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Curiosity and Exploration: Facilitating Positive Subjective Experiences and Personal Growth Opportunities

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In an effort to expand research on curiosity, we elaborate on a theoretical model that informs research on the design of a new measure and the nomological network of curiosity. Curiosity was conceptualized as a positive emotional-motivational system associated with the recognition, pursuit, and self-regulation of novelty and challenge. Using 5 independent samples, we developed the Curiosity and Exploration Inventory (CEI) comprising 2 dimensions: exploration (appetitive strivings for novelty and challenge) and absorption (full engagement in specific activities). The CEI has good psychometric properties, is relatively unaffected by socially desirable responding, is relatively independent from positive affect, and has a nomological network consistent with our theoretical framework. Predicated on our personal growth facilitation model, we discuss the potential role of curiosity in advancing understanding of various psychological phenomena.

Dictionaries commonly define *curiosity* as a "disposition to inquire, investigate, or seek after knowledge; a desire to gratify the mind with new information or objects of interest; inquisitiveness" (see online version of C. & G. Merriam Co., 1913). Curiosity therefore overlaps with other psychological constructs (e.g., behavioral activation system, positive affect, sensation seeking). In presenting theory and research that distinguishes curiosity from related constructs, curiosity is defined as a positive emotional-motivational system associated with the recognition, pursuit, and self-regulation of novel and challenging opportunities.

CURIOSITY: A THEORETICAL FRAMEWORK

Like others (Depue, 1996; Spielberger & Starr, 1994), we posit that curiosity is an important motivational component (but not the only one) that links cues reflecting novelty and challenge (internal or external) with growth opportunities. A primary facilitator of personal growth is sensitivity to its prerequisites. Curiosity prompts proactive, intentional behaviors in response to stimuli and activity with the following properties: novelty, complexity, uncertainty, and conflict. Berlyne (1960, 1967, 1971) has proposed two types of exploratory tendencies in response to these properties: (a) diversive curiosity—actively seeking out varied sources of novelty and challenge and (b) specific curiosity—actively seeking depth in one's knowledge and experience with a particular stimulus or activity. These two components seem to work in tandem such that diversive curiosity fosters contact with new stimuli and opportunities, and specific curiosity is activated by those stimuli with inherent uncertainty and complexity that can be further enjoyed by obtaining more information (Day, 1971; Krapp, 1999). This two-dimensional structure has been largely neglected in prior assessments of curiosity, with a recent and promising exception (Littman & Spielberger, 2003). A number of researchers have proposed that specific curiosity reduces the uncertainty and tension associated with novel activity (Berlyne, 1960; Day, 1971; Loewenstein, 1994). However, evidence has failed to support this anxiety reduction theory (e.g., White, 1959). Robust evidence finds that the pursuit and sensitivity to reward-incentive cues (i.e., appetitive motivation) is relatively independent from the desire to avoid pain and discomfort (e.g., Depue, 1996; Watson, Wiese, Vaidya, & Tellegen, 1999). Curiosity is clearly an intense pleasant experience (e.g., Csiksentmihalyi, 1990; Izard, 1977). Curiosity makes people seek out personally meaningful interests and desires and thereby is intrinsically motivating (Deci, 1975).

RECIPROCAL STAGES LEADING TO PERSONAL GROWTH

The process initiated by curiosity, proposed to lead to positive subjective experiences and personal growth, includes (a)

an increase in attention allocation to scan and orient oneself toward novel and challenging stimuli, (b) cognitive and behavioral exploration of rewarding stimuli, (c) flow-like engagement with rewarding stimuli and activities, and (d) the integration of novel experiences by assimilation or accommodation. Permeating each step of this process is the self-regulation of attentional resources. We propose that those with higher trait curiosity will be more likely to actively pursue and take advantage of these varied opportunities that can make for a good day and over time, a meaningful life.

The ability to ignore superfluous information and become absorbed in specific novel activities (Stages 2 and 3) is essential to experiencing pleasure. It has been argued that optimal experiences arise when individuals' energies and abilities are fully engaged in challenging activities; what Csiksentmihalyi (1990) called "flow" states. Flow is analogous to specific curiosity (cf. Fredrickson, 1998). During flow, people experience clear, immediate goals; maintain deeply focused concentration; and feel a strong sense of personal control. Individuals become largely unaware of themselves and the passage of time, enabling them to devote increasingly more attention to complex behavior. Flow states in which personal skills are congruent with challenges being confronted result in an inevitable sense of personal growth from the "stretching" of skills and confidence in using those skills. Qualities of flow, particularly the self-regulation of attentional resources, are argued to be essential to curiosity. The investment of attentional resources in ever increasing challenges (i.e., not too easy or too difficult) so as to enjoy the moment fully and enable growth opportunities has been proposed to be the pathway to eudaimonic, as opposed to hedonic, well-being (e.g., Csikszentmihalyi, 1990; Seligman, 2002). This absorption component of flow is proposed to be central to curiosity and measurable as a between-person individual difference variable. In the subsequent assessment of curiosity, we utilize the term *absorption* and not flow. The reason is that we emphasize the absorption quality of flow, whereas we do not give equal attention to other qualities such as having clear goals and challenge-skill balance in particular situations. These are probably best measured with experience-sampling techniques.

According to our model, curiosity may be malleable despite its trait-like features. Although curiosity for specific stimuli may wane with the successful integration of available information, striving to pursue other curiosity experiences may be heightened. The positive affective quality of curiosity is intrinsically reinforcing. Moreover, the subsequent process of growth or skill enhancement expands one's sense of self and adaptation to environmental challenges. Using newly learned skills likely increases feelings of pleasure and competence, reinforcing further involvement in skill-based activities and the desire for more learning (for reviews, see Deci & Ryan, 2000, and Kashdan & Fincham, in press).

This personal growth facilitation model of curiosity informs our research. Building on Berlyne's (1967, 1971) two-dimensional model of curiosity (and his proposition that curiosity is induced by the stimulus properties of novelty, complexity, uncertainty, and conflict), we present the development of a new dispositional measure of curiosity comprising (a) exploration or tendencies to seek out new information and experiences and (b) absorption or tendencies to become fully engaged in these rewarding experiences. Both facets are self-determined and reflect an appetitive motivational orientation. Before turning to our studies, we briefly examine prior attempts to assess curiosity.

ASSESSMENT OF CURIOSITY

There is prima facie evidence for two interrelated components of curiosity: diversive appetitive motivation and flow-like engagement in activities. However, closer examination shows that the interpretation of this evidence is not clear for at least two reasons. First, a number of curiosity measures use items that in essence assess positive affect (e.g., "I am excited" and "I feel mentally alive" items of the State–Trait Curiosity Inventory [STCI]; Spielberger, 1979). Using items that tap states that are not unique to curiosity, such as excitement and vitality, is problematic, as these states could result from a variety of positive experiences. Although curiosity is a positive experience, not all affective qualities are fundamental to the curiosity construct.

