prosociality and intrinsic aspirations), the present study also tested relations of the IAF with psychological process indicative of the capacity for open and healthy attention: mindfulness, curiosity, and self-awareness, which are thought to be important qualities leading to well-being and higher functioning (Brown & Ryan, 2003; Weinstein, Hodgins, & Ryan, 2010).

A final aim of this study was to assess test–retest reliability, or temporal stability. Given that the IAF is expected to measure a relatively stable characteristic we administered the scale once, again 3 months later, and again after a total 6-month period. We expected that individuals high on autonomy at time 1 would remain so at the end of this period.

5.1. Method

5.1.1. Participants and procedure

One hundred sixty students (45 men, 115 women), ages 18–32 ($M = 21$), took part in exchange for course credit in their Psychology courses, of which 16% were Freshman, 31% Sophomores, 29% Juniors, and 24% Seniors. One hundred and thirty-five (84%) spoke English as a first language, and 25 (16%) were fluent in English. Of participants, 69% were Caucasian, 6% African–American; 5% Hispanic, 15% Asian–American, and 5% another ethnicity. The HTML-based personality and well-being questionnaires were randomly presented for order of completion. Three months following their initial participation individuals once again completed the IAF. Six months after the initial participation 156 of these participants (97.5% retention) completed the IAF for a final time; t-tests revealed no differences in major personality constructs between those who took the IAF for a final time and those who did not, $ps > .05$.

5.2. Materials

5.2.1. Stable attention constructs

5.2.1.1. Mindfulness. The Mindful Attention Awareness Scale (*MAAS*, Brown & Ryan, 2003) has been extensively validated in a number of previous studies (see Brown, Ryan, & Creswell, 2007). Participants responded to a validated five-item adaptation of the trait MAAS (see Brown & Ryan, 2003), using a 1 to 6 (*almost always* to *almost never*) scale. Sample items include: "I did jobs or tasks automatically without being aware of what I was doing" and "I found myself doing things without paying attention" (both reverse scored). Reliability was $\alpha = .87$.

5.2.1.2. Curiosity. The Epistemic Curiosity subscale of the Curiosity Questionnaire consisted of 10 items (Collins, Litman, & Spielberger, 2004), and used a 5-point scale (*almost never* to *almost always*). Items included "When I learn something new, I would like to find out more about it"; $\alpha = .85$.

5.2.1.3. Self-awareness. Self-awareness was assessed with a 12-item scale (Hansell & Mechanic, 1985), paired with 7-point Likert options. Self-awareness reflects self-focused attention to feelings and other experiences. Items include "How much do you pay attention to your feelings" or "How much do you think about yourself when you are alone"; $\alpha = .68$.

5.2.2. Well-being outcomes

5.2.2.1. Positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS includes 20 adjectives reflecting positive affect (e.g., alert, proud, strong) and negative affect (e.g., scared, nervous, distressed). Participants rated each adjective on 7-point scales (1 = *very slightly or not at all*, 7 = *extremely*, present α = PA: .95, NA: .86).

5.2.2.2. Trait self-esteem. Trait self-esteem was assessed using the Multidimensional Self-Esteem Inventory (MSEI; O'Brien & Epstein, 1988). Participants responded on two 1 to 5 (*strongly disagree* to *strongly agree* and *never* to *very often*) scales to items such as "How often do you feel that you are a very important and significant person?" $\alpha = .79$.

5.2.2.3. Subjective Vitality Scale (SVS; Ryan & Frederick, 1997). Participants completed the seven-item SVS, with items including "I feel alive and vital" and "I feel I have energy and spirit." Internal consistency was $\alpha = .81$.

5.2.2.4. Life satisfaction. We also assessed life satisfaction with the five-item Life Satisfaction Scale (Diener, Emmons, Larsen, & Griffin, 1985; $\alpha = .87$), which involves a 7-point Likert-type scale ranging from 1(*not at all*) to 7(*very true*).

5.2.2.5. The Meaning in Life Questionnaire. The Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006) is a 10-item instrument; we used one of two subscales that measured the presence ($\alpha = .75$) of meaning using a 7-point scale that ranges from 1(*absolutely untrue*) to 7(*absolutely*). Items include "I have discovered a satisfying life purpose."

5.2.2.6. Personal Growth Initiative Scale. The nine-item Personal Growth Initiative Scale (Robitschek, 1998) asked participants to rate the extent to which they agree or disagree with statements including "I know what I need to do to get started to toward reaching my goals." Reliability was acceptable, $\alpha = .74$.

5.2.2.7. Contingent self-esteem. The Contingent Self-Esteem Scale (Kernis, 2003; Kernis & Paradise, 2002; $\alpha = .70$) includes 15 items such as "An important measure of my worth is how well I perform up to the standards that other people have set for me". Participants rated the extent statements using a 1(*not at all like me*) to 5(*very much like me*) scale.

5.2.2.8. Depression. Depression was measured using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977; $\alpha = .88$): Twenty items assessed such symptoms as "I felt sad" and "I could not get going," as experienced over the past month.

5.2.2.9. State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). The STAI assessed state anxiety by asking participants to agree on a 7-point scale to statements that describe how they're feeling (e.g., "I feel calm" (reversed), "I feel jittery," and "I feel anxious"). Present study $\alpha = .88$.

5.2.3. Measures of autonomy from SDT and other theoretical traditions

The GCOS was assessed as in the previous studies, and showed high internal consistency across the subscales, $\alpha s = .81–.89$.

5.2.3.1. Emotional autonomy. Emotional autonomy was measured using the Steinberg and Silverberg's (1986) Emotional Autonomy Scale (EAS), which consisted of two affective scales: non-dependency and individuation, and two cognitive scales: perceiving parents as people and individuation. All scales are designed to measure poor individual or autonomous development and so subscales were considered together (overall $\alpha = .70$). Items include "I wish my parents would understand who I really am". Ryan and Lynch (1989) and Ryan et al. (2005) provided evidence that this measure of autonomy primarily taps independence and detachment from parents rather than the sense of volition and self-regulation that characterizes the SDT definition of autonomy, and as such we expected the IAF should show only modest relations with the EA construct.

5.2.3.2. Sociotropy-autonomy. Sociotropy-autonomy The Sociotropy-Autonomy Scale (SAS; Beck et al., 1983) is a 60-item measure measuring trait-level inclinations toward independence and freedom from external controls, as well as valuing achievement and choice (autonomy; Moore & Blackburn, 1996); and tendencies toward dependency on relationships and valuing of intimacy, guidance, support, and acceptance by others (sociotropy; Blackburn, 1998). The two subscales were derived after participants respond using 5-point scales (sociotropy $\alpha = .71$; autonomy $\alpha = .74$).

5.2.3.3. Self-determination scale (SDS; Sheldon, 1995). Self-determination scale (SDS; Sheldon, 1995) is a 10-item measure asking participants to report the appropriateness of a matched pair of self-determined and non-self-determined options using a 1(*only A feels true*) to 9(*only B feels true*) scale, for example with "A: What I do is often not what I'd choose to do" and "B: I am free to do whatever I decide to do." The scale includes two subscales: awareness of self and perceived choice, which in this study were correlated .71 and were therefore combined for a total self-determination score, $\alpha = .77$.

