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The five-dimensional curiosity scale: Capturing the bandwidth of curiosity and identifying four unique subgroups of curious people

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ABSTRACT

Since the origins of psychology, curiosity has occupied a pivotal position in the study of motivation, emotion, and cognition; and disciplines as far-ranging as biology, economics, robotics, and leadership. Theorists have disagreed about the basic tenets of curiosity; some researchers contend that the rewards arise when resolving ambiguity and uncertainty whereas others argue that being curious is an intrinsically pleasurable experience. Three studies were conducted to consolidate competing theories and isolated bodies of research. Using data from a community survey of 508 adults (Study 1), 403 adults on MTurk (Study 2), and a nationally representative household survey of 3,000 adults (Study 3), we found evidence for five distinct factors: Joyous Exploration, Deprivation Sensitivity, Stress Tolerance, Social Curiosity, and Thrill Seeking - forming The Five-Dimensional Curiosity Scale (5DC). Each factor had substantive relations with a battery of personality, emotion, and well-being measures. Taking advantage of this multidimensional model, we found evidence for four distinct types of curious people in Study 3 referred to as The Fascinated (28% of sample), Problem Solvers (28%), Empathizers (25%), and Avoiders (19%). Subgroups differed in their passionate interests, areas of expertise, consumer behavior, and social media use; challenging an assumption that there is a homogenous population to be discriminated on a single dimension from incurious to very curious. With greater bandwidth and predictive power, the 5DC offers new opportunities for research on origins, consequences, life outcomes, and intervention strategies to enhance curiosity.

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1. Introduction

For over 100 years, curiosity has been scrutinized in psychological study (James, 1890). Scholars are in agreement that curiosity is critical to human survival and growth. Curious people are known to ask a large number of unprompted questions (Peters, 1978), read deeply (Schiefele, 1999), examine interesting images (Silvia, 2005), manipulate interesting objects (Reeve & Nix, 1997), investigate how other people think, feel, and behave (Renner, 2006), take risks to acquire new experiences (Zuckerman, 1994), and persist on challenging tasks (Sansone & Smith, 2000). Taken together, there is agreement that curiosity's immediate function is to seek out, explore, and immerse oneself in situations with potential for new information and/or experiences. In the longer term, consistently acting on curious feelings functions to expand knowledge, build competencies, strengthen social relationships, and increase intellectual and creative capacities (von Stumm & Ackerman, 2013; von Stumm, Hell, & Chamorro-Premuzic, 2011).

Curiosity can be commonly defined as the recognition, pursuit, and desire to explore novel, uncertain, complex, and ambiguous events. There is the feeling of interest in a situation where a potential exists for learning. There is a desire to seek out novel experiences - to see what happens, to find out how one will react, or discover how others react. With this definition, curiosity shares commonalities with a dizzying array of psychological terms such as openness to experience, novelty seeking, need for cognition, intrinsic motivation, tolerance of ambiguity, tolerance for uncertainty, frustration tolerance, and sensation seeking. Any researcher or practitioner interested in curiosity will be confronted with isolated strands of research with different terms describing a similar set of emotions and behaviors. Synthesis is needed and this will

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only be possible with a clear demarcation of the central features of curiosity.

1.1. Individual differences in curiosity

There have been multiple attempts to conceptualize how people differ in their curiosity. Several contemporary trait taxonomies include *openness to experience*, a heterogeneous higher-order trait. Openness to experience is much more than curiosity (e.g., DeYoung, Peterson, & Higgins, 2005; Woo et al., 2014), but curiosity is identified as a single facet in many models, such as the Big Five personality traits (McCrae, 1996), the HEXACO (Ashton & Lee, 2007), and the theoretical intellect framework (Mussel, 2013a). The fact that curiosity is nested under openness to experience but positive affect is nested under extraversion (e.g., DeYoung, 2015) offers support for the distinction between curiosity and positivity/happiness.

Most research on trait curiosity examines curiosity as a lower-level facet using scales that target it directly (Grossnickle, 2016). Several models of trait curiosity view it as a general, unitary trait associated with the motivation to explore and learn (Beswick, 1971; Loewenstein, 1994; Naylor, 1981) and a tendency to experience feelings of interest (Spielberger & Starr, 1994). A tacit assumption is that states and traits are psychologically equivalent (see Fleeson, 2001) with trait curiosity as the manifestation of frequent and/or intense momentary episodes of curiosity (Boyle, 1989; Silvia, 2008a).

In recent years, models of curiosity have started to distinguish facets. The revised Curiosity and Exploration Inventory (CEI-II; Kashdan et al., 2009), for example, distinguishes between *stretching* (wanting new knowledge and experiences) and *embracing* (being willing to accept the unpredictable and complex nature of daily life). Other scales have built upon earlier distinctions made by Berlyne (1960), such as breadth versus depth of curiosity (Ainley, 1987), and epistemic, sensory, and perceptual curiosity (Collins, Litman, & Spielberger, 2004; Litman, Collins, & Spielberger, 2005; Litman & Spielberger, 2003; Mussel, 2010).

Curiosity has also been separated into a feeling of interest (wanting to know for its own sake) versus curiosity as a feeling of deprivation (wanting to know because not knowing is frustrating; Litman, 2005). This distinction is important as the majority of assessment approaches assume that feeling curious and subsequent acts of exploration are pleasurable (CEI and CEI-II; Kashdan, Rose, & Fincham, 2004; Kashdan et al., 2009; curiosity subscale of the Values in Action questionnaire; Peterson & Seligman, 2004; Melbourne Curiosity Inventory; Naylor, 1981). The assumption that curiosity is pleasurable ignores the fact that people often seek information to resolve uncertainty or remove the tension of being unsure or confused (Loewenstein, 1994). Furthermore, even if it is apparent that acting on one's curiosity will lead to immediate pain and punishment, and no foreseeable future rewards, people willingly do so – satisfying curiosity is a powerful, basic human motive (Hsee & Ruan, 2016; Reiss, 2004). These divergent perspectives of curiosity, being oriented toward the pleasure of discovery versus the reduction of information gaps, emerge as distinct (although highly related) factors in correlational research (Litman, 2010; Litman, Crowson, & Kolinski, 2010; Litman & Mussel, 2013).

Other models sought to examine curiosity in specific life domains. For example, decades of research have been dedicated to the assessment and study of sensation seeking or the willingness to take financial, physical, and social risks in order to acquire novel, adventurous experiences (Zuckerman, 1994). Researchers have measured individual differences in curiosity at work (Mussel, Spengler, Litman, & Schuler, 2012), a context in which curiosity appears to help people adjust to new roles and situations (Harrison, Sluss, & Ashforth, 2011), predict job performance (Mussel, 2013b), and creative thinking (Celik, Storme, Davila, & Myszkowski, 2016). Similarly, another scale assesses entrepreneurial curiosity (Jeraj & Antoncic, 2013) as an attribute leading to innovation (Peljko, Jeraj, Săvoiu, & Marič, 2016). Social curiosity—an interest in acquiring information on how other people think, feel, and behave—has been shown to predict tendencies to gossip (Litman & Pezzo, 2007) and the accuracy of interpersonal perceptions about strangers (Hartung & Renner, 2011). As social animals who are heavily invested in forging friendships, finding mates, and attaining status in social hierarchies, it is surprising that social curiosity has yet to attract significant attention.

1.2. Current research program

The goal of this research program is to synthesize various strands of curiosity from the social sciences to create a single, comprehensive measure. By capturing the broad range of dimensions that exist, researchers will find it easier to explore the origins, correlates, consequences of curiosity, and interventions for enhancement. Based on a literature review, there appear to be several dimensions of curiosity that belong in a multidimensional measure. We followed best practices for measure construction (e.g., Clark & Watson, 1995) and constructed a measure simultaneously driven by theory and data analysis.

First, any measure of curiosity must distinguish between a general fascination with new information and experiences that are pleasurable (Kashdan & Silvia, 2009) from the intrinsic desire to resolve an information gap (Loewenstein, 1994). Walking through life with a love of learning and a tendency to view the world as a very interesting place is a qualitatively different experience than being unable to sleep until an answer is obtained for an ongoing problem (Litman, 2005). But there is more to curiosity than these two facets.

Second, the degree to which someone is curious is contingent on two appraisals that occur automatically and rapidly. The more obvious of the two is whether a person views an event as having potential for novelty, complexity, uncertainty, or unfamiliarity – and thereby enticing enough to warrant rapt attention. But this is insufficient. A person must also determine whether they are able to sufficiently cope or manage the negative emotions that arise from exploring new, complex, uncertain, unfamiliar, or unchartered territory (Silvia, 2005, 2008a). The ability to tolerate the stress that arises when confronting new, complex, uncertain, unfamiliar, or unchartered territory is in fact, a contributing element to experiencing curiosity and being a curious person (Silvia, 2008b). Separate from the tolerance of stress that arises from exploring the new is the willingness to take social, financial, and legal risks to acquire unique experiences (Zuckerman, 1979, 1994); a 40-year body of research that has been largely ignored in recent curiosity work. Thrill-seeking and being adventurous is a particular form of curiosity where stress is not something to be reduced, rather something to amplify.

Third, to understand the psychology of curiosity, it is necessary to acknowledge that "interpersonal relationships are the foundation and theme of human life, most human behavior takes places in the context of the person's relationships with others" (Reis, Collins, & Berscheid, 2000). Being curious about other people, thus, warrants consideration as a separate dimension (Litman & Pezzo, 2007; Renner, 2006).