Second, prior attempts to measure curiosity have failed to address the breadth of the construct. Most measures have focused on different objects of curiosity including high-risk activities (e.g., the "I would like to try parachute jumping" item of the Sensation Seeking Scale; Zuckerman, Eysenck, & Eysenck, 1978) and effortful mental activities (e.g., the "When I am given a new kind of arithmetic problem, I enjoy imagining solutions" item of the Epistemic Curiosity Scale; Litman & Spielberger, 2003). The problem is that focusing on the objects of curiosity is different from focusing on the qualities of curiosity. An individual high in trait curiosity does not necessarily prefer and seek out novel situations that are high in physical risk and disinhibition or high in intellectual stimulation. Rather, we argue that a highly curious individual is someone who has the propensity more readily to recognize, pursue, and become absorbed in novel and challenging experiences.

What object induces curiosity is largely based on individual differences in interests, expectations, and prior knowledge. A number of measures use items that focus on domain-specific activities and stimuli (Ainley, 1986; Day, 1971; Litman & Spielberger, 2003; Zuckerman et al., 1978). The consequence of having respondents with particular interests that either match or fail to match the specific activities or objects captured by scale items introduces nonrandom error. For example, if an individual is very interested in science and philosophy, they would score artificially higher on those curiosity measures that have more items tapping intellectual

pursuits, whereas individuals without academic interests would be rated artificially low in curiosity.

Our two-dimensional approach focuses on the defining features of curiosity rather than different objects that induce curiosity. To capture the proposed two core dimensions of curiosity, scale construction was guided by theoretical and empirical work on curiosity, appetitive motivation, and flow. In addition, all items were global, thereby avoiding the problem of domain specificity. Three independent samples were used for initial scale development, and with the inclusion of a fourth sample, we examined convergent and discriminant validity, test–retest reliability, and relations with informant reports. We separately examined incremental validity above and beyond activated positive emotions and the potential confounds of impression management and self-deception.

STUDY 1: THE CURIOSITY AND EXPLORATION INVENTORY: STRUCTURE AND RELIABILITY

The development of our measure was guided by three goals. These were to (a) assess the exploration (diversive) and absorption (specific) components of curiosity, (b) meet traditional psychometric standards, and (c) develop a brief measure that could be used in both laboratory and survey research. In an initial series of college student samples, we evaluated a pool of 55 items designed to reflect exploration of and absorption in novel and challenging experiences. These items were derived from descriptions of curiosity, interest, intrinsic motivation, and flow by leading theorists and researchers (e.g., Amabile, Berlyne, Beswick, Csiksentmihalyi, Deci, Krapp, Spielberger), literary and philosophy texts, discussions with colleagues, and a focus group with students in Todd Kashdan's undergraduate positive psychology class.

We used an iterative process to reduce the number of items. First, based on discussions among the authors of this article, items focusing on sensation seeking or risk taking (e.g., "I tend to avoid potentially risky or threatening activities") and idiosyncratic curiosity inducers (e.g., "I enjoy meeting new people") were eliminated, as they would introduce random error (see earlier discussion). Items narrowly focusing on positive affect (e.g., "I am easily fascinated by new experiences") were also eliminated because these items fail to differentiate passive and active recipients of pleasure. Second, items with non-normal distributions were eliminated. Third, items failing to exhibit a full range of responses on a 7-point Likert scale (ranging from 1 [*strongly disagree*] to 7 [*strongly agree*]) were eliminated. Fourth, remaining items without high item-total correlations (i.e., > .40) were eliminated. Based on these iterative stages of item reduction, seven curiosity items were retained for exploratory factor analysis. Four of these items represented exploration, and three represented absorption. One of the exploration items was reverse-scored in an attempt to minimize response sets.

Exploratory Factor Analysis

Initial data from two samples of undergraduate students from a large, Northeastern university (Samples 1 and 2) were used to explore the factor structure of the seven items. Descriptive information on these two samples is shown in Table 1. All students received course credit for their participation. Each sample was asked to complete a battery of self-report questionnaires. As can be seen in Table 1, the ethnic composition of Samples 1 and 2 was virtually identical, with the majority of students being of Euro-American origin. Although there were significant differences in age between Samples 1 and 2, $t(304) = 4.90$, $p < .001$, $d = .56$, age had a small to near-zero relationship with Curiosity and Exploration Inventory (CEI) items ($|.06| < rs < |.14|$). Participants in each of these samples were recruited in the same manner from the same undergraduate population (without overlap between the samples), and there were no statistically significant differences between them on any of the curiosity items ($ps > .20$), either of the derived CEI subscales ($ps > .35$), or the CEI total score ($p > .45$). Because participants also completed the same version of the CEI under nearly identical circumstances, we considered it appropriate to aggregate responses from them for the exploratory factor analysis and descriptive statistics that follow.

A principal axis analysis with an oblique (oblimin) rotation was conducted on 316 students. Two factors emerged with eigenvalues exceeding 1.0, accounting for 60.77% of the variance. An examination of the scree plot supported a two-factor model. Table 2 shows the factor loadings (using the structure matrix). Each item strongly loaded on only one of the two factors and item-total correlations were acceptably high (all > .50).

Confirmatory Factor Analysis

To supplement the use of college students in Samples 1 and 2, we hoped to obtain a more diverse sample by collecting data from an independent sample (Sample 3) with an Internet-based survey (see Silvia, 2002). The data included residents from the United States, Canada, England, Australia, and New Zealand. Level of education ranged from a few years less than a high school diploma to graduate and professional degrees (years of education: $M = 14.3$; $SD = 1.4$). The results of the confirmatory factor analysis are displayed in Figure 1. The proposed two-factor model with exploration and absorption as separate but correlated components of curiosity fit the data very well, $\chi^2(13, N = 213) = 18.00$, $p > .15$; $\chi^2/df = 1.38$; goodness-of-fit index (GFI) = .98, comparative fit index (CFI) = .98, and root mean square error of approximation (RMSEA) = .04. To examine the viability of this two-factor model, we tested whether a two-factor model was more appropriate than a unidimensional model using a model

TABLE 1
Descriptive Statistics for the Curiosity and Exploration Inventory Across Samples