5.3. Results

5.3.1. Attention

Individuals who scored high on IAF (total score) reported more mindful attention, $r = .48$, $p < .01$, curiosity, $r = .36$, $p < .01$, and self-awareness, $r = .17$, $p < .05$.

5.3.2. Positive and negative well-being

Consistent correlations were also found between the IAF and well-being outcomes. The higher individuals scored on the IAF,

Table 5
Study 4 correlations with personality characteristics and well-being outcomes.

	Congruence	Interest	Control	Total IAF
Personality constructs				
Mindfulness	.17[*]	.57[**]	−.18[*]	.48[**]
Curiosity	.33[**]	.38[**]	−.11	.36[**]
Self-awareness	.43[**]	.32[**]	−.20[*]	.45[**]
Positive well-being indicators				
Positive affect	.34[*]	.28[*]	−.23[**]	.39[**]
Self-esteem	.31[**]	.09	−.40[**]	.40[**]
Vitality	.39[**]	.23[**]	−.40[**]	.49[**]
Life satisfaction	.39[**]	.18[**]	−.38[**]	.45[**]
Clear meaning	.45[**]	.38[**]	−.17[*]	.45[**]
Personal growth	.54[**]	.36[**]	−.22[**]	.51[**]
Negative well-being indicators				
Negative affect	−.23[**]	.08	.52[**]	−.35[**]
CSE total	−.09	−.06	.37[**]	−.23[**]
Depression	−.24[**]	−.03	.52[**]	−.40[**]
Anxiety	−.26[**]	−.01	.53[**]	−.41[**]
Trait autonomy measures				
GCOS imperson	.00	−.17[*]	.26[**]	−.22[**]
GCOS control	−.36[**]	−.24[**]	.33[**]	−.41[**]
GCOS auto	.40[**]	.25[**]	−.18[*]	.38[**]
Emot autonomy	−.05	−.04	−.03	−.02
Sociotropy	−.32[**]	−.25[**]	.02	−.26[**]
Sensitivity control	−.16[*]	−.07	.13	−.02
Self-det: choice	.31[**]	.26[**]	−.43[**]	.49[**]
Self-det; aware	.22[**]	.07	−.39[**]	.34[**]

Notes: Congruence is the authorship/self-congruence subscale, interest is the interest-taking subscale, and control is the susceptibility to control subscale.
[*] *p* < .05.
[**] *p* < .01.

the more they were likely to experience positive well-being indicators such as positive affect, self-esteem, life-satisfaction, a sense of clear meaning in life, and a value for personal growth, *rs* for the IAF total scale averaged .45 (range = .39–.51; see Table 5). Individuals who scored high on the IAF also tended to report less presence of negative well-being indicators, with an average correlation of *r* = .35 (range = .23–.41; Table 5).

5.3.3. Trait autonomy measures

Considering measures of autonomy both within and outside the formulation of SDT, the IAF moderately related to the GCOS autonomy subscale, *r* = .38, *p* < .01, to the self-determination scale choice subscale, *r* = .49, *p* < .01, and negatively to the GCOS control subscale, *r* = −.41, *p* < .01, all SDT derived subscales. A moderate negative relation was found with the Sociotropy scale, *r* = −.36, *p* < .01.

5.3.4. Additional analyses

5.3.4.1. Incremental validity.
To measure incremental validity, the positive and well-being outcomes were combined (standardized and averaged) to reflect an overall measure of well-being. The GCOS subscales, emotional autonomy, self-determination scale (the choice and self-contact subscales), and the sociotropy-autonomy scale (sociotropy and sensitivity to control) were tested as predictors at step 1. Though each scale was tested in a separate hierarchical regression, subscales were tested jointly. To derive R^2 for these subscales we squared the partial correlation taken from each subscale. In the second step, we entered IAF subscales individually in separate regression analyses, and finally the total IAF score in an additional set of analyses. Incremental validity above and beyond other autonomy scales in predicting well-being outcomes is presented in Table 6, where R^2 for step 1 items reflects the squared partial correlations and R^2 for step 2 items reflects the overall variance accounted for by the step. Results showed that above and beyond the variance contributions of the GCOS, emotional autonomy, the self-determination scale, and the sociotro-

py-autonomy scale, each subscale of the IAF predicted additional variability in well-being outcomes, accounting for 19–32% of the variance in well-being above and beyond each of the SDT-based and non-SDT-based scales.

5.3.4.2. Test–retest.
Test–retest reliability was examined by testing the intraclass correlation between time 1 IAF total score, time 2 IAF total score (3 months after the first measurement), and time 3 IAF total score (6 months after the first measurement). Results showed high consistency across time ICC = .86, CI = .81 to .90, *F* = 7.09, *p* < .001. These relations across the 6-month period indicated stability in the construct over time.

5.4. Discussion

Study 4 expanded on the previous studies by linking the IAF to important well-being outcomes, including higher positive well-being (positive affect, self-esteem, and life satisfaction, clear meaning, and personal growth), and lower negative well-being (negative affect, lower contingent self-esteem, depression, and anxiety). In addition, the three subscales of the IAF predicted well-being indicators above and beyond the effects of commonly used scales of dispositional autonomy within the SDT tradition (GCOS and the SDS) and outside the SDT tradition (the emotional autonomy and autonomy-sociotropy scales). Moreover, the scale demonstrated consistency across a 6-month period, supporting the expectation that it taps a fairly stable personality characteristic.

6. Study 5: daily need satisfaction and well-being

The previous studies focused on correlations of the IAF with stable psychological processes and well-being indicators. Yet as well

Table 6
Study 4 Incremental validity.

	Well-being	R^2
GCOS Impersonal	−.46[**]	12%
GCOS Control	−.03	–
GCOS Autonomy	.30[**]	14%
Step 2: Congruence	.17[*]	3%
Step 2: Interest	.31[**]	15%
Step 2: Control	−.37[*]	10%
Total IAF	**.38[**]**	**21%**
Emotional autonomy	−.26[**]	7%
Step 2: Congruence	.39[**]	15%
Step 2: Interest	.28[**]	8%
Step 2: Control	−.55[**]	30%
Total IAF	**.57[**]**	**32%**
SD choice	.41[**]	20%
SD aware	.45[**]	24%
Step 2: Congruence	.20[**]	4%
Step 2: Interest	.35[**]	17%
Step 2: Control	−.27[**]	6%
Total IAF	**.31[**]**	**19%**
Sociotropy	−.45[**]	9%
Sensitivity to control	−.43[**]	8%
Step 2: Congruence	.33[**]	9%
Step 2: Interest	.36[**]	19%
Step 2: Control	−.45[**]	17%
Total IAF	**.41[**]**	**21%**

Notes: The GCOS subscales, emotional autonomy, self-determination scale subscales, and the sociotropy-autonomy scale were tested at step 1 in separate hierarchical regressions. In a first series of regressions, the IAF subscales were entered separately at step 2 in individual regressions; in a final series of regressions we entered the total IAF score at Step 2. As such, R^2 for the IAF reflects the ΔR^2 for the step, with the addition of one IAF predictor. Congruence is the authorship/self-congruence subscale, interest is the interest-taking subscale, and control is the susceptibility to control subscale.
[*] *p* < .05.
[**] *p* < .01.

as relating to broad indicators, dispositional personality variables (such as the IAF) are thought to impact people's day-to-day functioning in predictable ways (Tennen, Affleck, & Armeli, 2005). Studies 5 and 6 were designed to complement the previous results by exploring how the IAF relates to (and presumably shapes) daily experiences. To this end, Study 5 examined whether autonomously functioning individuals would be more likely to experience daily need satisfaction and positive affect, and less likely to incur stress and experience negative affect on a day-to-day basis.