1.3. Our approach

This work organizes the rich theories and methodologies of prior researchers into a single framework. The benefit of a single, multidimensional scale is the ability to study the correlates of

curiosity, including related personality dimensions, emotional states, and elements of well-being with stronger ties to particular dimensions of curiosity. For instance, a general fascination and ability to tolerate the stress of confronting the new appear to be central to experiencing well-being whereas a tendency to seek resolutions to information gaps is likely to be tied to some level of distress and unlikely to be directly tied to a life of happiness and meaning in life. Similarly, social curiosity, or a tendency to acquire information about what other people are doing through observation, probing questions, and gossip is probably more useful to maintain an orderly understanding of the world as opposed to being of direct benefit to one's well-being. Thrill seeking is akin to risk-taking for the sake of acquiring positive emotions and pleasurable experiences. If this predisposition is not channeled into meaningful life pursuits such as athletics, public stage performances, or first line responders, there is a vulnerability to reckless behavior to one's physical health, social relationships, and occupational life (where stressful situations are sought out for stimulation) as opposed to greater well-being (Zuckerman, 1994).

There is another benefit to a theoretically relevant, multidimensional approach to curiosity and that is to study curiosity profiles or types of curious people. Until now, studies addressing the influence of curiosity on psychological functioning have been limited to a variable-centric approach. Variable-centric approaches rely on correlations between one construct and another, making the assumption that the population is homogenous. Statements can only be made about the direction and strength of associations. A person-centric approach is conceptually different, beginning with the assumption that mean scores and correlations for singular variables mask heterogeneous people within a sample or population. The function of person-centric approaches, such as cluster and latent class analyses, is that statements can be made about the ways that multiple dimensions of curiosity are configured within a particular individual. The goal is to identify subgroups of individuals within a sample on multiple dimensions whose profile of dimensions (e.g., high on some, low on others) differ and determine how these profiles relate to meaningful outcomes such as who people are (personality traits, values), what people do (goals, interests, expenditure of attention, energy, and money), and how they function (knowledge and wisdom; emotional, social, and physical well-being). Researchers know a great deal about the correlates of global curiosity measures and comparatively little about types of curious people. To our knowledge there is no research on the distinct profiles that may differentiate people on curiosity.

Using three distinct samples, we created and validated the Five-Dimensional Curiosity Scale (5DC). In the first study, we reviewed existing theories and measures to generate items to capture the bandwidth of curiosity. Item content included facets of curiosity that are pleasurable (e.g., Joyous Exploration), wrought with tension (e.g., Deprivation Sensitivity), essential for coping with stimuli that are new, uncertain, complex, and conflict laden (e.g., Stress Tolerance), helpful for navigating the interpersonal world (e.g., Social Curiosity), and risky or dangerous situations a person endures to obtain novel, pleasurable experiences (e.g., Thrill Seeking) -- see the Method section for references. In the second study, we revised the instrument while including a broad range of existing curiosity related measures and indices of adaptive and maladaptive functioning. Doing so offered an expansive evaluation of how distinct curiosity dimensions might be related to personality dimensions (e.g., the Big Five, grit, positive and negative emotionality) and well-being (e.g., subjective happiness, meaning in life, psychological flexibility, and the satisfaction of psychological needs).

In the third study, we moved from a variable-centric to a person-centric approach to examine the presence and nature of different subgroups of people based on the five curiosity dimensions (pattern of scores on Joyous Exploration, Deprivation Sensitivity, Stress Tolerance, Thrill Seeking, and Social Curiosity). Empirically identified curiosity profiles were compared to understand which types of curious people possessed the most adaptive personality traits and values, and in what ways did they spend finite attention, energy, and money (assessing consumer behavior, passionate interests, and development of expertise in these areas of interest). By linking curiosity profiles with psychosocial functioning, we anticipated that certain clusters characterized by higher scores on Joyous Exploration and the ability to tolerate the stress of confronting novelty would exhibit healthier functioning in everything from number of interests and areas of expertise to the size of their online social network, whereas higher scores on Deprivation Sensitivity with distress intolerance would predict a less adaptive pattern.

Taken together, our research program moves beyond overly simplistic approaches where the singular label of curious is used to designate individuals as possessing a strength or not (Peterson & Seligman, 2004). Furthermore, it is time to test the assumption that the population is homogeneous wherein correlations offer a suitable explanation for the benefits (and costs) of curiosity. We tested whether a multidimensional approach can segment the population into meaningful subgroups to better understand human motivation, behavior, and well-being.

2. Study 1 Method

2.1. Preliminary item pool

To capture the broad scope of curiosity we reviewed measures of interest and curiosity (e.g., Kashdan et al., 2009; Litman, 2008; Naylor, 1981; Peterson & Seligman, 2004; Renner, 2006) and related domains including but not limited to openness to experience (e.g., Ashton & Lee, 2007), need for cognition (Cacioppo, Petty, Feinstein, & Jarvis, 1996), boredom proneness (Farmer & Sundberg, 1986), and sensation seeking (Byman, 1993; Zuckerman, Eysenck, & Eysenck, 1978). Upon additionally mining existing theories of interest and curiosity, we generated an initial item pool of 103 items.

We obtained feedback on the clarity and usefulness of these items from several focus groups using think-aloud approaches (Davison, Navarre, & Vogel, 1995). Based on feedback and ongoing conceptual discussions, we identified and refined problematic items. Items were often modified to improve grammar, use an active voice, avoid jargon, reduce the reading level, and increase comprehension. Other edits included rewording to avoid excessive domain specificity (e.g., "I enjoy scuba diving") and improve cross-cultural relevance. For example, one Deprivation Sensitivity item was previously written: "I work like a fiend at problems that I feel must be solved". We adapted this item to "I work relentlessly at problems that I feel must be solved" to reduce the required reading level. We refined and separated items into groups according to content similarity but theory and data informed the final domains.

2.2. Participants

To evaluate the quality and structure of items, we recruited 577 adults that are nationally representative of the United States for an online survey. Inclusion criteria included English-speaking, access to a computer, and a minimum of $15,000 household income for non-students. Quota sampling was used so that the final data were demographically aligned with the U.S. Census statistics of November 2015.

Due to missing data, our final sample consisted of 508 participants (49% male). Age ranged between 18 and 64 years with a

modal response between 45–54 years old. Forty-eight states and the District of Columbia were represented. In terms of race/ethnicity (allowing multiple selections), 78% endorsed Caucasian, 17% endorsed Hispanic, Latino, or Spanish origin, 12.1% endorsed African American, 7% endorsed Asian or Pacific Islander, 2.2% endorsed Alaskan Native/American Indian, and 3.9% endorsed other. Information on the demographics of all three samples (e.g., income, education) are detailed in Table 1.

Weighting procedures allowed us to produce a nationally representative sample. Sample cases were weighted to match the U.S. Census Current Population Survey for age, gender, education, income, and race/ethnicity.

2.3. Procedure

The field period for this survey was May 2, 2016 through May 3, 2016. 88% of eligible respondents who started the survey completed it (completion rate). A blended sampling frame was used, drawing samples from 2 separate non-probability based General Population Online Panels: Research Now and Lightspeed GMI. Two separate sample sources were used to maximize reach of the Internet universe as each sample house uses different methods / sources to build their online panel. Respondents received rewards points for completing the survey. Though thresholds varied for each sample source, accumulated rewards points could be "cashed in" for gift cards (similar to a loyalty program). Through an email invitation, selected respondents were directed to the online survey.

Quota sampling was used during fielding to ensure final data were demographically balanced to the U.S. population. Quota sampling is commonly used to offset sampling imbalances due to varying response rates and demographic skews with non-probability based sampling frames such as online panels. Four subgroups were selected for this research:

Subgroup	Quota	Final N	Weighted N
Men 18–34	80–90	80	88
Men 35–64	155–170	168	161
Women 18–34	95–105	92	97
Women 35–64	155–170	68	162

Census profiles were compiled for each subgroup using U.S. Census November 2015 CPS database to ensure each was properly balanced to U.S. Census statistics across key demographics. Adjustments were made to sample selection during fielding to better align this data with U.S. Census November 2015 CPS database profiles.

Once fielding was completed, survey data were weighted against the U.S. Census Current Population Survey for age, gender, education, income and race/ethnicity. Rim weighting was used to efficiently weight multiple variables simultaneously. Overall weighting efficiency was 89.5%. Weighting efficiency score is a good indicator of possible data distortion as a result of applied weights. Datasets with a weighting efficiency below 70% are indicative of potential data distortion.

2.4. Measures

Participants completed a preliminary pool of 103 curiosity items; ratings were made on a 7-point Likert scale (ranging from 1 = *does not describe me at all* to 7 = *completely describes me*). In addition to the curiosity measure, demographic questions were completed.

Table 1
Descriptive statistics for all studies.