	Sample 1[a]		*Sample 2*[b]		*Sample 3*[c]	*Sample 4*[c]		*Sample 5*[c]	
Descriptive Data		%		%			%		%
N									
Women	128		71		149	73		48	
Men	73		31		64	25		49	
Missing	13		1		0	2		0	
Age									
M	20.86		23.75		24.60	24.28		19.35	
SD	2.16		5.91		7.90	7.16		2.16	
Range	18 to 49		19 to 47		18 to 53	18 to 49		17 to 35	
Ethnicity									
EuroAmerican	134	62.6	70	68.0	—	74	74.0	72	74.2
Asian American	15	7.0	15	14.6	—	6	6.0	10	10.3
African American	14	6.5	5	4.9	—	6	6.0	8	8.2
Hispanic American	0	0	0	0	—	4	4.0	2	2.1
Other	48	22.4	13	12.7	—	10	10.0	5	5.2
Exploration subscale									
M	19.54		19.68		18.74	19.97		19.87	
SD	3.84		3.77		3.10	4.23		4.37	
α coefficient	.69		.69		.63	.74		.74	
Absorption subscale									
M	13.16		13.53		15.44	13.42		13.67	
SD	3.46		3.42		3.76	3.66		3.60	
α coefficient	.65		.73		.73	.73		.66	
Total score									
M	32.70		33.21		34.18	33.39		33.54	
SD	6.52		6.04		5.62	6.85		6.86	
α coefficient	.76		.75		.72	.80		.78	

Note. An em dash (—) indicates that data are not available.
[a]University at Buffalo undergraduate sample. [b]University at Buffalo undergraduate sample. [c]Web-based survey (see Silvia, 2002). [d]University at Buffalo undergraduate sample. [e]University at Buffalo undergraduate sample.

TABLE 2
Means, Standard Deviations, Factor Loadings for Oblimin-Rotated Exploratory Factor Analysis, and Item-Total Correlations for the CEI

	Factor Loading				
CEI Items	*Exploration*	*Absorption*	*M*	*SD*	*I-T*
1. I would describe myself as someone who actively seeks as much information as I can in a new situation.	.62	.37	5.28	1.39	.62
2. When I am participating in an activity, I tend to get so involved that I lose track of time.	.39	.55	4.51	1.41	.62
3. I frequently find myself looking for new opportunities to grow as a person (e.g., information, people, resources).	.69	.32	4.93	1.26	.63
4. I am *not* the type of person who probes deeply into new situations or things.[a]	.51	.13	3.09	1.46	.79
5. When I am actively interested in something, it takes a great deal to interrupt me.	.23	.64	4.46	1.52	.62
6. My friends would describe me as someone who is "extremely intense" when in the middle of doing something.	.13	.82	4.32	1.51	.58
7. Everywhere I go, I am out looking for new things or experiences.	.68	.35	4.45	1.42	.60

Note. $N = 316$. Underlined values are the factor each item loads on the highest. Items were introduced in the same order above by the following: "Using the scale below, please respond to each statement according to how you would normally describe yourself." Responses were based on a 7-point Likert scale with three descriptors: 1 (*strongly disagree*), 4 (*neither agree nor disagree*), and 7 (*strongly agree*). CEI = Curiosity and Exploration Inventory; I-T = item-total correlation.
[a]Item 4 was reverse scored; to reduce potential participant error in missing this reversed item, the word "*not*" is italicized.

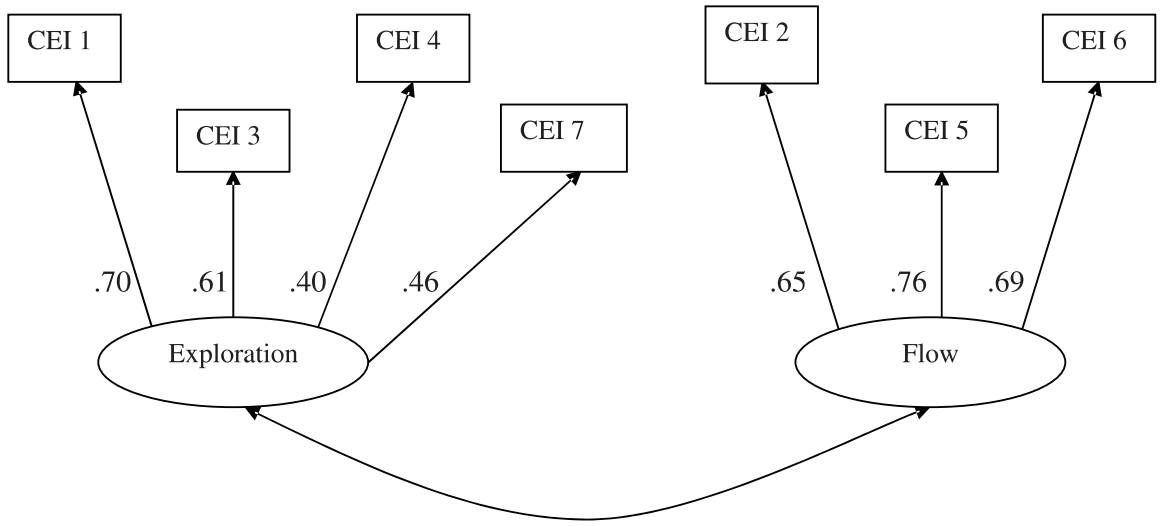

FIGURE 1 Confirmatory factor analysis of the Curiosity and Exploration Inventory ($n = 213$); $\chi^2(13, N = 213) = 18.00$, $p > .15$,; $\chi^2/df = 1.38$; GFI = .98, CFI = .98, and RMSEA = .04. Regression weights shown are standardized, and Item 4 was reverse scored prior to analysis.

comparison procedure introduced by Bollen (1980). By comparing the hypothesized two-factor model to a model in which the zero order association between the two dimensions of curiosity is constrained to be one (thereby positing a single factor), two- and one-factor models can be compared directly by interpreting the change in chi-square (per change in *df*) as a chi-square statistic. When the association between exploration and absorption was constrained to unity, there was an acceptable fit to the data, $\chi^2(14, N = 213) = 32.04$, $p < .005$; $\chi^2/df = 2.29$; GFI = .92, CFI = .93, and RMSEA = .08. However, allowing exploration and absorption to covary freely resulted in a significant improvement in model fit, $\chi^2(1, N = 213) = 14.04$, $p < .001$. Thus, the CEI measures two distinct but related components of curiosity.

Descriptive Statistics

As shown in Table 1, the means, standard deviations, and internal consistencies of each subscale and the total score were very similar for Samples 1, 2, and 3. Cronbach's αs ranged from .63 to .74 for CEI–Exploration, from .66 to .73 for CEI–Absorption, and from .72 to .80 for CEI–total. These internal reliabilities were in the acceptable range for a research instrument (between .70 and .80, with slightly lower values being acceptable for shorter scales; John & Benet-Martinez, 2000; Nunnally, 1978) and did not demonstrate excessive homogeneity or item overlap (for critique of other curiosity scales, see Boyle, 1983). The average CEI item scores were slightly higher than the scale midpoint (approximately 4 to 5 on a 7-point Likert scale) with a full range of responses for each item.

Sex differences were found in Sample 2; men compared to women reported greater absorption, $t(100) = 2.66$, $p < .01$, $d = .53$; exploration, $t(100) = 2.06$, $p < .05$, $d = .41$; and CEI–total, $t(100) = 2.66$, $p < .01$, $d = .53$. Although similar trends were found for the other three samples, none was significant. If the sex difference found in Sample 2 proves to be a reliable finding, this is a difference that deserves more research attention in the future.