6.1. Method

6.1.1. Participants and procedure

Three hundred and forty-two adults recruited online from a social networking site participated in exchange for the opportunity to win a raffle prize. Of these, 228 were men and 114 were women, and ages ranged from 18 to 49 years ($M = 27$ years). All but 15 spoke English as a first language. Ethnicity was reported to be 74% Caucasian, 8% African–American; 4% Hispanic, 11% Asian–American, and 3% other.

6.1.2. Measures

The IAF was used as in previous studies.

6.1.2.1. Basic Psychological Needs Scale. The nine-item version of the Basic Psychological Needs Scale (La Guardia, Ryan, Couchman, & Deci, 2000; present study $\alpha = .85$) was used to assess daily satisfaction of the needs for autonomy, competence, and relatedness. Participants completed an initial survey assessing the IAF, along with a number of other personality constructs. Then, for the seven days following completion of the initial survey, participants reported on a daily diary survey before going to bed on each day.

6.1.2.2. Daily well-being. Day-specific versions the PANAS and Subjective Vitality Scale were used to assess daily experiences of positive and negative well-being. These scales were used in the same way as in the previous studies with two exceptions. First, questions were rewritten to reflect daily rather than general experiences. Second, factor analyses on the PANAS revealed two separate components representing negative affect items: negative externalized affect (e.g., anger) and negative internalized affect (e.g., sadness). This distinction is made in previous research (e.g., Antaramian, Huebner, Hills, & Valois, 2010), and reflects the more subtle dynamics of emotion as they occur on a short-interval, daily level.

6.1.2.3. Stress. Daily perceived stress was examined with the single item: "How much stress did you experience today?" This item was used in past research to examine daily stress (e.g., Weinstein et al., 2010).

6.2. Results

6.2.1. HLM analyses

Hierarchical linear modeling (HLM) was used due to the nested nature of the diary data within individuals (Bryk & Raudenbush, 1992). Using HLM, the interdependence of person-nested daily data is accounted for and individual differences can be assessed while simultaneously measuring daily relations. HLM is also better able to work with missing data than ordinary least squares regression (Little & Rubin, 1987). Day-end and experience sampling data were analyzed in two separate models. In each model, lower-level (level 1) units were daily provided day-end reports; while higher-level (level 2) units reflected IAF reports provided at the start of the study.

6.2.2. Need satisfaction

See Table 7 for results of HLM analyses. All three subscales correlated with daily experiences of relatedness, autonomous, and competence need satisfactions. The total scale consistently related to daily need satisfactions, Bs = .23 to .28, $ts(334) = 2.26$–2.75, $ps < .05$. Consistent with results at the trait level, the highest relation across the three needs was with daily autonomous need satisfaction.

6.2.3. Well-being

Those scoring highly on the IAF also reported more vitality at the day level, $B = .28$, $t(334) = 2.73$, $p < .01$, more daily positive affect, $B = .34$, $t(334) = 3.30$, $p < .01$, and less daily experiences of stress, $B = -.24$, $t(334) = -2.29$, $p < .05$. The total IAF score also related to less experiences of internalized negative affect on a daily level (e.g., sadness), though there was no relation with externalized negative affect (e.g., anger). These effects were largely consistent across the subscales, with the exception that the interest-taking subscale did not relate to internalized negative affect, $B = -.01$, $t(334) = -0.21$, $p > .05$, a result consistent with findings from the previous study (that this subscale did not consistently correlate with negative well-being indicators).

6.3. Discussion

Results from Study 5 showed that individuals scoring highly on the IAF (on the person level) experienced higher levels of daily need satisfaction, that is, satisfaction of their needs for autonomy, relatedness, and competence (on the day level), as well as well-being on a daily basis, as indicated by higher levels of vitality and positive affect, and lower levels of internalized affect (e.g., sadness) and perceived stress. These findings provided initial evidence that personality-level motivational factors can impact day-to-day functioning in a meaningful way, a finding that complements the previous studies' results across longer time frames.

7. Study 6: daily activities and interactions

Having found that individuals scoring high on the IAF tended to experience higher well-being in their daily life, we sought to explore daily experiences more deeply by directly examining the clearly defined events that take place daily for autonomous individuals, which might have lead to a sense of well-being in the previous diary study. We focused on participants' most important daily activities and interpersonal interactions as two types of important moments that shape well-being in the short- and long-term.

7.1. Method

7.1.1. Participants and procedure

Participants were 132 university students, ages 18–28 years ($M = 21$ years) who took part in exchange for course credit. Of these, 68 were women and 64 men, and 119 students spoke English as a first language. Of participants, 72% were Caucasian, 8% African–American; 6% Hispanic, 9% Asian–American, and 5% identified as another ethnicity. After completing the IAF in an initial lab session participants reported daily, for seven days, on the most important interpersonal interactions and activities, and responded to surveys about these daily experiences.

7.1.2. Measures

7.1.2.1. Interpersonal interactions. Participants responded in reference to the most important interpersonal activity of the day. Specifically, they reported on whether the person/persons with

Table 7
Studies 5 and 6 daily need satisfaction, well-being, interactions, and activities.