	Study 1: Community (n = 508)	Study 2: Mturk (n = 403)	Study 3: Community (n = 3000)
Gender	49% male	55.7% male	49% male
Age (years)	14.4% were 18–24 21.9% were 25–34 20.7% were 35–44 22.2% were 45–54 20.9% were 55–64	33.90 (SD = 9.5)	14.1% were 18–24 20.7% were 25–34 21.2% were 35–44 22.2% were 45–54 21.9% were 55–64
Race/Ethnicity	78% Caucasian* 17.3% Hispanic, Latino 12.1% African American 7% Asian or Pacific Islander 2.2% Alaskan Native/American Indian 3.9% other	79.8% Caucasian 7.8% African American 6.6% Asian/Pacific Islander 4.6% Hispanic, Latino 1.2% other	80.9% Caucasian* 17.3% Hispanic, Latino 12.6% African American 7.1% Asian or Pacific Islander 1.6% Alaskan Native/American Indian 2.3% other
Relationship status	47.7% married 32% single 10.2% separated or divorced 9.6% living with significant other 0.6% widowed	39.4% single 34.1% married 19.5% long-term relationship 0.7% other 0.5% separated	54.9% married 27% single 8.8% living with significant other 8.2% separated or divorced 1.1% widowed
Highest Education	25.4% some college 21.4% Bachelor's 14.8% high school degree 12.4% Master's 10.3% Associate's 3.3% post graduate non-degree seeking 4.9% Doctoral/professional degree (e.g., M.D.) 0.2% some high school	33.3% Bachelor's 24.6% some college 16.1% high school degree 11.7% Associate's 16.1% professional/graduate degree 2.9% some professional school 2.4% trade, technical, or vocational school	30.7% Bachelors 20.7% some college 13% Master's 12.6% Associate's 12.3% high school degree 4.3% post graduate non-degree seeking 5.4% Doctoral/professional degree (e.g., M.D.) 1.1% some high school
Income	19.5% earned $15,000–$34,999 25.9% earned $35,000–$59,000 25.5% earned $60,000–$99,999 29.1% earned over $100,000	36.7% earned $10,000 and $30,000 40.2% earned $30,001 and $60,000 18.8% earned $60,001 and $90,001 4.3% earned over $100,000	18.8% earned $15,000–$34,999 20.5% earned $35,000–$54,999 34% earned $55,000–$99,999 26.1% earned over $100,000
Employment	67.4% full-time	60.1% full-time	62.4% full-time

* *Note*. Multiple races selections were allowed, accounting for total percentages above 100%.

3. Study 1 Results

The preliminary curiosity item pool was analyzed or modified in the following three stages: (a) examination of endorsement rates, (b) elimination of redundant items, and (c) identification of factor structure.

3.1. Item analyses

We made modifications to the instrument by examining endorsement rates (removing items that failed to receive a full range of responses or high endorsement as demonstrated by means above 6.0) and eliminating redundancies (correlations greater than 0.70 with other items). For example, "I think the world is a very interesting place" was removed for negative skew (skewness = −1.07, *SE* = 0.11). These two processes eliminated 12 items.

Through a series of exploratory factor analyses (EFAs) with promax rotation, we removed items that cross-loaded on multiple factors (greater than 0.35) and/or did not load significantly on any factor (less than 0.35). This iterative process eliminated 61 items, ending with a final pool of 30 items used in the final exploratory factor analysis. The strength of correlations between these preliminary factors are reported in supplemental material.

3.2. Factor structure

3.2.1. Parallel analysis

We used parallel analysis (Horn, 1965) on the 43 items to guide the number of factors to extract. A parallel analysis compares obtained eigenvalues with those generated from random datasets to correct for inflated item correlations due to sampling error (Humphreys & Montanelli, 1975). To prevent over extraction of factors, we used the 95th percentile of the random eigenvalues (Glorfeld, 1995). This analysis revealed that up to five factors could be extracted (adjusted eigenvalues were 8.8, 5.29, 2.17, 1.38, and 1.23). We considered solutions up to five factors and examined item content to identify the best structure.

3.2.2. EFA of 43 items

The associations among the 43 items were examined via exploratory factor analyses (principal-axis factoring). Oblique (promax) factoring was used, as it was expected that the resulting factors would be correlated. Extracting fewer than 5 factors generated "glop" factors with dissimilar content, suggesting a need for a larger number. Extracting more than 5 factors resulted in "junk" factors with few items (less than 4) with little meaning. As a result, the five-factor solution, which explained 42.4% of the total variance, was retained for further analysis. During this process, 13 additional items were dropped due to weak main-loadings (less than 0.35) and/or strong cross-loadings (greater than 0.35).

3.2.3. Parallel analysis and EFA of 30 items

A second round of parallel analysis and EFA (same procedures) were conducted on the remaining 30 items. Parallel analysis again suggested up to 5 factors and the EFA factor solution with 5 correlated factors was meaningful (explaining 47% of the variance). The labels given to the five factors – in order of extraction - were Joyous Exploration, Social Curiosity, Stress Tolerance, Deprivation Sensitivity, and Thrill Seeking. Joyous Exploration contained 8 items (pure enjoyment of novel stimuli; e.g., "I find it fascinating to learn new information"); Social Curiosity contained 6 items (interest in the lives of others; "I like finding out why people behave the way they do"); Stress Tolerance contained 6 items reverse-scored (managing the distress that arises with unfamiliar stimuli; "I cannot handle the stress that comes from entering uncertain situatio ns"); Deprivation Sensitivity contained 6 items (the need to resolve a lack of information; "I can spend hours on a single problem because I just can't rest without knowing the answer"); Thrill Seeking contained 4 items (passion for adventure; "Risk-taking is exciting to me"). Loadings for Joyous Exploration ranged from 0.51 to 0.87, loadings for Social Curiosity ranged from 0.54 to 0.77, loadings for Stress Tolerance ranged from 0.61 to 0.72, loadings for Deprivation Sensitivity ranged from 0.34 to 0.78, and loadings for Thrill Seeking ranged from 0.49 to 0.73. The maximum cross-loading on any factor was −0.27.

4. Study 1 Discussion

The initial findings support the presence of five related, but independent, dimensions of curiosity. Previously isolated bodies of work on curiosity are for the first time, being integrated into a single framework. For instance, certain theories and measures have described curiosity as a positive emotional experience combined with an approach motivation (e.g., Kashdan et al., 2004; Sansone & Thoman, 2005) and others have countered that curiosity elicits tension when a person attempts to reconcile gaps in their information (e.g., Litman & Jimerson, 2004; Loewenstein, 1994). Rather than choosing between models, our 5-dimensional model integrates them, with the additional inclusion of other bodies of work capturing social curiosity, thrill or sensation seeking, and the distress tolerance required to pursue the new, uncertain, complex, and ambiguous. This approach builds on ideas from two-dimensional (Litman, 2005) and three-dimensional (Reio, Petrosko, Wiswell, & Thongsukmag, 2006) frameworks. In Study 2, we moved through additional steps of scale development (e.g., Clark & Watson, 1995) by attempting to replicate the 5-dimensional structure and exploring construct validity.

For ease of interpretation, we first present the factor analytic results (Study 2a) and then detail the measures used and results for construct validation (Study 2b).

5. Study 2 – Participants and procedures

5.1. Secondary item pool generation

In Study 1, Social Curiosity and Thrill Seeking items did not perform as well as items from other dimensions. The majority of items generated for these two dimensions failed to load onto the primary factor with loadings as low as 0.25 and inter-item correlations as low as 0.17. To fully explore the nature of these factors, we added 25 items with specific content related to Social Curiosity and Thrill Seeking. We generated the items in a similar method to Study 1: reviewing theories and generating relevant content.

5.2. Participants

To evaluate the quality, structure, and validity of our items, we recruited 425 U.S. adults from Amazon's Mechanical Turk (i.e., MTurk). Inclusion criteria included English-speaking, access to a computer, and living in the United States. After removing 22 participants who failed to pass a careless responding check (e.g., Please select "slightly agree"), our final sample consisted of 403 participants (55.7% male). Ages ranged between 18 and 69 years old, mean of 33.9 years old (*SD* = 9.5). In terms of race/ethnicity (not allowing multiple selections), 79.8% endorsed Caucasian, 7.8% endorsed African-American, 6.6% endorsed Asian/Pacific Islander, 4.6% endorsed Latino/Hispanic, and 1.2% endorsed other. Further information regarding the demographics of all three samples (e.g., income, education) is in Table 1.

5.3. Procedures

Participants were recruited through MTurk during July 2016. The study description was purposefully vague to prevent demand characteristics. The title was "personality survey" and the description stated "You will be asked 300 questions about your personality. It will require approximately 45 min to complete." Participants were paid $7 for study completion. Amazon Mechanical Turk arguably provides more generalizable participants than typical American college students studying psychology (Buhrmester, Kwang, & Gosling, 2013).

Participants who completed the survey were contacted 4 months later to complete a similar survey on MTurk from November-December 2016. All procedures described for the initial Mturk survey apply. Of participants contacted, 80% completed the follow-up survey. No variables in the initial dataset predicted whether or not participants completed the follow-up survey suggesting generalizability. MTurk participants received $2 for the follow-up survey. The average worker wage is less than $2 per hour (Sheehan & Pittman, 2016).

6. Study 2a – Methods and results for factor analyses

The first component of the second study of data collection had two goals: (a) testing additional items and (b) further refinement of the existing item pool.

6.1. Measure evaluation

Participants responded to a total of 55 new and revised curiosity items. The resulting 55-item pool was analyzed in a community sample for the following: (a) examination of endorsement rates, (b) elimination of redundancies, (c) factor structure, (d) test–retest reliability, and (e) associations with related measures.

6.2. Item analyses

Initial item analyses were identical to Study 1. After examining endorsement rates, one item was dropped from subsequent analyses due to an extreme negative skew (e.g., 5.97 mean score on a 7-point scale). All items correlated less than 0.70 with each other, thus no items were removed due to redundancy.

6.3. Factor structure

6.3.1. EFA of 54 items

The associations among the remaining 54 items were examined via exploratory factor analyses (principal-axis factoring). With the expectation of correlated factors, oblique (promax) factoring was used. Based on results from Study 1, a five-factor solution was anticipated. In this sample, two-, three-, and four-, factor solutions resulted in large heterogeneous factors that were difficult to interpret, suggesting the need to extract additional dimensions. A five-factor structure solution yielded interpretable and stable factors. The six- and seven-factor solutions resulted in junk factors with few items, indicating that too many factors had been extracted. During this process, we removed 27 items due to insufficient loadings on any of the factors and 2 items due to significant cross-loadings.