For the remainder of this article, we focus on the separate CEI dimensions of Exploration and Absorption; data on the total score can be obtained by contacting us (on average, effect sizes with the CEI–total were slightly larger than those shown with the CEI–Exploration).

Temporal Stability of the CEI

We examined whether curiosity was a stable character trait by testing the 1-month test–retest reliability of the CEI. Seventy-five of the 103 participants in Sample 2 completed the CEI at two separate time points. Test–retest reliability was high for the CEI–Exploration, $r = .78$, $p < .001$, and CEI–Absorption, $r = .74$, $p < .001$. Given the alpha reliabilities of our scale across studies (.63 to .80; see Table 1), the temporal stability correlations approached the maximum value.

Convergence Between Self-Ratings and Informant Ratings of Curiosity

We examined whether other individuals corroborate respondent reports of curiosity. Participants in Sample 2 ($n = 43$) were asked to have confidants complete questionnaires about them. To facilitate this process, the CEI items were reworded in the third person with appropriate male–female pronouns. Participants were instructed to hand envelopes to third-party informants. Informants were instructed to seal and sign the

envelope and return the packet to Todd Kashdan's campus mailbox or have the participant return the sealed envelope. Overall, 39 of 43 participants had an informant complete a packet.

Respondent and informant ratings were positively correlated for the CEI–Exploration, $r = .34$, $p < .05$, and to a lesser degree with the CEI–Absorption, $r = .24$, $p > .10$. These correlations are similar in size to correlations observed between informant reports and self-reports of other individual differences that are in large part internal experiences with varied behavioral manifestations (cf. Adams & John, 1997; McCullough, Emmons, & Tsang, 2002; Watson & Clark, 1991; Wink, 1991), supporting the validity of our measure. However, the absence of multiple informants prevented us from assessing the reliability of informant ratings. These findings are preliminary, and more work is needed on cross-informant convergence within existing relationships such as teacher–student, boss–worker, and romantic partners.

Summary

Initial findings demonstrate that the CEI assesses two meaningful, interrelated components of curiosity: Exploration and Absorption. Evidence for this two-dimensional structure was found in two independent samples. Furthermore, the CEI and its subscales appear to be internally consistent and temporally stable, and self-appraisals of curiosity are consistent with observer reports. In light of these promising findings, we turned to conduct one of the first systematic investigations of the nomological network of curiosity and its two proposed components.

STUDY 2: CONVERGENT AND DISCRIMINANT VALIDITY

Study 2 investigated relationships between Exploration and Absorption with various measures of curiosity, affect, appetitive motivations, relevant attributes, and well-being. In addition, the differential validity of the Exploration and Absorption subscales was examined and tests of incremental validity beyond social desirability and positive affect.

Despite the different features of Exploration (general appetitive strivings for novelty and challenge irrespective of source) and Absorption (strong interest in exploring the properties of specific, impinging activity), they share a core component. Nonetheless, nearly all relationships with global self-report scales were expected to be larger with the less source-driven Exploration component. Strong positive relations were expected between each factor with other curiosity scales and weaker relations with isolated curiosity domains (e.g., sensation seeking). Fitting with descriptions of intrinsically motivating states (Amabile, 1983), both factors were expected to have strong positive relations with activated positive emotions (e.g., vitality, attentiveness, interest) and extraversion (a manifestation of trait positive affect; Carver, Sutton, & Scheier, 2000) and no relations with positive states with low energetic arousal. Given our conceptualization of curiosity with ties to the Behavioral Activation System Scale (BAS; Carver & White, 1994), both subscales were expected to have strong positive relations with appetitive motivation (i.e., Hope Scale, BAS Scale) and near-zero relations with the behavioral inhibition system (shown to be independent of the BAS; e.g., Carver & White, 1994). Strong relationships were also expected with the trait Openness to Experience, a supraordinate construct wherein curiosity serves as a lower order motivational component (McCrae & Costa, 1997). To a lesser extent, both subscales were expected to relate to introspective tendencies (a potential precursor to recognizing and integrating reward cues), time perspectives focusing on moment-to-moment hedonic experiences, and a positive future perspective (optimistic goal pursuit). There was no rationale for either scale to be related with other Big Five traits.

To extend prior work on curiosity and negative affect primarily focused on boredom and global anxiety (e.g., Cacioppo, Petty, Feinstein, & Jarvis, 1996; Peters, 1978), we expected exploration to be negatively related to social anxiety because interpersonal reinforcers are powerful contributors to well-being (Myers & Diener, 1995), and social fears can interfere with social pursuit and engagement (Kashdan, 2002, in press).

A recent study found Openness to Experience to uniquely predict greater psychological well-being beyond other core personality traits (Keyes, Shmotkin, & Ryff, 2002); no relationships were found with life satisfaction. Thus, we expected a large positive relation between Exploration and an index of global positive subjective experiences and no relation with life satisfaction.

We tested the differential validity of Exploration and Absorption by examining unique variance. As for Absorption, after controlling for Exploration, strong relationships were expected with idiosyncratic novel and challenging experiences. In this study, we used an open-ended assessment of idiographic personal strivings and with this information evaluated the ratio of approach to avoidance strivings and had participants evaluate each striving on perceived progress, effort, purpose, commitment, and joy from success (Emmons, 1986). In contrast, after statistically controlling for Absorption, we expected Exploration to sustain relations with indexes of appetitive motivation and global questionnaires capturing the essential features of subjective well-being (high activated positive affect, low negative affect, and positive cognitive appraisals; e.g., Kashdan, 2004a).

Measures of virtuous qualities such as curiosity can be expected to be associated with reporting of other positive characteristics. We therefore controlled for social desirability in examining many of the outlined hypotheses, but we expected curiosity to retain significant findings. As a more robust test of incremental validity, we examined whether curiosity pre-

dicted a variety of constructs independent of the overlapping construct of activated positive affect (e.g., excitement, joy). Empirical work on curiosity lags substantially behind that on positive affect; thus, we needed to consider the possibility that the correlates of curiosity may be subsumed by positive affect. We expected the removal of variance attributable to positive affect to decrease the strength of CEI correlates. However, we hypothesized that the CEI would continue to retain significant relationships with other curiosity measures, indexes of goal-oriented motivation, and psychopathological domains proposed to thwart curiosity.

To test construct validity, we utilized Samples 1 and 2 and two additional samples of undergraduate students from a large, Northeastern university. Sample 4 comprised 100 undergraduate students who received course credit for their participation. Sample 5 consisted of persons currently in romantic relationships. We report the details and findings of this experiment in Study 3.