	Author B	Interest B	Control B	Total B
Study 5				
Daily need satisfaction				
Autonomy	.22[*]	.30[**]	−.33[**]	.28[**]
Competence	.20[*]	.27[**]	−.28[**]	.24[*]
Relatedness	.20[*]	.22[*]	−.21[*]	.23[*]
Daily positive emotion				
Vitality	.25[*]	.21[*]	−.29[**]	.28[**]
Positive affect	.16[#]	.32[**]	−.18[#]	.34[**]
Daily negative emotion				
Negative internal	−.24[*]	−.02	.25[*]	−.28[**]
Negative external	−.07	−.01	.02	−.01
Stress	−.18[#]	−.20[*]	.24[*]	−.24[*]
Study 6				
Interpersonal interaction				
Close	.30[**]	.26[**]	−.35[**]	.34[**]
Autonomy	.31[**]	.32[**]	−.39[**]	.40[**]
Competence	.22[*]	.21[*]	−.21[*]	.22[*]
Relatedness	.37[**]	.22[*]	−.36[**]	.38[**]
Meaning[a]	.20[*]	.19[*]	−.34[*]	.23[*]
Happiness[a]	.28[**]	.24[*]	−.38[**]	.31[**]
Activities				
Choiceless (control)	−.31[**]	−.19[*]	.40[**]	−.35[**]
Guilt (control)	−.26[**]	−.20[*]	.38[**]	−.41[**]
Value (autonomy)	.27[**]	.24[*]	−.29[**]	.29[**]
Enjoy (autonomy)	.26[**]	.36[**]	−.18[*]	.31[**]
Reward	.23[*]	.21[*]	−.31[**]	.30[**]
Energize	.27[**]	.23[*]	−.33[**]	.31[**]

[#] $p < .08$.
[*] $p < .05$.
[**] $p < .01$.
[a] Analyses controlled for meaning or happiness before the interaction.

whom they interacted was/were primarily: stranger(s) (8%), acquaintance(s) (22%), friend(s) (39%), or family member(s) (31%). They then reported on how close they felt to the person/persons with which they interacted on a scale of 1(*not at all*) to 5(*very close*). Using the same scale, participants next described the extent to which the interaction satisfied basic psychological needs, adapted from the Basic Need Satisfaction scale (Ilardi et al., 1993), stating how "capable and effective" (*competence*), "close and intimate" (*relatedness*), and "free to be who I am" (*autonomous*) they felt before and after these events. They also reported on how much life meaning they experienced after the interaction on the same scale, with the item: "I have a sense of life meaning", and how happy they felt, with a single item: "I feel happy". Finally, participants were asked to report on a forced choice scale whether the person was "similar" or "different" from them by selecting one of these two options.

7.1.2.2. Activities.
Participants were also asked to reflect on the most important or time-consuming activity of the day. They then described the motivation for the activity, adapted from the perceived locus of causality scales (Ryan & Connell, 1989) for use with general activities and in a diary context. Items were "I felt I had no choice" (control motivation), "I would feel guilty or ashamed if I didn't do the activity" (control motivation), "I personally valued the activity" (autonomy motivation), and "I enjoyed the activity" (autonomy motivation). Finally, they reported on how rewarding and energizing the activity was using one item each. Scales for both measures ranged from 1(*Not at all*) to 5(*Completely*).

7.2. Results

Analyses were conducted using HLM as in Study 5. Table 7 presents results for both interpersonal interactions and activities.

7.2.1. Interpersonal interactions
On a day-to-day level, autonomously functioning participants reported feeling more close to individuals with whom they interacted, $B = .34$, $t(127) = 3.58$, $p < .01$. An exploratory interaction examined closeness with targets perceived to be similar or different from oneself, interaction $B = .16$, $t(127) = 2.49$, $p < .05$, and simple effects showed that individuals scoring high on the IAF felt equally close to interaction partners who were similar to and different from them, $B = .10$, $t(127) = 1.12$, $p > .05$, while individuals scoring low on the scale felt closer to those who were similar to them, $B = .21$, $t(127) = 2.36$, $p < .05$.

In addition, autonomous participants derived more need satisfaction from their daily interactions, $B = .22–.40$, $ts(127) = 2.31–4.19$, $ps < .05$. Of these relations, the highest were with autonomy need satisfaction, an expected finding considering the direct conceptual link between the two constructs (acting from an autonomous motive should directly helps one to feel that he or she is acting autonomously), and one that mirrors findings from the previous studies. After their interpersonal interactions, individuals scoring high on the IAF also reported experiencing more life meaning, $B = .23$, $t(127) = 2.49$, $ps < .05$, and happiness, $B = .31$, $ts(127) = 3.24$, $p < .01$, findings that inform the daily well-being results from Study 5.

7.2.1.1. Activities.
With respect to their most important daily activities, participants scoring high on the IAF reported less choicelessness (more choice, $B = .35$, $t(127) = −3.68$, $p < .01$), less guilt or shame, $B = .41$, $t(127) = −4.10$, $p < .01$, more valuing, $B = .29$, $t(127) = 3.01$, $p < .01$, and more enjoyment, $B = .31$, $t(127) = 3.30$, $p < .01$, as factors motivating their daily activities. Thus, those higher on the IAF reported motivations for daily activities that were consistently more autonomous; these effects were present and in the expected directions across the subscales. Moreover, after they

engaged in important daily activities, individuals scoring high on the IAF experienced a greater sense of personal reward, $B = .30$, $t(127) = 3.09$, $p < .01$, and were more energized, $B = .31$, $t(127) = 3.35$, $p < .01$. These results were in line with results reported above indicating that these individuals experienced more rewarding interactions (this study) and had generally higher well-being throughout the day (Study 5).

7.3. Discussion

Previous studies presented in this paper demonstrated relations of the IAF with helpful personality characteristics and attention process, and a diversity of positive and negative well-being indicators. Studies 5 and 6 expanded on these results by showing that the IAF relates to daily as well as trait experiences as would be expected for autonomous individuals. Results showed that individuals scoring highly on the IAF felt more need satisfied and reported more well-being throughout their days. Study 6 focused on specific daily events; namely important interpersonal interactions and activities. Results showed that individuals scoring high on the IAF felt more interpersonal closeness after their interactions, and were open to feeling close with both similar and dissimilar others. The latter results implied that individuals scoring high on the IAF may be more open to a diversity of others, a result that mirrors previous expectations with respect to the effects of autonomy on relationships (e.g., Weinstein et al., 2010).

After their daily interactions, autonomous individuals reported more need satisfaction, a sense of life meaning, and happiness. In addition and important for scale validation, individuals scoring high on all three subscales were autonomously motivated to engage their daily activities, and found these more enjoyable and rewarding.

8. Study 7: lab-based collaborative interactions

Because interpersonal functioning is an important component thought to emerge from an autonomous orientation (e.g., Hodgins, Koestner, & Duncan, 1996; Hodgins et al., 2010; Weinstein & Ryan, 2010), the previous studies (particularly Studies 3 and 6) sought to examine interpersonal outcomes related to the IAF in naturalistic settings. Study 7 was aimed at providing lab-based support for the relation between the IAF and interpersonal interactions. To this end, we adopted techniques that have related state autonomy manipulations to dyadic functioning in previous research (Weinstein et al., 2010). We hypothesized that individuals scoring highly on the IAF would take advantage of an interaction to connect with their partner, and would be more likely to show positive relational behaviors such as empathy. We also anticipated individuals scoring high on the IAF (more autonomous) would be more likely to approach the interaction with an autonomous motivation.

8.1. Method

8.1.1. Participants

One hundred and ninety university students (54 men, 136 women) participated in the study for course credit, aged 18–24 ($M = 20$ years). Of the sample, 5% were black, 5% Hispanic, 17% Pacific Islander or Asian, 66% Caucasian, and 7% identified as another ethnicity.

8.1.2. Materials

The IAF (present study $\alpha = .82$), PANAS (PA: $\alpha = .79$; NA: $\alpha = .81$), and BIDR ($\alpha = .77$) were used as in previous studies.