6.3.2. EFA of 25 items

To reexamine the structure, we conducted a new set of factor analyses on this reduced set of 25 items, hereby referred to as the Five-Dimensional Curiosity Scale (5DC). The factor loading results from Studies 2 and 3 are reported in Table 3. Loadings for Joyous Exploration ranged from 0.69 to 0.87, loadings for Stress Tolerance ranged from 0.75 to 0.85, loadings for Social Curiosity ranged from 0.49 to 0.93, loadings for Deprivation Sensitivity ranged from 0.48 to 0.91, and loadings for Thrill Seeking ranged from 0.58 to 0.85. The final 25 items can be found in Appendix A. See Table 2 for the descriptive statistics of the five unit-weighted subscale scores.

6.4. Test-retest reliability

To examine the temporal stability of the 5DC, we examined correlations (using list-wise deletion) between the initial survey and 4-month follow-up for each dimension. Results were within the range of stable personality traits (Watson, 2004): Joyous Exploration (0.80), Deprivation Sensitivity (0.67), Stress Tolerance (0.72), Social Curiosity (0.59), Thrill Seeking (0.79).

7. Study 2b – Methods and results for construct validity

The second component of Study 2 focused on convergent, discriminant, and construct validity. The following measures were used to understand the nomological network and correlates of the five dimensions of curiosity.

7.1. Convergence with existing curiosity scales

Participants completed the Curiosity and Exploration Inventory-II (CEI-II; Kashdan et al., 2009). The stretching subscale reflects a motivation to seek out knowledge and new experiences. The embracing subscales reflects a willingness to tolerate the novel, uncertain, and unpredictable nature of everyday life. Participants responded to 10 items (5 for each subscale) on a 5-point Likert scale from 1 = *very slightly or not at all* to 5 = *extremely*. Construct validity has been shown in prior studies assessing curiosity, goal-striving, and well-being (e.g., Sheldon, Jose, Kashdan, & Jarden, 2015). Reliability was acceptable for both subscales (αs = 0.84 and 0.87).

Table 2
Correlations, means, standard deviations, and alphas for the 5DC (Study 2 & Study 3).

Subscales	JE	DS	ST	SC	TS
Joyous Exploration	–	.40*	.15*	.32*	.51*
Deprivation Sensitivity	.49*	–	−.26*	.33*	.22*
Stress Tolerance	.42*	−.06	–	−.24*	.09*
Social Curiosity	.26*	.29*	−.12	–	.29*
Thrill Seeking	.34*	.11	.34*	.20*	–
Mean (Study 2/Study 3)	4.52/5.25	4.01/4.90	4.02/4.42	4.00/4.42	3.08/3.88
SD (Study 2/Study 3)	1.09/1.09	1.10/1.14	1.30/1.36	1.08/1.35	1.16/1.32
Alpha (Study 2/Study 3)	.90/.87	.83/.81	.90/.87	.84/.86	.86/.85

Notes. Correlations for Study 2 (n = 403) are presented below the diagonal, and correlations for Study 3 (n = 3000) are presented above the diagonal. JE = Joyous Exploration; DS = Deprivation Sensitivity; ST = Stress Tolerance; SC = Social Curiosity; TS = Thrill Seeking.
* Correlation is significant at the .01 level.

Table 3
Factor loadings for the final 25 items of the 5DC for Study 2 (N = 403) and 3 (N = 3000).

	JE		DS		ST		SC		TS	
Items	Study 2	Study 3	Study 2	Study 3	Study 2	Study 3	Study 2	Study 3	Study 2	Study 3
JE1	**0.69**	**0.68**	0.04	0.06	−0.21	−0.11	−0.01	−0.03	−0.09	0.05
JE2	**0.78**	**0.70**	−0.04	−0.06	−0.10	0.05	−0.07	0.00	0.07	0.19
JE3	**0.87**	**0.70**	−0.01	0.05	0.00	0.07	−0.11	−0.03	0.04	0.08
JE4	**0.82**	**0.81**	0.01	−0.03	0.03	0.01	−0.02	0.00	−0.06	−0.03
JE5	**0.79**	**0.84**	0.09	0.01	0.08	0.00	0.00	−0.01	−0.06	−0.14
DS1	0.20	0.07	**0.53**	**0.51**	0.16	0.10	−0.04	0.10	0.14	−0.15
DS2	0.16	−0.06	**0.72**	**0.53**	0.05	0.18	−0.04	−0.02	0.06	0.12
DS3	−0.12	−0.06	**0.91**	**0.80**	−0.08	0.01	0.01	−0.05	−0.04	0.07
DS4	0.09	0.03	**0.79**	**0.79**	−0.18	−0.13	0.01	−0.01	−0.08	−0.04
DS5	−0.08	0.06	**0.48**	**0.76**	0.30	−0.13	0.06	−0.02	−0.16	0.02
ST1	−0.11	−0.04	0.02	−0.04	**0.75**	**0.78**	0.01	0.00	0.07	0.06
ST2	−0.02	−0.03	−0.08	−0.05	**0.85**	**0.77**	−0.03	0.00	0.04	0.02
ST3	−0.01	0.01	−0.09	−0.03	**0.87**	**0.74**	0.00	0.04	0.08	−0.06
ST4	0.03	0.05	−0.07	0.04	**0.79**	**0.74**	−0.02	−0.03	−0.12	−0.07
ST5	0.02	0.04	0.07	0.02	**0.78**	**0.73**	−0.06	−0.04	−0.05	0.02
SC1	0.30	0.16	−0.07	−0.05	0.08	0.01	**0.54**	**0.66**	0.09	0.07
SC2	0.31	0.24	−0.02	0.03	0.07	0.00	**0.49**	**0.60**	0.04	−0.02
SC3	−0.11	−0.12	0.00	0.00	−0.06	−0.03	**0.93**	**0.89**	−0.01	−0.01
SC4	−0.12	−0.03	−0.03	−0.03	−0.02	−0.04	**0.85**	**0.78**	−0.03	−0.07
SC5	−0.12	−0.15	0.07	0.05	−0.02	0.04	**0.69**	**0.74**	−0.01	0.10
TS1	−0.05	0.16	0.16	0.01	−0.08	−0.01	−0.01	−0.04	**0.58**	**0.61**
TS2	−0.12	−0.04	0.16	0.03	−0.15	−0.09	0.00	0.02	**0.75**	**0.81**
TS3	0.06	−0.06	−0.14	0.00	0.11	0.05	−0.05	0.06	**0.84**	**0.74**
TS4	−0.03	−0.10	−0.07	0.00	0.07	0.02	0.03	0.04	**0.85**	**0.81**
TS5	0.07	0.11	−0.01	0.00	−0.01	0.00	−0.01	−0.04	**0.68**	**0.62**

Notes. Study 2 factor loadings are from an exploratory factor analysis (EFA). Study 3 factor loadings are from a confirmatory factor analysis (CFA). Items loading on each factor are in boldface. JE = Joyous Exploration; DS = Deprivation Sensitivity; ST = Stress Tolerance; SC = Social Curiosity; TS = Thrill Seeking.

Participants completed the Need for Cognition Scale (Cacioppo & Petty, 1982) to measure a person's preference for and enjoyment of abstract thinking, deep contemplation, and problem-solving. Participants responded to 15 items on a 7-point Likert scale from 0 = *strongly disagree* to 6 = *strongly agree*. Reliability was acceptable ($\alpha = 0.91$).

Participants completed the brief Need for Closure Scale (Roets & Van Hiel, 2011) to assess a preference for order – such that a person continually attempts to assimilate new information into existing beliefs, expectations, and routines (Neuberg, Judice, & West, 1997). Participants responded to 15 items on a 6-point Likert scale from 1 = *strongly disagree* to 6 = *strongly agree*. Reliability was acceptable ($\alpha = 0.96$).

Participants completed the Epistemic Curiosity Inventory (Litman & Spielberger, 2003) to assess the desire to eliminate gaps in knowledge by learning new things and solving problems. Participants responded to 10 items on a 7-point Likert scale from 0 = *Does not describe me at all* to 6 = *completely describes me*. Reliability was acceptable ($\alpha = 0.93$).

Participants completed the Tendency to Gossip Questionnaire (TGQ; Nevo, Nevo, & Derech-Zehavi, 1993). Participants responded to 20 items on a 7-point Likert scale from 1 = *never* to 7 = *always*. Reliability was acceptable ($\alpha = 0.95$).

Participants completed the Arnett Inventory of Sensation Seeking (Arnett, 1994) to assess the need for varied, novel, complex, and intense sensations and experiences along with the willingness to take risks to achieve these experiences. Participants responded to 20 items on a 4-point Likert scale from 0 = *does not describe me at all* to 3 = *describes me very well*. Reliability was acceptable ($\alpha = 0.78$).

7.2. Construct validity

7.2.1. Personality measures

Participants completed the 20-item Mini-International Personality Item Pool (Mini-IPIP; Donnellan, Oswald, Baird, & Lucas, 2006) to capture the Big Five factors of personality on a 5-point Likert scale from 1 = *very inaccurate* to 5 = *very accurate*. Relevant items were averaged to assess Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. The mini-IPIP demonstrates similar reliabilities as the IPIP-Five Factor Model Scale (120 items; Johnson, 2014) and the Ten-Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003). Measuring the Big Five, as a core taxonomy of personality, is helpful to understand the positioning of any new individual difference measure (Schutte et al., 1998). Reliabilities were acceptable (αs from 0.77 to 0.89).

Participants completed the Balanced Measure of Psychological Needs Scale (Sheldon & Hilpert, 2012) to capture satisfaction of basic needs for relatedness, autonomy, and competence (Ryan & Deci, 2000). Participants responded to 18 items on a 5-point Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*. Subscale reliability ranged from 0.76 to 0.81.