Method

Participants

Table 1 presents descriptive data on Samples 1 to 5. Four Samples (1, 2, 4, 5) were used to test construct validity. As shown in Table 1, the reliability of the CEI was again acceptable in Samples 4 and 5. Additionally, the CEI subscales were positively correlated in Sample 4, $r = .51$, $p < .001$, and Sample 5, $r = .48$, $p < .001$. Samples 1, 2, 4, and 5 each received different sets of self-report questionnaires. An indicator of the specific sample that provided the data follows all reported findings. Findings presented from these 5 independent samples have not been previously published.

Convergent and Discriminant Self-Report Scales

Curiosity scales. The 10-item STCI–Trait (Spielberger, 1979) assessed general interest and curiosity. The 20-item Melbourne Curiosity Inventory (Naylor, 1981) assessed tendencies to experience curiosity and explore the environment. The 30-item Work Preference Inventory (WPI; Amabile, Hill, Hennessey, & Tighe, 1994) measured motivational orientations in work/school. As part of the WPI, the Intrinsic Motivation scale has two subscales: Enjoyment and Challenge. We used the total score of the Extrinsic Motivation scale, tapping external recognition and incentives.

Curiosity-relevant scales. The 40-item Sensation-Seeking Scale Version V (Zuckerman et al., 1978) assessed a willingness to accept risks and danger to obtain novelty (experience seeking, thrill and adventure seeking, disinhibition, boredom susceptibility). Both the 18-item and 34-item Need for Cognition Scale (Cacioppo & Petty, 1982) were administered to assess general tendencies to enjoy effortful cognitive and intellectual activities. The 28-item Boredom Proneness Scale (Farmer & Sundberg, 1986) measured general tendencies to experience boredom.

Affect scales. The 20-item trait Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) assessed general activated affective states. We measured deactivated positive (e.g., calm, relaxed, serene) and negative (e.g., bored, droopy, tired) affect with adjunct five-item subscales (see Barrett & Russell, 1998). The seven-item Subjective Vitality Scale (Ryan & Fredrick, 1997) measured energy, representing an activated form of positive affect. The 10-item trait State–Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) assessed anxiety. The 19-item Social Interaction Anxiety Scale (Mattick & Clarke, 1998) assessed social interaction anxiety (e.g., distress when initiating and maintaining conversations).

Well-being scales. The five-item Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Grifin, 1985) assessed cognitive appraisals about one's life. The 18-item Well-Being scale (WBS; Tellegen, 1982) measured tendencies to feel good about oneself and the future and general joyfulness. Whereas the WBS measures the affective and cognitive components of happiness, the SWLS is circumscribed to cognitive self-evaluations.

Appetitive motivation scales. The eight-item trait Hope Scale (Snyder et al., 1991) assessed beliefs that goals can be obtained through effort (i.e., agency) and that obstacles can be circumvented (i.e., pathways); we used the total score. The 13-item BAS Scale (Carver & White, 1994) measured three factors: (a) reward responsiveness or reactivity to rewarding opportunities; (b) drive or reward-seeking efforts, and (c) fun seeking or the propensity to be spontaneous and engage in enjoyable activities. The adjunct seven-item Behavioral Inhibition System Scale (Carver & White, 1994) measured sensitivities to cues of punishment and unpleasant consequences.

Big Five personality dimensions. The five-factor model of personality, including Openness to Experience, Extraversion, Agreeableness, Neuroticism, and Conscientiousness was measured with the 54-item Big Five Inventory (John, Donahue, & Kentle, 1991).

Personality attributes. The 10-item Private Self-Consciousness subscale of the Self-Consciousness Scale (Scheier & Carver, 1985) assessed introspective tendencies. We assessed two positive time orientations using the 56-item Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999): (a) Present Hedonistic (living in the moment for immediate pleasures) and (b) Future (willingness to prepare for long-term efforts and goals).

Social desirability scales. The 40-item Balanced Inventory of Desirable Responding (Paulhus, 1984) assessed both impression management (i.e., presenting oneself in an unrealistically favorable light) and self-deception (i.e., denying universally true but potentially threatening self-descriptions). The 60-item Self-Presentation Style Questionnaire (Roth, Harris, & Snyder, 1988) assessed the same response styles, referring to them as attributive and repudiative tactics, respectively.

Striving Assessment Packet

Each participant was provided with an open-ended format to generate a list of eight goals or strivings that describe what underlies their everyday actions and behaviors (for more details, see Emmons, 1986, 1989). They were given an instruction page that defined personal strivings ("an objective that you are typically trying to accomplish or attain"), provided examples (e.g., "I typically try to eat a healthy, nutritious diet"), and told them that strivings could be positive or negative, something that is approached or avoided. Similar to reports by Emmons (1986), none of our participants had difficulty generating eight strivings. After listing their strivings, participants completed a rating form for each of their strivings. For this study, participants rated six dimensions concerning their feelings and experiences with each striving: progress (over the past month), effort (personal resources devoted to pursuit), interpersonal resources (helpful support and advice from others), purpose (sense of purpose), commitment (commitment to goal pursuit), and enjoyment (pleasure when successful).

Each participant's eight strivings were coded as either approach or avoidance by two trained, independent raters. Using Cohen's Kappa, interrater reliability was excellent at .94. We created a striving index by aggregating the number of approach strivings.

Results

Overview of Analyses

We computed bivariate correlations between the CEI–Exploration and Absorption with other measures. Partial correlations were also computed between the CEI–Exploration and Absorption with other scales controlling for shared variance between the two CEI subscales. We examined significant differences in the magnitude of these dependent correlations (where appropriate) using one-tailed *t* tests (for a test of differences in dependent correlations, see Williams, 1959; Howell, 1997). Finally, incremental tests were conducted by statistically controlling for social desirability and positive affect. We only mention correlations of > .20 as having possible functional significance.

Convergent and Discriminant Correlations

Convergent validity. Table 3 reports the specific correlations between Exploration and Absorption with the scales described in the last section. As hypothesized, both Exploration and Absorption show the strongest positive correlations with other curiosity measures, Openness to Experience, and slightly lower, albeit large correlations with domain-specific curiosity scales (i.e., sensation seeking, need for cognition), appetitive motivations (Hope and BAS Scale), and activated positive affective states. Expected positive relationships were also found with introspective tendencies and positive time perspectives (see Personality Attributes section). Only Exploration exhibited significant positive relations with the BAS-Reward Responsiveness subscale and negative relations with boredom proneness, social anxiety, and trait anxiety.

Fitting with the non-source-driven features of the exploration component, most bivariate correlations were higher for Exploration compared to Absorption. Using tests of dependent correlations, exploration had significantly stronger relationships with curiosity scales (i.e., STCI and Melbourne Curiosity Inventory; ps < .05), boredom proneness ($p < .001$), activated positive affective states (i.e., PANAS–activated Positive Affect [PA] and Subjective Vitality Scale; ps < .05), social anxiety ($p < .001$), trait anxiety ($p < .001$), deactivated negative affective states ($p = .01$), well-being (i.e., Well-Being Scale and Satisfaction With Life Scale; ps < .05), and appetitive motivation (i.e., Hope Scale; $p < .05$). The reader may contact us for details on specific *t* tests.