8.1.2.1. Domain specific autonomous motivation. To assess the degree to which individuals were autonomous for the task, we used an adapted version the self-regulation questionnaire (Ryan, Rigby, & King, 1993) for the current task. Participants were asked to respond on a scale of 1(*not at all true*) to 7(*very true*) to how true each of eight statements were, including "I engaged in the remote association task because...I had no choice" (control), and "because it was personally important to me to do so" (autonomy). Four items assessing autonomy were averaged ($M = 4.25$), as were four items assessing control ($M = 3.61$). Autonomy and control motivations were computed separately; reliabilities were $\alpha = .79–.81$.

8.1.2.2. Perceived closeness. Feelings of closeness are indicative of healthy relationships (Hornstein, 1985). Participants responded to the eight-item relatedness subscale of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989; Ryan, 1982), considering how they felt with respect to their partners. Items included "I would feel really distant to this person" (r), and "I would like a chance to interact with this person more often" using scales ranging from 1(*not at all true*) to 5(*very true*). Internal reliability was high ($\alpha = .83$).

8.1.2.3. Perceived contributions by partner. Participants responded to a single item asking to what degree they felt they or their partners contributed to the task. The item was scaled from 1(*I was fully responsible for our success*) to 7(*my partner was fully responsible for our success*). Contributions attributed to partners reflected higher valuing of partners above self-interest.

8.1.2.4. Empathy. Empathy was measured with nine items adapted from the Balanced Emotional Empathy Scale (BEES; Mehrabian, 1969). Items included "the emotions of the other participant easily rubbed off on me," and "I was trying to put myself in the other participant's shoes." Participants responded using a 1(*strongly disagree*) to 7(*strongly agree*) scale ($\alpha = .83$).

8.1.2.5. Chair closeness. To measure interpersonal closeness at the end of the study, we used a task developed by Vohs, Mead, and Goode (2006), in which participants are allowed to select how near to one another they prefer to sit. Pairs were taken to the 'debriefing room' at the end of the study, where two chairs were placed stacked on one another. Pairs were asked to pull up the chairs so that they may be debriefed together. Distance reflected the closeness experienced between the participants. Participants sat between 9.2″ and 21.4″ away from one another ($M = 12.8″$).

8.1.3. Procedure

Participants first completed an online survey assessing individual differences (including biased responding and the IAF). One day later participants attended a single lab session and were randomly assigned to dyads. Participant pairs received instructions for completing the task (the Remote Associations Task, RAT; Mednick, 1962) based on a design used by Weinstein and colleagues (2010), and two sample sets with answers. Dyads then worked jointly for 8 min on the RAT, a creative task that elicits joint engagement, which served as the context for interacting sharing one answer sheet and pencil. This task involves finding common associations for sets of words; for example "stop," "petty," and "sneak" can be linked by the concept "thief." The RAT requires participants to find a common concept linking three seemingly unrelated concepts. Participants were instructed to come to agreement about terms before recording them on the given sheet.

After completing the task, each participant was led to a separate lab room, and completed a second online survey set assessing mood, recall of contributions, and empathy, as well as the task motivation questionnaire. Before leaving, participants were

returned to one lab room, told that they would be debriefed together, and asked to set up their chairs next to one another to discuss study procedures with the experimenter. Distance of the chairs inversely reflected closeness at the end of the study (Vohs et al., 2006).

8.2. Results

8.2.1. Data analytic strategy

Hierarchical linear model was used as in Studies 5 and 6, but in this study level 1 data reflected individual differences nested in dyads. Analyses controlled for biased responding and affect at the start of the study (at level 1).

8.2.2. Primary results

Table 8 presents results for primary analyses. Analyses demonstrated that individuals scoring highly on the IAF were more autonomously motivated for the task, $B = .41$, $t(185) = 4.19$, $p < .01$. Additionally, those higher on the IAF reported more closeness and sat themselves closer to one another, $Bs = .30$ & .31, $ts(185) = 3.08$ and 3.30, $ps < .01$. As well as experiencing closeness with their partners, individuals scoring high on the IAF also adopted a more prosocial approach to their partners, reporting more empathy and attributing more contributions to their partners, $Bs = .24$ and .27, $ts(185) = 2.51$ and 2.69, $ps < .05$. Finally, the IAF predicted positive and negative affect in the expected directions: positive affect, $B = .21$, $t(185) = 2.23$, $p < .05$, and negative affect, $B = -.23$, $t(185) = -2.46$, $p < .05$.

8.3. Discussion

When asked to complete a collaborative task, individuals who were assessed as autonomous by the IAF approached the task with a more prosocial attitude in that they reported more empathy for partners, were more likely to recognize partners' strengths, and utilized the task experience to foster interpersonal closeness. Additionally, as a result of shared experiences, those higher in IAF were more likely to experience benefits in terms of more positive affect, a finding paralleling the diary results attained in Study 6 for interpersonal encounters in daily life.

9. General discussion

The present studies were aimed to develop and validate a reliable self-report scale of dispositional autonomy, the Index of Autonomous Function (IAF), with three subscales. Autonomous individuals were expected to view themselves as the author of behavior and to assent to their actions (Ryan & Deci, 2004), and we therefore developed an *Authorship/Self-Congruence* subscale. We also expected they their behavior would reflect interest-taking and reflective self-understanding, thus facilitating a non-reactive and more integrated style of behavioral regulation (Deci & Ryan, 1985a; Loevinger, 1976; Ryan & Deci, 2006; White, 1963), as reflected in the *Interest-Taking* subscale. Finally, we developed the *Susceptibility to Control* subscale as a reverse loading subscale that reflected a tendency to view behavior as a response to self-imposed expectations or pressure from others (Meissner, 1988; Ryan & Connell, 1989).

The IAF was systematically constructed based upon both theoretical and empirical considerations. We first collected accounts from SDT researchers to identify appropriate subscales for an underlying autonomy construct, and recruited other experts in the area of human motivation to identify paradigmatic items for these subscales. As well, we refined the item selection using a data-driven approach, retaining items that showed high variability

Table 8
Study 7 relations with IAF subscales.

	Author B	Interest B	Control B	Total B
Autonomous motivation	.37[**]	.31[**]	−.39[**]	.41[**]
Perceived closeness	.30[**]	.28[**]	−.26[**]	.30[**]
Behavioral closeness	.31[**]	.23[*]	−.28[**]	.31[**]
Empathy	.23[*]	.26[**]	−.20[*]	.27[*]
Partner contributions	.20[*]	.20[*]	−.23[**]	.24[*]
Positive affect	.21[*]	.19[*]	−.21[*]	.21[*]
Negative affect	−.22[*]	−.17[#]	.24[*]	−.23[*]

[#] $p < .08$.
[*] $p < .05$.
[**] $p < .01$.

and consistent loadings using conservative benchmarks in determining both. Across all studies, the resulting IAF demonstrated internal consistency, a coherent factor structure, and strong predictive ability. In addition, IAF responses showed stability across a 6-month time span.