Participants completed the Beliefs about Well-Being Scale (McMahan & Estes, 2011). Subscales captured what people believe are the defining features of well-being: pleasure, avoidance of negative experience, self-development, and contribution to others. Participants responded to 16 items on a 7-point Likert scale from 1 = *strongly disagree* to 7 = *strongly agree*. Reliabilities for the four factors were acceptable (αs from 0.81 to 0.92).

Participants completed the Subjective Happiness Scale (Lyubomirksy & Lepper, 1999) where two items ask respondents to endorse how happy they are using absolute ratings and ratings relative to peers and two items provide descriptions of happy and unhappy individuals and ask respondents the extent to which the statements describe them. Responses, with different anchors, are given on a 7-point scale. Reliability was acceptable ($\alpha = 0.86$).

Participants completed the presence subscale of the Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006) to assess how much a person believes that their life contains significant meaning and purpose. Participants responded to 5 items on a 7-point Likert scale from 1 = *absolutely untrue* to 7 = *absolutely true*. Reliability was acceptable ($\alpha = 0.96$).

Participants completed the Short Grit Scale (Duckworth & Quinn, 2009) to assess perseverance toward meaningful, long-term goals. Participants responded to 4-item perseverance (α = 0.83) and 4-item consistency of interests (α = 0.88) subscales on a 5-point Likert scale from 1 = *very much like me* to 5 = *not like me at all*. Because of their differential validity, subscales were analyzed separately (Disabato, Goodman, & Kashdan, in press).

Participants completed the Acceptance and Action Questionnaire-II (Bond et al., 2011) to assess psychological inflexibility – or the tendency to avoid uncomfortable emotions that arise in demanding situations. Participants responded to 10 items on a 7-point Likert scale from 1 = *never true* to 7 = *always true*. Reliability was acceptable (α = 0.94).

Participants completed the Distress Intolerance Index (McHugh & Otto, 2012) to assess a perceived inability to tolerate undesirable physical sensations and emotions. Participants respond to 10 items on a 6-point Likert scale from 1 = *strongly disagree* to 6 = *strongly agree*. Reliability was acceptable (α = 0.96).

7.2.2. Emotion measures

Participants completed the positive and negative emotion subscales of the Brief Mood Introspection Scale (Mayer & Gaschke, 1988). Participants responded to 16 items on a 4-point Likert scale from 1 = *definitely do not feel* to 4 = *definitely feel*. Reliability was acceptable for the positive and negative emotion subscales (αs = 0.88 and 0.89).

Participants completed the Brief Experiential Avoidance Questionnaire (Gámez et al., 2014) to assess an unwillingness to remain in contact with distressing emotions, thoughts, memories, and physical sensations (Hayes, Strosahl, & Wilson, 2011). Participants responded to 16 items on a 6-point Likert scale from 1 = *strongly disagree* to 6 = *strongly agree*. Reliability was acceptable (α = 0.90).

Participants completed the Depression Anxiety Stress Scales (DASS-21; Henry & Crawford, 2005). Two subscales examine the severity of depression and anxiety symptoms. Participants responded to 14 items on a 5-point Likert scale from 0 = *never* to 4 = *almost always*. Reliability was acceptable (αs = 0.94 and 0.87).

8. Study 2b Results

8.1. Convergent associations with existing curiosity scales

As shown in Table 4, a pattern of correlations with existing measures of curiosity support the convergent validity of each 5DC subscale. Of the measures in the survey, Joyous Exploration correlated strongest with a measure of the motivation to seek out knowledge and new experiences (0.83 with the CEI-II stretching subscale). Deprivation Sensitivity correlated strongest with epistemic curiosity (0.50), the CEI-II stretching subscale (0.44), and need for cognition (0.41). Stress Tolerance correlated strongest, inversely, with a need for closure (−0.53). Thrill Seeking correlated strongest with a measure of the willingness to tolerate volatility, uncertainty, and ambiguity (0.82 with the CEI-II embracing subscale) and sensation seeking (0.70). Social Curiosity correlated strongest with a tendency to gossip (0.37).

Table 4
Correlations of the 5DC dimensions with related curiosity measures (Study 2).

Subscale	JE	DS	ST	SC	TS
CEI-II (stretch)	.83*	.44*	.42*	.21*	.34*
CEI-II (embrace)	.47*	.19*	.34*	.21*	.82*
Need for Cognition (total)	.76*	.41*	.43*	.12*	.22*
Need for Closure Scale (total)	−.37*	.08	−.53*	−.01	−.53*
Sensation Seeking (total)	.37*	.19*	.36*	.14*	.70*
Tendency to Gossip (total)	.08	.11	−.05	.37*	.27*
Epistemic Curiosity Inventory (total)	.79*	.50*	.33*	.25*	.25*

Notes. JE = Joyous Exploration; DS = Deprivation Sensitivity; ST = Stress Tolerance; SC = Social Curiosity; TS = Thrill Seeking.
* Correlation is significant at the .01 level.

8.2. Construct validity

Table 5 shows a pattern of correlations for the 5DC dimensions with multiple measures of personality and emotion. Joyous Exploration and Stress Tolerance showed evidence of near universal association with adaptive, healthy outcomes. For Deprivation Sensitivity, the only meaningful associations were with greater openness to experience and the belief that a good life consists of self-improvement and contributing to others. For Social Curiosity, meaningful associations were with greater agreeableness and the belief that a good life consists of self-improvement and contributing to others. Thrill Seeking deviated from the other dimensions by correlating with the belief that a good life is about hedonism.

8.3. Construct specificity

We conducted construct specificity analyses to determine whether the five dimensions of curiosity predicted relevant measures over and above the variance attributed to the Big Five personality traits (John & Srivastava, 1999). We used two-step hierarchical multiple regressions in which the Big Five were entered in the first step and the 5DC was entered in the second. Because the curiosity dimensions represent the only change between steps, any added prediction can be attributed to the dimensions (Hunsley & Meyer, 2003).

Table 6 shows the results of the regression equations. To illustrate the pattern of results, we provide the following example. The first step including only the Big Five traits resulted in a model accounting for 52% of the variance in subjective happiness. Adding the five dimensions of curiosity led to a significant increase in vari-

Table 5
Construct Validity for 5DC dimensions (Study 2).

Personality	JE	DS	ST	SC	TS
Extraversion	.25*	−.01	.46*	.13*	.35*
Conscientiousness	.21*	.19*	.22*	−.06	−.14*
Agreeableness	.31*	.07	.24*	.28*	.02
Openness	.50*	.33*	.32*	.15*	.21*
Neuroticism	−.28*	.04	−.61*	.09	−.14*
Autonomy (BMPNS)	.29*	−.04	.44*	−.13	−.01
Competence (BMPNS)	.43*	.10	.51*	−.02	.02
Relatedness (BMPNS)	.26*	−.08	.47*	.00	−.04
Avoidance of negative experience (BWBS)	−.24*	.03	−.27*	−.02	−.12
Pleasure (BWBS)	.02	.02	−.04	.10	.22*
Contribution to others (BWBS)	.44*	.24*	.24*	.20*	.14*
Self-development (BWBS)	.52*	.33*	.20*	.22*	.17*
Subjective Happiness	.33*	−.02	.49*	.01	.17*
Meaning in Life	.29*	.06	.38*	.04	.03
Grit: Perseverance	.40*	.18*	.39*	.07	.08
Grit: Consistency of interests	.20*	−.01	.36*	−.09	−.08
Psychological Inflexibility	−.21*	.12	−.62*	.14*	.00
Distress Intolerance	−.29*	.13*	−.70*	.14*	−.14*
Emotion	**JE**	**DS**	**ST**	**SC**	**TS**
Positive Emotions	.42*	.13	.43*	.05	.17*
Negative Emotions	−.18*	.11	−.45*	.14*	−.05
Experiential Avoidance	−.39*	.04	−.67*	.05	−.16*
Depression	−.24*	.07	−.48*	.05	−.02
Anxiety	−.11	.16*	−.39*	.12	.11

Notes. JE = Joyous Exploration; DS = Deprivation Sensitivity; ST = Stress Tolerance; SC = Social Curiosity; TS = Thrill Seeking; BMPNS = Balanced Measure of Psychological Needs Satisfaction; BWBS = Beliefs about Well-being Scale.
* Correlation is significant at the .01 level.

Table 6
Construct specificity and partial correlations for 5DC dimensions beyond Big Five personality traits (Study 2).

Personality	Step 1 R^2	Step 2 R^2 Δ	JE	DS	ST	SC	TS
Autonomy	.37*	.03*	.11*	−.02	.12*	−.13*	−.08
Competence	.42*	.07*	.25*	.05	.24*	−.04	−.06
Relatedness	.41*	.03*	.03	−.11*	.12*	−.04	−.16*
Avoidance of negative experience (BWBS)	.03*	.07*	−.18*	.06	−.23*	.03	−.06
Pleasure (BWBS)	.01	.09*	−.07	.02	−.19*	.11*	.19*
Contribution to others (BWBS)	.31*	.07*	.31*	.23*	.09	.06	.13*
Self-development (BWBS)	.19*	.12*	.39*	.25*	.04	.16*	.14*
Subjective Happiness	.52*	.14*	.16*	.03	.01	.03	.01
Meaning in Life	.26*	.02*	.14*	.08	.07	.01	−.07
Grit: Perseverance	.26*	.05*	.25*	.11*	.16*	.03	.04
Grit: Consistency of interests	.29*	.03*	.01	−.11*	.19*	−.17*	−.11*
Psychological Inflexibility	.50*	.07*	.02	.15*	−.32*	.16*	.19*
Distress Intolerance	.43*	.16*	−.08	.19*	−.49*	.15*	−.004
Emotion	**Step 1 R^2**	**Step 2 R^2 Δ**	**JE**	**DS**	**ST**	**SC**	**TS**
Positive Emotions	.34*	.04*	.09	−.02	.12*	.02	.09
Negative Emotions	.39*	.01*	−.02	.12*	−.13*	.11*	.02
Experiential Avoidance	.29*	.21*	−.17*	.15*	−.53*	.15*	−.05
Depression	.47*	.01*	−.03	.09	−.09	−.003	.10
Anxiety	.31*	.06*	.10*	.20*	−.07	.11*	.24*

Notes. JE = Joyous Exploration; DS = Deprivation Sensitivity; ST = Stress Tolerance; SC = Social Curiosity; TS = Thrill Seeking; BWBS = Beliefs about Well-being Scale. Step 1 R^2 is the amount of variance in each outcome explained by the Big Five personality traits alone. Step 2 R^2 Δ is how much variance is further explained by the five curiosity dimensions beyond the Big Five. Reported partial correlations are from different analyses in which each curiosity dimension was added separately at Step 2 to determine its unique partial correlation with each outcome.