Relationships with strivings. As an open-format measure, this was the only scale (Striving Assessment Packet; Emmons, 1986) focusing on idiographic experiences. Consistent with our theory, Absorption, which taps specific curiosity, was positively related to each of the beneficial feelings, thoughts, and behaviors associated with strivings. Although Exploration was positively related to striving purpose, commitment, and enjoyment, these relationships became nonsignificant after controlling for Absorption. Furthermore, the number of approach (compared to avoidance) strivings endorsed by participants had a positive relationship with Absorption but not Exploration. The small to moderate magnitude of correlations between strivings and curiosity scales may be a result of the striving assessment format. Respondents can write about any striving they desire and approach strivings are not necessarily related to novelty, challenge, excitement, or personal growth. For example, many respondents listed eating healthy meals, getting a good grade in biology, and being a good friend. Although these are all positive approach strivings, they are somewhat mundane.

Discriminant validity. As expected, negligible relationships were found between Absorption and Exploration with

TABLE 3
Correlations and Partial Correlations of the CEI With Various Self-Report and Striving Assessment Scales

Scale	*Sample*	*r With CEI–Exploration*	*pr Control for Absorption*	*r With CEI–Absorption*	*pr Control for Exploration*
Curiosity					
STCI Curiosity	1	.56***	.44***	.42***	.15*
MCI Curiosity	2	.71***	.64***	.57***	.43***
Work Preference Inventory					
Intrinsic Orientation	2	.65***	.56***	.54***	.40***
Enjoyment	2	.56***	.44***	.45***	.30**
Challenge	2	.54***	.43***	.45***	.30**
Extrinsic Orientation	2	–.02	–.02	–.06	–.06
Curiosity Relevant					
Boredom Proneness Scale	1	–.41***	–.40***	–.19**	.08
Need for Cognition					
34-item[a]	2	.54***	.41**	.41**	.15
18-item[b]	2	.43***	.37**	.29*	.19
Sensation Seeking Scale–V	2	.31**	.16	.37***	.18
Experience Seeking	2	.40***	.29**	.33**	.21*
Thrill-Seeking	2	.34***	.24*	.31**	.18
Disinhibition	2	.01	–.11	.23*	.25*
Boredom Susceptibility	2	.13	.00	.21*	.21*
Affect					
PANAS–Activated PA	1	.44***	.33***	.33***	.09
PANAS–Deactivated PA	1	.15*	.14*	.09	–.02
PANAS–Activated NA	1	–.22***	–.28***	.01	.18*
PANAS–Deactivated NA	1	–.36***	–.29***	–.22**	.00
Subjective Vitality Scale	1	.38***	.31***	.21*	–.06
	4	.49***	.45***	.25***	.02
STAI Anxiety	1	–.29***	–.28***	–.10	.08
SIAS Social Anxiety	1	–.43***	–.49***	–.18**	.09
	4	–.39***	–.35***	–.04	.25*
Well-Being Scales					
Satisfaction With Life Scale	1	.19**	.19**	.06	–.06
Well-Being Scale	1	.38***	.34***	.23**	.00
Appetitive Motivation					
Hope Scale	1	.43***	.33***	.31***	.07
BAS Scale	1	.33***	.25***	.26***	.06
	5	.36***	.27**	.29**	.14
Reward Responsive	1	.25***	.24**	.14*	–.02
	5	.33***	.30**	.13	–.03
Drive	1	.26***	.15*	.26***	.12
	5	.23*	.18	.16	.06
Fun Seeking	1	.29***	.21**	.23**	.05
	5	.31**	.16	.39***	.28**
Aversive Motivation					
BIS Scale	1	–.20**	–.21**	–.05	.09
	5	.02	.09	–.12	–.15
Big Five					
Openness to Experience	2	.54***	.44***	.45***	.28**
Extraversion	2	.25*	.19	.21*	.11
Agreeableness	2	.21*	.17	.13	.04
Conscientiousness	2	.16	.12	.12	.05
Neuroticism	2	–.21*	–.26**	.05	.18
Personality Attributes					
Private Self-Consciousness	2	.38***	.29**	.27**	.15
ZTPI–Present Hedonistic	4	.25*	.16	.26**	.15
ZTPI–Future	4	.25*	.16	.21*	.09
Social Desirability					
BIDR–Impression Management	4	.14	.12	.08	.02
BIDR–Self-Deception	4	.36***	.28**	.16	.02
SPSQ–Attributive Tactics	1	.15*	.11	.11	.02
SPSQ–Repudiative Tactics	1	–.01	.07	–.08	–.10
Striving Assessment Packet					

(continued)

TABLE 3 (Continued)

Scale	*Sample*	*r With CEI–Exploration*	*pr Control for Absorption*	*r With CEI–Absorption*	*pr Control for Exploration*
Approach Striving Index	5	.15	.04	.25*	.20*
Progress	5	.12	–.01	.27**	.25*
Effort	5	.12	.00	.24*	.21*
Interpersonal Resources	5	.16	.04	.27**	.22*
Purpose	5	.26*	.10	.37***	.29**
Commitment	5	.24*	.10	.32**	.24*
Enjoyment	5	.22*	.11	.27**	.19

Note. *N*s for Samples 1, 2, 4, and 5 are 214, 103, 100, and 97, respectively (other descriptive data are reported in Table 1). Correlations between CEI subscales for each of the Samples were .55, .41, .51, and .48, respectively. CEI = Curiosity and Exploration Inventory; STCI = State–Trait Curiosity Inventory; MCI = Melbourne Curiosity Inventory; PANAS = Positive and Negative Affect Schedule; PA = Positive Affect; NA = Negative Affect; STAI = State–Trait Anxiety Inventory; SIAS = Social Interaction Anxiety Scale; BAS = Behavioral Activation System; BIS = Behavioral Inhibition System; ZTPI = Zimbardo Time Perspective Inventory; BIDR = Balanced Inventory of Desirable Responding; SPSQ = Self-Presentation Style Questionnaire.
[a]*N* = 59. [b]*N* = 43.
*$p < .05$. **$p < .01$. ***$p < .001$.

the behavioral inhibition system, extrinsic motivation, and the Big Five factors of Conscientiousness and Agreeableness. Although Absorption had no relationships, Exploration had small, although significant, negative relationships with indexes of global negative affect (i.e., PANAS and Neuroticism; see Table 3).