This procedure resulted in a useful scale of dispositional autonomy, and it strategically explored the central elements of autonomous functioning. The three factors that emerged from initial tests of the IAF consistently and highly correlated with other features we believed would be associated with autonomy. This thus provides a transparent operational understanding of autonomy, which can guide future research and inform theoretical comparisons within areas (for example, contributing to the self-determination literature on dispositional autonomy), and between areas (for example, contrasting self-determination theory with the sociotropy-autonomy literature; Beck et al., 1983).

Though the IAF relies on the measurement of three distinct factors, consistent findings for the subscales (as seen in the tables) across the seven studies suggested that the most parsimonious way to assess autonomy is by using the total score averaged across the subscales. Keeping this in mind, it is important to note that the correlations between the subscales are moderate (in part because items were selected so as not to cross-load), and researchers who wish to use individual subscales are thus justified in doing so. Also, as seen in tables, at times the scales showed different predictive patterns. For example Study 4 (Table 5) indicated that negative well-being indicators (negative affect, depression, anxiety) appear to be driven by Susceptibility to Control, whereas processes reflective of openness to experience, such as curiosity and self-awareness, are more strongly predicted by the Authorship/Self-Congruence and Interest-Taking subscales. Thus, there appear to be appropriate areas of study where one or two subscales may be selected, or be expected to differentially relate to other constructs.

9.1. Scale validation

The studies presented here provided conceptual validation for the IAF by way of evaluating its position within a nomological net of related and unrelated constructs. Developmentally we might expect that autonomy-supportive parenting styles would be associated with greater trait autonomy (Deci & Ryan, 2002; Mahler, Pine, & Bergman, 1975), and indeed we found they related when using this measure. In addition, we found robust correlations with satisfaction of each of the three basic psychological needs, a promising finding considering the strong theoretical links between these constructs within the SDT tradition (Deci & Ryan, 1985b; Ryan & Deci, 2000). Complementing this, we found lower correlations with the subscales of the Big-5 traits, and particularly with conscientiousness, neuroticism, and agreeableness, all constructs thought to be distinct from the motivational processes that underlie an

autonomous orientation (McCrae & Costa, 2003). Our finding that the IAF moderately correlated with the subscales of the Big-5 is consistent with the literature in dispositional autonomy, which suggests the two sets of constructs are distinct but related (Olesen, 2011).

The IAF also related to a number of indicators of well-being, consistent with expectations that autonomous individuals tend to experience a sense of wellness (Ryan & Deci, 2001; Weinstein & Ryan, 2010). We found these patterns by testing general reports of positive and negative well-being (Study 4), as well as by using reports of well-being experienced in daily experiences (Studies 5 and 6, using diary designs). Interestingly, although the overall scale and two of its subscales consistently related to both positive and negative indicators of well-being the interest-taking subscales did not relate to negative well-being (e.g., sadness, anxiety, anger), indicating that not all aspects of an autonomous orientation effectively inhibit negative emotions. Rather, one's willingness to engage and explore inner emotional experiences might expectably result in negative emotions as often as positive ones.

9.2. Contributions to the literature

The findings across these present studies aimed to validate the IAF but they also made a number of theoretical contributions to the broader literature. Important to both motivation and personality literatures, the present studies demonstrated the importance of trait-level predictors for outcomes such as well-being and interpersonal functioning. Whereas much of research in motivation focuses on contextual influences and state level motivation, we argue and demonstrate that stable dispositional motivational influences can also have a robust impact. Dispositional processes may provide useful independent predictors in future research or they may moderate the effects of contextual factors, for example autonomous functioning may act on contextual factors by ameliorating harmful motivational influences (e.g., harmful motivational effects of deadlines and being observed; Amabile, DeJong, & Lepper, 1976) or by encouraging receptiveness to beneficial ones (e.g., meaningful feedback).

An additional contribution is to the area of human motivation and relationships. Some have argued that autonomous motivation and interpersonal closeness are incompatible, but self-determination theory argues instead that autonomy and relatedness go hand in hand (for review of this controversy see Hodgins et al., 1996). The present research provides compelling support for conceptual models that suggest that an autonomous orientation is in line with interpersonal relationships and promotes intimacy and closeness in interactions (Hodgins et al., 1996; La Guardia & Patrick, 2008; Weinstein et al., 2010). Across the present studies, the IAF was consistently predictive of openness to experiencing closeness with others. The final lab-based study showed that individuals high on the IAF, when asked to perform a task with a partner, took the opportunity to experience more closeness with their partners (both self-reported and behavioral), and interacted with a more prosocial mindset, providing more empathy and recognizing partner successes. These results were consistent with those with both trait measures (Study 3) and daily diary reports (Studies 5 and 6) showing that autonomous individuals are more connected, and that they take advantage of opportunities for interacting with others to derive more well-being benefits.

Findings from these studies indicated the IAF related to other measures of autonomy, both those within the SDT tradition and from other theoretical traditions. Yet, correlations were moderate, indicating the IAF is a distinct measure. Important for scale validation, the IAF also showed predictive ability above and beyond the GCOS autonomy subscale, emotional autonomy, the self-determination scale, and the SAS, with its subscales accounting for

12–32% of the variance beyond these other measures in a number of outcomes specifically pertinent to autonomy. Thus the IAF may provide benefits over existing scales in some predictive contexts. In addition, we believe that a major contribution of the IAF is that it assesses autonomy in a transparent way using theoretically and empirically derived items and constructs founded in both classical and new literature (e.g., Deci & Ryan, 1985a; Dworkin, 1988; Mead, 1934; Pfander, 1911; Sartre, 1956). That is, the new scale provides a self-evident operationalization of autonomy that can guide future research, and be expanded or built upon.

Future studies could extend the present research in a number of ways. First, the IAF may prove useful in clinical samples and as a way to understand mental health symptoms, particularly having to do with disorders that have a strong environmental etiology such as anxiety and substance use (e.g., Kendler, Health, Martin, & Eaves, 1987; Krueger et al., 2002). Future research validating this measure in clinical populations would therefore open the door to extensive additional research linking the areas of human motivation and clinical psychology. In addition, the IAF should be tested in diverse cultures. In line with fundamental SDT assertions we propose that basic relations of dispositional autonomy would extend to different cultures, with comparable benefits to well-being and relationships. Finally, future research may use the IAF to test autonomous functioning across the life span. The questions of how autonomous functioning may change as individuals age has to date been under-explored in the literature.