* $p < .05$.

ance explained (R^2 **Δ** = 0.14, $p < .05$). Change in R^2 was significant for every outcome. Results offer empirical support for the unique contribution of the 5DC beyond the Big Five for a variety of psychological adaptive and maladaptive outcomes.

Partial correlations from analyses in which each dimension of curiosity was individually added at Step 2 are reported in Table 6. These values represent the unique contribution of each dimension over the Big Five. Joyous exploration correlated strongest with adaptive outcomes and was the only dimension to show unique incremental validity in predicting happiness and meaning in life. Deprivation Sensitivity and Social Curiosity showed positive associations with both adaptive and maladaptive outcomes.

In contrast, Stress Tolerance had the strongest inverse associations with maladaptive outcomes, such as experiential avoidance ($pr = -0.53$), distress tolerance ($pr = -0.49$), and psychological inflexibility ($pr = -0.32$). Unique to Social Curiosity was an inverse association with autonomy ($pr = -0.13$). Thrill Seeking strongly correlated with a belief that the good life is about pleasure and in addition, a moderate positive association with anxiety. The frequency and variability of associations demonstrate construct specificity for each dimension above and beyond what the Big Five explains.

9. Study 2 Discussion

Strong convergence with existing, empirically supported, curiosity related scales provides evidence that each dimension of the 5DC is measuring what is intended (e.g., epistemic curiosity the strongest correlate of Deprivation Sensitivity, sensation seeking scales the strongest correlates of Thrill Seeking, a tendency to gossip the strongest correlate of Social Curiosity). The variation in correlations between each dimension and other constructs justify the need for a multi-faceted conceptualization of curiosity.

People endorsing greater dispositional curiosity experience a higher probability of pleasurable and meaningful moments in their life (Gallagher & Lopez, 2007; Kashdan, Sherman, Yarbo, & Funder, 2013; Kashdan & Steger, 2007; Peterson, Ruch, Beerman, Park & Seligman, 2007; Vittersø, 2003). A subset of these moments of well-being result from curious people expending greater effort toward exploration, discovery, and personally meaningful goal pursuits (e.g., Kaczmarek et al., 2013; Mussel, 2013b; Sheldon et al., 2015). The results in the current study offer nuances to prior work by showing that Joyous Exploration and Stress Tolerance appear to be the curiosity dimensions most relevant to well-being.

Joyous Exploration is the dictionary definition of curiosity, capturing a preference for new information and experiences, and the valuing of self-expansion over security. Stress Tolerance reflects the perceived ability to cope with the anxiety inherent in confronting the new. Both appear essential in acquiring the psychological benefits of experiencing intrigue and taking the step to explore and discover. Our results support this framework as people scoring high on Joyous Exploration or Stress Tolerance endorsed a strong level of openness and emotional stability, grit, happiness, meaning in life, psychological flexibility, satisfaction of the needs for competence, autonomy, and relatedness, and healthy reactions to distress. Findings for curiosity dimensions could not be explained by the Big Five personality traits; a conservative test of construct specificity (especially because Openness to Experience is composed of curiosity and intellect; DeYoung et al., 2005). To our knowledge, this is the most comprehensive examination of well-being outcomes linked to curiosity.

Our results suggest that the type of curiosity matters in understanding the occurrence of well-being. Unlike the reward seeking inherent to Joyous Exploration, Deprivation Sensitivity is about seeking information to escape the tension of not knowing something. Our data support this description. Individuals endorsing greater Deprivation Sensitivity possessed high epistemic curiosity or a "drive to know" (p. 187, Berlyne, 1954) and the belief that a good life is about working to achieve one's potential and cultivate knowledge as opposed to the pursuit of positive experiences. Compared with the other dimensions, Deprivation Sensitivity showed the strongest correlation with anxiety. To some degree, Thrill Seeking exhibits the opposite pattern. The correlations in the present study suggest that the Thrill Seeking dimension is not about learning or growing (as in Joyous Exploration or Deprivation Sensitivity)

but rather the belief that a good life is about seeking out pleasure and adventure, especially when significant physical, social, legal, and/or financial risks are required.

The final dimension, Social Curiosity, has only been seriously considered within the past decade (Litman & Pezzo, 2007) and thus the downstream consequences remain unknown. In the present study, the Social Curiosity dimension had the strongest association with a tendency to gossip (Litman & Pezzo, 2007). Such an association confirms the specific nature of this dimension – an interest and even fixation on how other people think and behave. Based on the pattern of correlations, socially curious people report behavioral evidence of wanting friendships (e.g., being agreeable and friendly) but such niceties do not translate to feeling connected to other people (satisfaction of the need to belong).

Why is "stress tolerance" inversely related to social curiosity? Because the social curiosity construct reflects "the need to form a coherent map of the social environment" (Renner, 2006). This suggests an awareness of a gap between social knowledge that a person has and desires. This gap might be magnified for people who are less comfortable handling the uncertainty of the social world, and covertly seek cultural knowledge about normative behavior. These findings suggest that the benefits of being a socially curious person are probably contingent on other dimensions. For instance, if you cannot tolerate the stress of incomplete information, regardless of your social interest, entering and maintaining relationships will be difficult. There is a need to move beyond scores on each curiosity dimension to explore profiles, which is one of the primary goals of Study 3.

In sum, the factor analytic results, and correlations with existing curiosity related scales, and various measures of personality, emotion, and well-being, establish support for a reliable, valid, five-dimensional measure of curiosity. The test–retest data suggest that curiosity dimensions are relatively stable. The tests of unique variance above and beyond the Big Five suggest that curiosity cannot be subsumed by global features of personality.

In the first two studies, we moved beyond decades of research that has been primarily limited to the amount of curiosity experienced (curious versus incurious; Kashdan, 2009; Lowenstein, 1994; Silvia, 2008a). Building off prior models (Grossnickle, 2016), we provided evidence for five distinct but related curiosity dimensions and their predictive power.

Correlating mean scores on curiosity measures with mean scores on behavioral outcomes assumes a single homogenous population. Perhaps mean scores mask subgroups of people with different curiosity profiles. Instead of asking how curious a person is on one to five dimensions, in Study 3, we used a subtyping technique to explore the presence of clumps of people with potentially distinct personalities, values, attitudes, interests, and areas of expertise. Specifically, we explored how different types of curious people (based on their scores across each of the 5 dimensions) differed in what they care about and as a metric of interest and exploration — what they spent their finite attention, energy, and money on. If there are distinct types of curious people, they should differ in magazines read and purchased, websites visited, hobbies, and areas of expertise emerging from this investment of attention.

Building off Study 2, we expected a combination of higher Joyous Exploration and Stress Tolerance to be essential for triggering interests and over time, persevering through the often difficult learning curve of gaining expertise in a particular area of interest. The types of activities pursued, and benefits extracted (e.g., size of one's social network), were expected to differ depending on the unique combination of Deprivation Sensitivity, Social Curiosity, and Thrill Seeking in a person's profile. This is one of the first studies to move beyond the assumption of a single, homogenous sample to understand curiosity and instead use a multidimensional framework to identify heterogeneous subgroups of curious people.

10. Study 3 Methods

10.1. Participants

To determine meaningful profiles of curiosity, we recruited 3261 adults to achieve 3000 complete survey responses from a nationally (USA) representative sample. Inclusion criteria included English-speaking, access to a computer, and a minimum of $15,000 household income for non-students. We used quota sampling during recruitment to ensure the final data were demographically aligned with the U.S. Census statistics of November 2015.

Our final sample consisted of a representative sample of the US population: 51% female, between 18 and 64 years old with a modal response between 45 and 54 years old. In terms of race/ethnicity (allowing multiple selections), 80.9% endorsed Caucasian, 17.3% endorsed Hispanic, Latino, or Spanish origin, 12.6% endorsed African American, 7.1% endorsed Asian or Pacific Islander, 1.6% endorsed Alaskan Native/American Indian, and 2.3% endorsed other. The demographics are reported in Table 1. To ensure a nationally representative sample, we weighted observations to match the U.S. Census Current Population Survey for age, gender, education, income, and race/ethnicity.

10.2. Procedure

The field period for survey data collection was May 19, 2016 through June 1, 2016. 92% of eligible respondents who started the survey completed it (completion rate). A blended sampling frame was used, drawing sample from 3 separate non-probability based General Population Online Panels: Research Now, Lightspeed GMI, and ProdegeMR. Three separate sample sources were used to maximize reach (similar to Study 1). Respondents received rewards points for completing the survey (similar to Study 1). Through an email invitation, selected respondents were directed to an online survey.

Quota sampling was used during fielding to ensure final data were demographically balanced to the U.S. population. Quota sampling is commonly used to offset sampling imbalances due to varying response rates and demographic skews with non-probability based sampling frames such as online panels.