Relationships with the Big Five personality dimensions. To test whether curiosity simply reflected the Big Five, a simultaneous regression analysis was conducted with the Big Five entered as a single block to predict CEI–total. The Big Five explained a moderately large proportion of variance in the CEI, $R^2 = .39$, $F(5, 93) = 11.85$, $p < .001$, $d = .84$. However, the only unique predictor was Openness, partial correlation (pr) = .57, $p < .001$. Because variance from a higher order factor (Openness) was removed from a lower order factor (curiosity), it was surprising that the model only explained 39% of the CEI's variance. These findings indicate that there is variance associated with curiosity beyond that which could be attributed to the Big Five.

Unique Variance Attributable to Exploration and Absorption

Compared to Absorption, we expected Exploration to have stronger relationships with nearly all global measures. After controlling for the variance shared by these subscales, both were positively related to all curiosity scales and most curiosity-relevant scales (see partial correlations in Table 3). These results provide some evidence that both components are independently tapping curiosity experiences. On partialing out shared variance, Exploration had stronger relationships with all scales expected to converge with curiosity compared to Absorption. Differences between the Exploration and Absorption partial correlations were significant (*p*s < .05) except for sensation seeking, time perspectives, and all Sample 5 BAS scales (except Reward Responsiveness). Exploration appeared to be the driving force of relationships between the CEI and greater positive subjective experiences and appetitive motivations and less social anxiety symptoms.

As for our idiographic assessment of personal strivings, Absorption had significantly stronger relationships than Exploration with four of six striving dimensions (*p*s < .05). The difference between Absorption and Exploration correlates on the ratio of approach strivings was near significance ($p = .06$). Thus, Absorption was the driving force behind associations between strivings and curiosity.

Incremental Validity

Social desirability. Exploration demonstrated small to moderate positive correlations with two of four social desirability scales. Separate analyses were conducted to control for these scales. These analyses show that the CEI retained all significant relationships (i.e., STCI, pr = .50, p < .001; Vitality Scale, $pr = .35$, $p < .001$; Present-Hedonistic Time Perspective, $pr = .36$, $p < .001$; Future Time Perspective, $pr = .21$, $p < .05$; and Social Interaction Anxiety Scale, $pr = –.19$, $p < .05$). Removing variance associated with attributive self-presentation tactics had virtually no impact on the strength of CEI correlates (compare Tables 3 and 4).

Positive affect. Table 4 also shows the results of analyses in which variance attributable to positive affect was partialed out. These analyses showed that the four-item Exploration scale retained significant positive relationships with all curiosity measures, most appetitive motivation scales, and negative relationships with boredom proneness and social anxiety. After removing the PANAS–PA items that are functionally equivalent to curiosity ("interested" and "attentive"), controlling for positive affect had a reduced influence on CEI correlates (see third column of Table 4). Although positive affect is a primary component of well-being and appetitive motivational orientations, the CEI maintained significant relationships with the Well-Being Scale, the BAS Scale, and the Hope Scale.

GENERAL DISCUSSION

The primary goals of these studies were to examine the nature of curiosity within the context of a new theoretical framework. We described two different components of curiosity and examined their viability. Diversive curiosity or exploration entails scanning, recognizing, pursuing, and allocating personal resources (e.g., attention) to novel and challenging experiences, regardless of source. Engagement in well-defined activity brings with it specific curiosity and exploration and entails flow-like absorption and investigative behaviors resulting in discovery, pleasure, and skill usage. These two components of curiosity can lead to learning and a sense of mastery by the successful integration of new experiences and the notion that curiosity begets further curiosity. In contrast to other curiosity models (e.g., Berylne, 1960, 1971; Loewenstein, 1994), we have provided theoretical arguments and data to show that higher levels of curiosity constitute an intensely pleasant dimension of human functioning. Based on our model, we would hypothesize that the greatest rewards come from the process of integrating novel and challenging experiences rather than the affect associated with it.

To evaluate our theoretical model and examine the nomological network of curiosity, we developed the brief multidimensional CEI. Although this is only the first stage of research using the CEI, the theoretical model underlying its development, the convergence of self-reports and informant reports, its relative freedom from the effects of social desirability, and its incremental validity beyond the more established, related construct of positive affect lead us to believe that the CEI has the potential to advance understanding of curiosity. The studies reported show that the CEI is a psychometrically sound measure of stable, individual differences in two dimensions of curiosity: exploratory tendencies and the propensity to experience flow states.

Nomological Network of Curiosity

Consistent with prior theory and research on curiosity-related constructs (e.g., Amabile, 1993; Fredrickson, 1998), our findings indicate that being curious is associated with positive subjective experiences; positive evaluations of the self, world, and future; beliefs that goals are attainable and obstacles can be circumvented; general tendencies to enjoy effortful cognitive endeavors and be open to new experiences and ideas; and self-determined tendencies to recognize, pursue, and thrive in pleasure, excitement, and challenge. Curiosity was also negatively related to social anxiety, boredom, anxiety, and apathy, which have all been shown to thwart the self-regulation of attentional resources and learning (e.g., Csiksentmihalyi, 1990). Finally, the CEI was not related to constructs hypothesized to have no relations with curiosity-related constructs such as the behavioral inhibition system, extrinsic motivational orientations, and deactivated positive affective states. As evidence of the distinctiveness of the CEI (and curiosity) from other positive psychological constructs, factor-analytic studies have indicated that measures of hope, optimism, positive affect, well-being, and life satisfaction all load onto a single global factor, whereas the CEI loads onto an independent factor (Kashdan, 2002, in press).

TABLE 4
Partial Correlations for Curiosity and Exploration I nvenotry–Exploration With Relevant Variables Controlling for Social Desirability and Positive Affect

	Partial Correlations		
Variable	*Controlling for Social Desirability*	*Controlling for PANAS–PA*	*Controlling for Eight-Item Version of PANAS–PA*[a]
Self-Presentation Style	—	.00	.04
PANAS–Activated PA	.43***	—	—
PANAS–Deactivated PA	.12	–.12	–.04
PANAS–Activated NA	–.19	–.11	–.17*
PANAS–Deactivated NA	–.33***	–.16*	–.25***
Social Interaction Anxiety Scale	–.37***	–.25***	–.33***
STAI–Trait	–.26***	–.10	–.17*
STCI–Trait	.57***	.43***	.49***
Sensation Seeking Scale–Short	.26***	.18**	.20**
Boredom Proneness Scale	–.41***	–.27***	–.34***
Hope Scale	.41***	.26***	.32***
BAS–Total	.32***	.19**	.24***
Satisfaction With Life Scale	.15*	–.03	.04
Well-Being Scale	.38***	.19**	.27***

Note. Sample 1: An em dash (—) indicates that data are not available. Self-presentation was measured with the Attributive Self-Presentation Style subscale. Activated PA was measured with the PANAS. PANAS = Positive and Negative Affect Scale; PA = Positive Affect; NA = Negative Affect; STAI = State–Trait Anxiety Inventory; STCI = State–Trait Curiosity Invcntory; BAS = Behavioral Activation System.