9.3. Closing remarks

The present studies were designed to validate the IAF, and illustrate the scale's relations with dispositional and state outcomes using multiple methods including survey, experience sampling, and lab-based designs. Yet these studies provided only an initial validation of this measure, in primarily student samples, and largely (though not exclusively) in the West. Moreover, with the exception of Study 7, the studies relied heavily on self-reported correlates of the IAF. As such, we have little understanding as to the range of behavioral and physiological correlates of the IAF. Finally, the present studies examined the IAF in relation to several scales in the human motivation domain (e.g. Self-determination scale, GCOS) but not all related assessments. For example the present research did not examine links between the IAF and measures of well-being such as the PWB (Ryff & Keyes, 1995) or the Authenticity Scale (Wood, Linley, Maltby, Baliousis, & Joseph, 2008). The two measures can be differentiated from the IAF in that they have emerged from different theoretical traditions and reflect mental health or well-being constructs rather than motivational ones. Analyses presented in these studies were focused on comparisons with scales more immediately relevant to human motivation and emerging from SDT (e.g., GCOS, self-determination scale). Although measures such as these are differentiated from the IAF on theoretical grounds, future research should compare the IAF to these measures, as well.

Despite these limitations, the present studies met their aims to develop and validate a consistent, empirically and theoretically founded measure of dispositional autonomy, with high predictive ability. Such a scale may facilitate further explorations into the nature of autonomy and relations with positive personality development and functioning.

References

Amabile, T. M., DeJong, W., & Lepper, M. (1976). Effects of externally imposed deadlines on intrinsic motivation. *Journal of Personality and Social Psychology, 34,* 92–98.

Antaramian, S. P., Huebner, S., Hills, K. J., & Valois, R. F. (2010). A dual-factor model of mental health: Toward a more comprehensive understanding of youth functioning. *American Journal of Orthopsychiatry, 80*(4), 462–472.

Arbuckle, J. L. & Wothke, W. (1999). *Amos 4.0 user's guide.* Chicago, IL: SPSS.

Beck, A. T., Epstein, N., Harrison, R. P., & Emergy, G. (1983). *Development of the sociotropy-autonomy scale: A measure of personality factors in psychopathology.* University of Pennsylvania, Philadelphia: Unpublished manuscript.

Blackburn, I. M. (1998). Cognitive therapy. In A. S. Bellack & M. Hersen (Eds.). *Comprehensive clinical psychology* (Vol. 1, pp. 51–84). New York: Pergamom.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Minfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211–237.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models.* Newbury Park, CA: Sage.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267–283.

Chamberlain, J. M., & Haaga, D. A. F. (2001). Unconditional self-acceptance and psychological health. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 19*, 163–176.

Cicchetti, D. (1991). Fractures in the crystal: Developmental psychopathology and the emergence of the self. *Developmental Review, 11*, 271–287.

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7*, 309–319.

Collins, R. P., Litman, J. A., & Spielberger, C. D. (2004). The measurement of perceptual curiosity. *Personality and Individual Differences, 36*, 1127–1141.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO PI-R professional manual.* Odessa, FL: Psychological Assessment Resources, Inc.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10*(7), 1–9.

de Charms, R. (1968). *Personal causation.* New York: Academic Press.

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62*, 119–142.

Deci, E. L., & Ryan, R. M. (1985a). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

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

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 4*, 227–268.

Deci, E., & Ryan, R. (Eds.). (2002). *Handbook of self-determination research.* Rochester, NY: University of Rochester Press.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71–75.

Dworkin, G. (1988). *The theory and practice of autonomy.* New York: Cambridge University Press.

Everitt, S. (1975). Multivariate analysis: The need for data, and other problems. *British Journal of Psychiatry, 126*, 2S7–240.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*(3), 286–299.

Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*, 199–223.

Grolnick, W. S., Deci, E. L., & Ryan, R. M. (1997). Internalization within the family: The self-determination theory perspective. In J. E. Grusec & L. Kuczynski (Eds.), *Parenting and children's internalization of values* (pp. 135–161). New York: Wiley.

Hansell, S., & Mechanic, D. (1985). Introspectiveness and adolescent symptom reporting. *Journal of Human Stress, 11*, 165–176.

Hmel, B. A., & Pincus, A. L. (2002). The meaning of autonomy: On and beyond the interpersonal circumplex. *Journal of Personality, 70*(3), 277–310.

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., Weisbust, K. S., Weinstein, N., Shiffman, S., Miller, A., Coombs, G., et al. (2010). The cost of self-protection: Threat response and performance as a function of autonomous and controlled motivations. *Personality and Social Psychology Bulletin, 36*, 1101–1114.

Hornstein, G. A. (1985). Intimacy in conversational style as a function of the degree of closeness between members of a dyad. *Journal of Personality and Social Psychology, 49*, 671–681.

Ilardi, B. C., Leone, D., Kasser, R., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology, 23*, 1789–1805.

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

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22*, 280–287.

Kendler, K. S., Health, A. C., Martin, N. G., & Eaves, L. J. (1987). Symptoms of anxiety and symptoms of depression: Same genes, different environments? *Archives of General Psychiatry, 44*(5), 451–457.

Kernis, M. H. (2003). Toward a conceptualization of optimal self-esteem. *Psychological Inquiry, 14*, 1–26.

Kernis, M. H., & Paradise, A. W. (2002). Distinguishing between secure and fragile forms of high self-esteem. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 330–360). Rochester, NY: University of Rochester Press.

Kline, P. (1994). *An easy guide to factor analysis.* New York: Routledge.

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.

Koestner, R., Bernieri, F., & Zuckerman, M. (1992). Self-regulation and consistency between attitudes, traits, and behaviors. *Personality and Social Psychology Bulletin, 18*, 52–59.

Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being highly motivated: A closer look at introjection, identification, and intrinsic motivation. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 101–121). Rochester, NY: University of Rochester Press.

Koestner, R., Losier, G. F., Vallerand, R. J., & Carducci, D. (1996). Identified and introjected forms of political internalization: Extending self-determination theory. *Journal of Personality and Social Psychology, 70*, 1025–1036.

Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior and personality: Modeling the externalizing spectrum. *Journal of Abnormal Psychology, 111*(3), 411–424.

Kuhl, J., & Kazen, M. (1994). Volitional aspects of depression: State orientation and self-discrimination. In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action vs. state orientation* (pp. 297–315). Gottingen, Germany: Hogrefe.

La Guardia, J. G., & Patrick, H. (2008). Self-determination theory as a fundamental theory of close relationships. *Canadian Psychology, 49*, 201–209.

La Guardia, J. G., & Ryan, R. M. (2007). Why identities fluctuate: Variability in traits as a function of situational variations in autonomy support. *Journal of Personality, 75*, 1205–1228.

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*, 367–384.

Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data.* New York: Wiley.

Loevinger, J. (1976). *Ego development.* San Francisco: Jossey-Bass.

Mahler, M. S., Pine, F., & Bergman, A. (1975, 2000). *The psychological birth of the human Infant: Symbiosis and individuation.* Basic Books.

McAuley, E., Duncan, T., & Tammen, V. V. (1989). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport, 60*, 48–58.

McCrae, R. R., & Costa, P. T. (1997). Personality trait structures as a human universal. *American Psychologist, 52*, 509–516.

McCrae, R. R., & Costa, P. T. (2003). *In personality in adulthood: A five-factor theory perspective* (2nd ed.). New York: Guilford.

Mead, G. H. (1934). In C. W. Morris (Ed.), *Mind, self, and society.* University of Chicago Press.

Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review, 69*, 220–232.