4 subgroups were selected for this research:

Subgroup	Quota range	Final N	Weighted N
Men 18–34	450–550	485	507
Men 35–64	900–1050	985	962
Women 18–34	550–600	557	581
Women 35–64	900–1000	973	949

Census profiles were compiled for each subgroup using U.S. Census November 2015 CPS database to ensure each was properly balanced to U.S. Census statistics across key demographics. Adjustments were made to sample selection during fielding to better align this data with U.S. Census November 2015 CPS database profiles. Once fielding was completed, survey data were weighted against the U.S. Census Current Population Survey for age, gender, employment status, marital status, presence of children, and race/ethnicity. Rim weighting was used to efficiently weight multiple variables simultaneously. Overall weighting efficiency was 81.5%. Weighting efficiency score is a good indicator of possible data distortion as a result of applied weights. Datasets with a weighting efficiency below 70% are indicative of potential data distortion.

To limit survey length, half the questions in the last third of the survey were treated as (random) planned missing data for each participant. Therefore, around half the sample ($n \sim 1500$) com-

pleted each question in the last third of the survey. For the measures below, all items had 3000 cases except the values, attitudes, passion, and expertise items (n ~ 1500).

10.3. Measures

Participants completed the 25 items of the 5DC; ratings were made on a 7-point Likert scale (ranging from 1 = *does not describe me at all* to 7 = *completely describes me*). Besides the curiosity measure, several personality and consumer behavior measures were included.

10.3.1. Demographics

Participants responded to the following questions: gender, age, race, education, income, employment, political party, marriage status, and parent status.

10.3.2. Personality

We selected 40 positive and negative adjectives from a standard pool of possible personality items (cf. IPIP – Goldberg, 1999). The purpose of using different personality adjectives stemmed from our intent to select items that may clearly differentiate curiosity – thus, we chose to not use a standard personality inventory. Furthermore, we wanted to get participant's immediate responses to these adjective without them deliberating about a rating scale. Participants read the adjectives and endorsed whether or not (yes/no) they felt the word "described qualities of their personality". Based on factor analyses, we collapsed the 40 adjectives into the following 7 meaningful groups. *Extraverted*: "Active," Adventurous", "Enthusiastic", "Extroverted", "Introverted" (reverse coded), "Leader", and "Social", *Neurotic*: "Anxious", "Dramatic", "Neurotic", and "Obsessive", *Conscientious*: "Detail-oriented", "Driven", "Focused", "Hardworking", "Organized", and "Disorganized" (reverse coded), *Agreeableness*: "Agreeable", "Appreciative", "Calm", "Easy-going", "Empathic", "Friendly", "Generous", "Patient", and "Sensitive", *Openness*: "Aspiring", "Complex", "Creative", "Cultured", "Deep", "Idealistic", and "Innovative", *Outspoken*: "Opinionated", "Outspoken", and "Impatient", and *Apathetic*: "Apathetic", "Careless, "Conceited", and "Lazy". Average alpha reliability for categories was 0.53. These seven categories included the Big Five along with two additional categories (e.g., Goldberg, 1992).

10.3.3. Values

Participants rated 33 statements (e.g., "Wealth: having material possessions, a lot of money") on a 7-point Likert scale (ranging from 1 = "*meaning not at all important*" to 7 = "*meaning extremely important*") in response to the prompt "how important is this value to you as a guiding principle in your life?" Based on factor analyses, we collapsed these 33 value statements into 8 meaningful categories as follows: *Tradition* (ancestors, gender roles, faith, and tradition), *Duty* (protecting family, stable relationships, duty, being helpful, friendship, and working hard), *Independence* (freedom, authenticity, self-reliance, and knowledge), *Status* (wealth, status, ambition, public image, looking good, power, and self-interest), *Hedonia* (enjoying life, having fun, adventure, and excitement), *Social Justice* (social welfare, equality, open-minded, and social tolerance), *Environment* (nature and environment), and *Romance* (romance and sex). Average alpha reliability for all the categories was 0.75.

10.3.4. Attitudes

Participants rated statements regarding their psychological attitudes on a 4-point Likert scale (ranging from 1 = "*Agree completely*" to 4 = "*Disagree completely*"). The following attitudes were analyzed individually: "*I feel stressed out a lot of the time*", "*I handle difficult situations in ways that make people feel good*", "*I am in touch with my emotions*", "*My friends are the most important thing in my life*", "*You are better off having what you want now as you never know what tomorrow brings*", and "*I have to admit, I have a short attention span*".

10.3.5. Passionate interests and expertise in life domains

Participants endorsed whether (yes/no) they were passionate about the following list of domains (based on factor analyses from a longer list): *Health and fitness, Movies and TV, Politics, Music, Travel, Technology, Fashion, Cooking, Decoration, Sports, Finance,* and *Fishing*. Using this same list, participants endorsed which of these 12 domains they viewed themselves as experts (i.e., "your friends and family often ask for and trust your advice about"). We calculated the number of topics endorsed for passionate interests and expertise, respectively.

10.3.6. Social media

Participants endorsed (yes/no) whether they "regularly accessed" the following social media sites either on a computer, tablet, or smartphone: *Facebook, YouTube, Twitter, Instagram, Pinterest, Snapchat, Tumblr,* or *Reddit*. Participants also reported how many people they have "'friended', connected with, followed, or obtained as followers on these sites.

10.3.7. Magazines

Participants endorsed (yes/no) whether they had "read or looked at a given magazine in the past 6 months" from a list of 36. We sorted these magazines into categories based on factor analytic results: *Fashion and Style* (e.g., "InStyle"), *Celebrity and Entertainment* (e.g., "Entertainment Weekly"), *Home Decorating* (e.g., "Southern Living"), *Food and Cooking* (e.g., "Food Network"), *Health and Fitness* (e.g., "Shape"), *Sports* (e.g., "Sports Illustrated"), *Business* (e.g., "Money"), and *Travel* (e.g., "Travel + Leisure"). We calculated the number of magazine categories endorsed.

10.3.8. Websites

Participants endorsed (yes/no) whether they visited a list of 40 websites within the past 30 days (either through web browser or an app). We sorted these websites into categories based on factor analytic results: *Fashion and Style* (e.g., "InStyle"), *Celebrity and Entertainment* (e.g., "Cosmopolitan"), *Home Decorating* (e.g., "Country Living"), *Food and Cooking* (e.g., "Bon Appetit"), *Sports* (e.g., "120 Sports"), *Business* (e.g., "Business Insider"), *Money and Finances* (e.g., "CNN Money"), *Travel* (e.g., "Departures"), and *News* (e.g., "Vice"). We calculated the number of website genres endorsed.

11. Study 3 Results

11.1. Confirmatory factor analyses

We began with a confirmatory factor analysis (CFA) on the 5DC items using full maximum-likelihood estimation with robust standard errors and a Santorra-Bentler test statistic - estimated with lavaan (Rosseel, 2012), the latent variable analysis package in R along with the lavaan survey package to account for the sampling weights (Oberski, 2014). The observed correlation matrix of observed curiosity dimension scores is presented in Table 2.

To evaluate model specification, the −2 log likelihood chi-square value (χ^2), comparative fit index (CFI), Tucker-Lewis fit index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) were used to assess model fit. An excellent fitting model has a small, non-significant chi-square value; however, this is an overly stringent model fit criterion for large sample sizes (Kline, 2011). Instead we compared several different theoretically plausible measure-

ment models of curiosity and evaluated them based upon model fit, model parsimony, and theoretical utility.

Global model fit for a correlated 5-factor model was acceptable: $\chi^2(2\ 6\ 5) = 1887.88$, $p < .001$; CFI = 0.923; TLI = 0.913, RMSEA = 0.045; SRMR = 0.057. All standardized loadings were greater than 0.50 and presented in Table 3. The correlations between the latent factors ranged from −0.25 to 0.49. Evaluation of modification indices, suggested the possibility of a 6 or 7 factor model by splitting up the Social Curiosity and/or Joyous Exploration factors. Although global model improved from the 5-factor model, the latent correlations between the two factors emerging from the Social Curiosity or Joyous Exploration items approximated 0.80. Therefore, we chose the 5-factor solution because improvement from model fit did not warrant the increase in model complexity. These findings offer another layer of empirical support for the factor analytic results in studies 1 and 2.

11.2. Person-centric analyses

To explore different types of curious people, we conducted cluster analyses with Sawtooth Software (Sawtooth Software, 2008). K-means cluster analysis is an effective clustering algorithm for aggregating Likert response scale items (Milligan & Cooper, 1987). Compared to hierarchical cluster analysis, K-means is an optimization clustering algorithm that allows cases to change clusters from one iteration to the next. The dissimilarity measure used was the squared Euclidian distance from cluster means and the minimization criterion was the total within-cluster sum of squares (i.e., variance).

Subscale scores were used rather than individual items to minimize multicollinearity and increase normality. We generated subscale scores corresponding to the 5 curiosity factors (dimensions): Joyous Exploration, Deprivation Sensitivity, Stress Tolerance, Social Curiosity, and Thrill Seeking. The five items from each factor were weighted based on contributions to the formation of the confirmatory factor analysis (i.e., standardized factor loadings) and then summed to arrive at preliminary total scores. Because K-mean cluster analysis is sensitive to different variable ranges, subscale scores were standardized within-person — minimizing scale-effects and inter-rater bias in the formation of clusters (Milligan & Cooper, 1988). Lastly, all cases were weighted by the same sampling weights used in confirmatory factor analyses.

K-means results with 1–10 clusters were evaluated. Examining the solution graphically, the elbow of the graph suggested between three to five clusters. The four cluster solution had a reliability percentage of 96.8%, while the three and five cluster solutions had reliability percentages of 81.8% and 86.7%, respectively. Based upon three criteria - graphical analysis, reliability, and theoretical plausibility, we retained the four cluster solution.