[a]Eight-item version deleted overlapping curiosity items (interested, attentive).

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

Of interest, the majority of prior curiosity research has focused on the activation of curiosity by external stimuli. Our findings of positive relationships between curiosity and self-reflection and self-regulatory behaviors suggest that curiosity is affected by internal and external novelty and challenge and perhaps can be self-generated. Internal processes of introspection, absorption, goal agency and pathways, and the integration of experiences can be expected to lead to greater well-being and increased self-expansion opportunities. As an idiosyncratic measure of what individuals characteristically do on a daily basis, curiosity was positively associated with appetitive personal strivings and reported progress, effort, purpose, social support, commitment, and enjoyment in their pursuit. Albeit a promising beginning on explicating the topography of curiosity, there appears to be much value in investigating the sequelae of curiosity and positive subjective and objective outcomes.

The Uniqueness of the CEI

One of the strongest correlates of the CEI was the 15-item Intrinsic Motivation subscale of the WPI. Considering the high convergence between the CEI and the widely validated Intrinsic Motivation subscale, is there a need for the CEI? First, the two separate versions of the WPI were designed to focus on student academic or adult occupational affairs, whereas the CEI was designed to avoid any context dependency. Second, the CEI is grounded in a theoretical model of curiosity as an affective-motivational system that facilitates positive subjective experiences and personal growth opportunities. This model also includes a focus on two intrinsic components of curiosity, exploration (i.e., diversive) and absorption (i.e., specific), posited to be activated by different inducers and operate differently in the pursuit of optimal stimulation. As originally formulated by Berlyne (YEAR), these components of curiosity appear to be meaningful and complementary, and we provided initial evidence of their unique utility. Finally, the CEI was designed to be a brief, easily administered measure. Short scales are highly desirable in many research settings including studies that have large batteries of measures, longitudinal studies, behavior-oriented studies, and studies using ecological momentary assessment in which item quantity is a primary consideration.

Caveats and Some Future Research Directions

Our findings are limited by reliance on self-report scales, the cross-sectional nature of our data, and use of college student participants. Nonetheless, the psychometric properties and structure of curiosity were validated in a more diverse sample from various countries (Sample 3; the Internet-based survey). In addition, we provided support for the relative immunity of the CEI from social desirability concerns.

Curiosity appears to have modest to strong associations with various aspects of positive human functioning. The exploratory behaviors set in motion by curiosity appear to increase opportunities for fulfilling competence and interpersonal relatedness needs, producing further positive states such as vitality and joy (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon, Ryan, & Reis, 1996). We provided some initial evidence of links between curiosity and appetitive strivings. The next line of inquiry is how curiosity is associated with enhanced goal pursuit, performance, and well-being. The modest convergence of self-ratings and informant ratings of curiosity was important, as it is indicative of observable behaviors that can influence others and the environment (Funder & Sneed, 1993). Recent work (Kashdan & Roberts, in press) has shown that curiosity is uniquely associated with the development of interpersonal closeness between strangers, even after controlling for the effects of positive affect. Of perhaps greater interest is how curiosity influences others. In a social context, perhaps highly curious people are more responsive, infuse more novel twists of excitement to interactions, and are more likely to seek, capitalize, and build on interaction partner disclosures. Any of these behaviors may cause complementary positive emotions and behaviors and can provide incentives for increasing affiliation (Keltner & Haidt, 1999). These research suggestions highlight the need for appropriate assessments of potential sources, processes, and consequences associated with the activation, development, and cultivation of curiosity experiences.

Curiosity may be integral to some of the trajectories toward well-being. Searching for and obtaining engagement with personally meaningful activities can provide a sense of life direction and purpose, antecedents to living a good life (Seligman, 2002). As active agents of change, individuals with high curiosity may be more likely to capitalize on personal and social resources when confronted with life stress or time of less than optimal stimulation. They may be more mindful of what is currently available (introspection, present hedonistic time orientation) but at the same time, actively explore new terrain and possibilities (optimistic future orientation). The small to moderate relationships between exploration and well-being suggest the possibility of interesting moderating variables such as those explored in this study that merit theoretical and empirical examination.

As mentioned, our model predicts that curiosity is a malleable trait with relevance to intervention and resilience. Curiosity was related to more daily appetitive strivings and the dimensions associated with goal commitment, effort, and success. The importance of goal pursuit and mastery for resilience cannot be understated (Rutter, 1985). Pursuing intrinsically motivating activities may not only promote positive subjective experiences but also provide a successful strategy to deal with emotional distress. In terms of promoting youth resiliency, much can be gained by encouraging structured avocations that offer opportunities for challenge and subsequent enhancements in skills and self-efficacy (Csiksentmihayli, Rathunde, & Whalen, 1993). Satisfying curiosity through intrinsically rewarding activities may pro-

vide immediate rewards, help people discover long-term interests (Silvia, 2001), and serve as an adaptive defense against adversity. However, it cannot go unstated that excessive curiosity may have aversive outcomes such as has been shown with excessive sexuality, morbid fascination, gambling, substance use, and other delinquent, risky, and dangerous acts associated with sensation seeking (a domain-specific feature of curiosity; see Zuckerman, 1994). Despite these findings associating curiosity with life fulfillments and positive outcomes, there is merit in exploring when and how devotions to curiosity can interfere with other life domains.

Although curiosity appears to be pleasant and desirable, in some cases, tension and distress may be a consequence of a disrupted personal schema in attempting to integrate new information. The process from curiosity to personal growth may be inhibited by moments when prior information still requires mental organization (Aron & Aron, 1997) and conditions that interfere with attentional resources. Not everyone is prepared to benefit from opportunities for personal growth, but for the majority who are, curiosity is proposed to be a primary facilitator.

Conclusions

Curiosity has relevance to nearly all facets of human functioning and opportunities for future research extend beyond psychology to areas such as business, education, politics, and journalism (Kashdan, 2004b; Kashdan & Fincham, in press). We believe the CEI distinguishes itself from other curiosity inventories that tend to lack theoretical frameworks, use idiosyncratic items that evoke nonrandom error, have uncertain incremental validity, and focus on items assessing inducers and not qualities of curiosity. To increase our knowledge of curiosity, self-reports will need to be supplemented by measures and paradigms that tap the cognitive, behavioral, and neurological referents of curiosity. Promising work has already shown that novelty seeking may be the first personality trait to be specifically associated with genetic markers (e.g., Dulawa, Grandy, Low, Paulus, & Mark, 1999). Considering the potential intervening role of curiosity in skill and knowledge acquisition, the development of interests, goal perseverance, and various positive subjective experiences, the adequate measurement and study of individual differences in curiosity can be expected to open up new avenues of research across disciplines. Curiosity is a ubiquitous part of human's lexicon and daily experiences. Refinements in theory and measurement will increase the likelihood that curiosity is given its long overdue attention in basic and applied research.

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