Mehrabian, A. (1969). Significance of posture and position in the communication of attitude and status relationships. *Psychological Bulletin, 71*, 359–372.

Meissner, W. W. (1988). *Treatment of patients in the borderline spectrum.* Northvale, NJ: Jason Aronson.

Moore, R. G., & Blackburn, I. M. (1996). The stability of sociotropy and autonomy in depressed patients undergoing treatment. *Cognitive Therapy and Research, 20*, 69–80.

Niemiec, C. P., Lynch, M. F., Vansteenkiste, M., Bernstein, J., Deci, E. L., & Ryan, R. M. (2006). The antecedents and consequences of autonomous self-regulation for college: A self-determination theory perspective on socialization. *Journal of Adolescence, 29*, 761–775.

O'Brien, E. J., & Epstein, S. (1988). *MSEI: Multidimensional self-esteem inventory.* Odessa, FL: Psychological Assessment Resources.

Olesen, M. H. (2011). General causality orientations are distinct from but related to dispositional traits. *Personality and Individual Differences, 51*, 460–465.

Paulhus, D. L. (1988). *Assessing self-decision and impression management in self-reports: The balanced inventory of desirable responding.* University of British Columbia, Vancouver, Canada: Unpublished manual.

Perls, F. S. (1973). *The Gestalt approach and eyewitness to therapy.* New York: Bantam Books.

Pfander, A. (1911). Motive und motivation. In A. Pfander (Ed.), *Munchener philosophische abhandlungen (Festschrift fur Theodor Lipps)* (pp. 163–195). Leipzig: Barth.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385–401.

Ricoeur, P. (1950, 1966). *Freedom and nature: The voluntary and the involuntary, trans. Erazim Kohak.* Evanston: Northwestern University Press.

Robbins, R. J. (1994). *An assessment of perceptions of parental autonomy support and control: Child and parent correlates.* Department of Psychology, University of Rochester: Unpublished Doctoral Dissertation.

Robitschek, C. (1998). Personal growth initiative: The construct and its measure. *Measurement and Evaluation in Counseling and Evaluation, 30*, 183–198.

Roth, G., Assor, A., Kanat-Maymon, Y., & Kaplan, H. (2007). Autonomous motivation for teaching: How self-determined teaching may lead to self-determined learning. *Journal of Educational Psychology, 99*, 761–774.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450–461.

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

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

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78.

Ryan, R. M., & Deci, E. L. (2001). To be happy or to be self-fulfilled: A review of research on hedonic and eudaimonic well-being. In S. Fiske (Ed.), *Annual review of psychology* (Vol. 52, pp. 141–166). Palo Alto, CA: Annual Reviews/Inc.

Ryan, R. M., & Deci, E. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality, 74*, 1557–1586.

Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–33). Rochester, NY: University of Rochester Press.

Ryan, R. M., & Deci, E. L. (2004). Autonomy is no illusion: Self-determination theory and the empirical study of authenticity, awareness, and will. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology*. New York: Guilford.

Ryan, R. M., Deci, E. L., Grolnick, W. S., & LaGuardia, J. G. (2006). The significance of autonomy and autonomy support in psychological development and psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology: Theory and methods* (2nd ed., Vol. 1, pp. 295–849). New York: John Wiley & Sons.

Ryan, R. M., & Deci, E. L. (2003). On assimilating identities to the self: A self-determination theory perspective on internalization and integrity within cultures. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self and identity* (pp. 253–272). New York: Guilford.

Ryan, R. M., & Frederick, C. M. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*, 529–565.

Ryan, R. M., La Guardia, J. G., Solky-Butzel, J., Chirkov, V. I., & Kim, Y. (2005). On the interpersonal regulation of emotions: Emotional reliance across gender, relationships, and culture. *Personal Relationships, 12*, 146–163.

Ryan, R. M., & Lynch, J. (1989). Emotional autonomy versus detachment: Revisiting the vicissitudes of adolescence and young adulthood. *Child Development, 60*, 340–356.

Ryan, R. M., Rigby, C. S., & King, K. (1993). Two types of religious internalization and their relations to religious orientations and mental health. *Journal of Personality and Social Psychology, 65*, 586–596.

Ryff, C., & Keyes, C. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*, 719–727.

Sartre, J. P. (1956). *Being and nothingness*. New York: Philosophical Library.

Scherhorn, G., & Grunert, S. C. (1988). Using the causality orientations concept on consumer behavior research. *Journal of Consumer Psychology, 13*, 33–39.

Shapiro, D. (1981). *Autonomy and rigid character*. New York: Basic Books.

Sheldon, K. M. (1995). Creativity and self-determination in personality. *Creativity Research Journal, 8*, 25–36.

Spielberger, C. D., Gorsuch, R. C., & Lushene, R. E. (1970). *Manual for the state trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53*, 80–93.

Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development, 57*, 841–851.

Tennen, H., Affleck, G., & Armeli, S. (2005). Personality and daily experience revisited. *Journal of Personality, 73*, 1465–1483.

Vallerand, R. J., Deci, E. L., & Ryan, R. M. (1987). Intrinsic motivation in sport. In K. Pandolf (Ed.). *Exercise and sport science reviews* (Vol. 15, pp. 389–425). New York: Macmillan.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 271–360). New York: Academic Press.

Vansteenkiste, M., Ryan, R. M., & Deci, E. L. (2008). 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* (pp. 187–223). Oxford: Oxford University Press.

Vohs, K. D., Mead, N. L., & Goode, M. R. (2006). The psychological consequences of money. *Science, 314*, 1154–1156.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative mood: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.

Weinstein, N., Deci, E., & Ryan, R. M. (2011). Motivational determinants of integrating positive and negative past identities. *Journal of Personality and Social Psychology, 100*, 527–544.

Weinstein, N., Hodgins, H. S., & Ryan, R. M. (2010). Autonomy and nondefense in dyads: The effect of primed motivation on interaction quality and joint creative performance. *Personality and Social Psychology Bulletin, 36*(12), 1603–1617.

Weinstein, N., & Ryan, R. M. (2010). When helping helps: An examination of motivational constructs underlying prosocial behavior and their influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology, 98*, 222–244.

Weinstein, N., & Ryan, R. M. (2011). A motivational approach to stress response and adaptation. *Stress and Health, 1*, 4–17.

White, R. W. (1963). *Ego and reality in psychoanalytic theory*. New York: International Universities Press.

Wild, J. (1965). Authentic existence: A new approach to "value theory". In J. M. Edie (Ed.), *An invitation to phenomenology* (pp. 59–78). Chicago: Quadrangle.

Wood, A. M., Linley, P. A., Maltby, J., Baliousis, M., & Joseph, S. (2008). The authentic personality: A theoretical and empirical conceptualization and the development of the authenticity scale. *Journal of Counseling Psychology, 55*(3), 385–399.

Zuckerman, M., Gioioso, C., & Tellini, S. (1988). Control orientation, self-monitoring, and preference for image versus quality approach to advertising. *Journal of Research in Personality, 22*, 89–100.