Only 4 participants could not be classified into one of these four clusters (based on inconsistent data), resulting in 2996 classified cases. Based on the relative magnitude of each curiosity dimension, clusters were given face-valid labels: The Fascinated (n = 843; 28.1% of the sample), Problem Solvers (n = 823; 27.5% of the sample), Empathizers (n = 751; 25.1% of the sample), and Avoiders (n = 579; 19.3% of the sample. For ease of interpretation, subscale scores were converted to the percentage of maximum possible units (i.e., POMP; Cohen, Cohen, Aiken, & West, 1999) where 0% corresponds to 1 on all items and 100% corresponds to 7 on all items. For example, someone who endorses a 4 out of 7 for all items would receive a 50%. Fig. 1 displays the subscale mean differences across profiles. The Fascinated cluster was highest on Joyous Exploration, Stress Tolerance, and Thrill Seeking and lowest on Deprivation Sensitivity; Problem Solvers were highest on Deprivation Sensitivity, high on Joyous Exploration, and lowest on Social Curiosity; Empathizers were highest on Social Curiosity and low on Thrill Seeking; Avoiders were lowest on Stress Tolerance, Joyous Exploration, and Thrill Seeking.

11.3. Outcomes associated with clusters

To establish the validity of the curiosity profiles, we used the clusters to predict relevant outcomes. For full results, please see Table 7. We highlight meaningful cluster differences.

11.3.1. Personality

The largest personality difference among clusters was in *Extraversion*; the Fascinated (42.32) endorsed more than double the standardized POMP units of the Avoiders (19.46). The Avoiders were an outlier, endorsing significantly low scores for adaptive personality traits: *Conscientiousness, Agreeableness,* and *Openness;* for *Neuroticism*, the Avoiders and Empathizers reported significantly higher POMP scores (23.45 and 22.90, respectively) than other clusters (the Fascinated: 16.24, Problem Solvers: 16.67). The Problem Solvers reported the lowest level of apathy (7.72) of all clusters.

11.3.2. Values

The largest value differences among clusters was for *Hedonia, Independence, and Romance*. The Fascinated reported far above the total sample mean for these values whereas the Avoiders reported far below; Problem Solvers and Empathizers fell close to the total sample means. The Problem Solvers embraced *Independence* as their core value, highest of all clusters. For empathizers, *Status* emerged as their core value; to better understand this group, prosocial values such as *Social Justice* and *Environment* did not distinguish them. Of the clusters, the Fascinated had the strongest endorsement of both prosocial values.

11.3.3. Attitudes

The statement with the greatest differentiation among clusters was "*I feel stressed out a lot of the time*". The Avoiders reported the highest endorsement (70.4%) and the Fascinated the least (36.0%). The Avoiders reported the lowest endorsement (74.4%) for "*I handle difficult situations*", the Fascinated the highest (89.0%). The Avoiders also reported the least endorsement (78.3%) of "*I am in touch with my emotions*"; the Fascinated the highest (93.7%) with the empathizers also in the high range (91.2%). For the Problem Solvers, they had the highest endorsement rates (85.0%) for "*I give the impression that my life is under control*" whereas the Fascinated has the least endorsement (88.2%).

11.3.4. Passions and expertise

For the number of domains that groups endorse passionate interest, the Fascinated led (4.13) followed by the Problem Solvers (3.57), Empathizers (3.50), and Avoiders (2.72). For the number of domains that groups endorsed expertise, the Fascinated also led (4.23) followed by the Empathizers (3.30), Problem Solvers (3.48), and Avoiders (2.51). As examples of large group differences: 34.2% of the Fascinated endorsed expertise in *Politics* compared to 14.9% of the Avoiders, 46.0% of the Fascinated endorsed *Travel* expertise compared to 25.1% of the Avoiders, and 36.7% of the Fascinated endorsed expertise in *Sports* compared to 18.7% of the Avoiders. Similar ratios were found for expertise in *Technology, Fashion*, and *Finance*.

11.3.5. Social media

The Fascinated reported the most friends and followers in their online social network (479.63) followed by the Empathizers (394.17), Problem Solvers (328.24), and Avoiders (301.74). There were remarkable differences in social media platform use, such

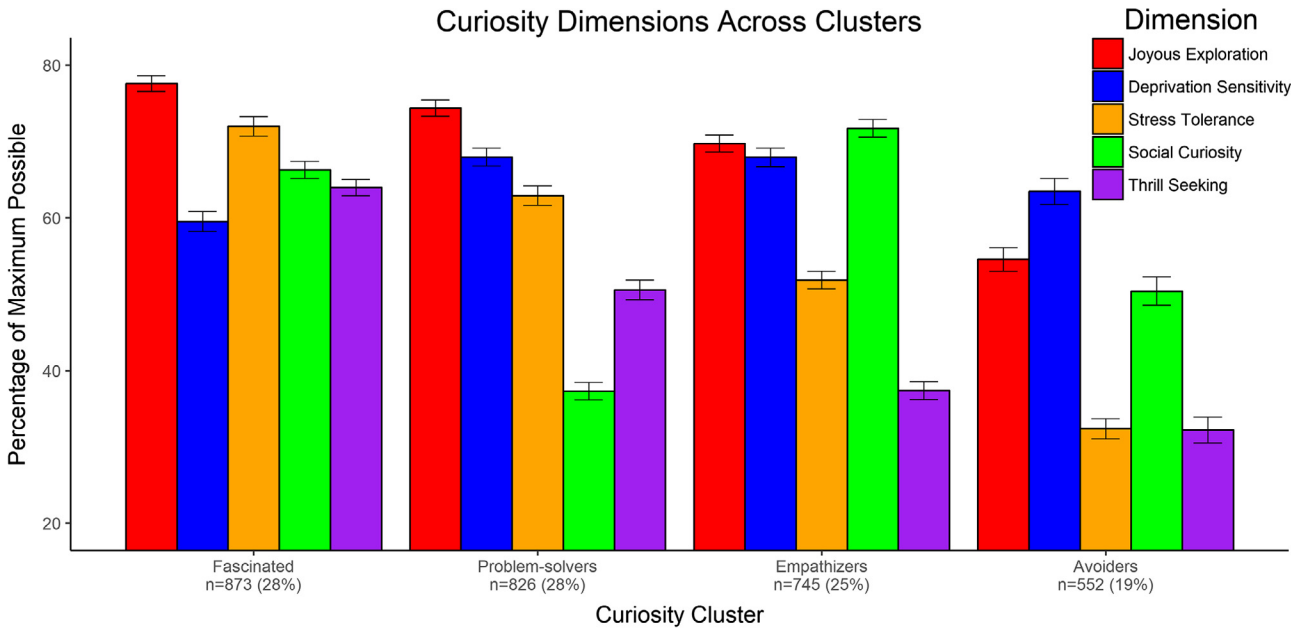

Fig. 1. Curiosity dimensions across clusters.

that the Fascinated and Empathizers report the highest interaction with a wide variety of social media.

11.3.6. Magazines

The clusters differed meaningfully in the total number of magazines read/purchased. The Fascinated read the most (2.23), nearly twice as many as Avoiders (1.17). Magazine content areas with the most meaningful difference between clusters were *Business, Sports, Travel*, *Health and Fitness,* and *Food and Cooking.*

11.3.7. Websites

A similar pattern emerged for websites. The Fascinated endorsed time spent on an average of 1.22 website genres whereas the Avoiders only endorsed 0.65. Content areas with the largest discrepancies between clusters included *Business, Sports,* and *Travel.*

12. Study 3 Discussion

Our results supported the presence of five dimensions of curiosity. Deviating from the prior two studies, we explored the types of curious people through cluster profiles and found four meaningful groups that differed in daily life activity. Our focus was on how different types of curious people (see Fig. 1) use their most valuable, finite resources in everyday life – time, energy, and money (see Table 7). We found evidence for four meaningful types of curious people: The Fascinated, Problem-Solvers, Empathizers, and Avoiders (non-curious). The Fascinated captured the archetype of a highly curious person – someone possessing a psychological strength that enables them to explore, discover, develop passionate interests, and uncover their full potential (Kashdan et al., 2004; Mussel, 2013b; Silvia, 2008a).

The following narrative best describes a portrait of the Fascinated: an adult who is highly educated and makes more money than those in the other profiles. In social situations, they are extraverted and are distinguished by their strong valuing of hedonism, social justice, and romance that guides their personal pursuits. They do not get stressed frequently and believe they can handle most difficult situations. True to the Fascinated label, they demonstrate the widest ranges of interests and sources of expertise, and spend a large amount of attention, energy, and finances on magazines and websites. This is clearly attractive to other people as they possess more friends and followers on social media than any other profile.

A second profile, the Problem-Solvers, is distinguished by high Deprivation Sensitivity and Stress Tolerance and low Social Curiosity. A portrait of this profile would include someone obsessively interested in solving a crossword puzzle on their own. They would rather work to solve problems and seek information, rather than casually talk with friends about life. Unsurprisingly, Problem-Solvers endorse independence as an important value, more so than other profiles. Affirming a desire to eradicate perceived gaps in their knowledge, of all the profiles, they report the lowest level of apathy. Problem-solvers are on a mission to uncover something specific in their lives; a contrast to the greater interest diversity of the fascinated.

The Empathizers profile is distinguished by their high level of Social Curiosity. They also have relatively lower levels of Stress Tolerance and Thrill Seeking compared to other profiles. The Empathizers are more likely to be women. They describe themselves as neurotic and frequently feel stressed, but also the most agreeable of the subgroups. They also have the strongest interest in giving the impression their life is under control. Maintaining and attaining social status emerged as a core value, which fits with their interest in what other people think and do. They do not endorse prosocial values (e.g., social justice and environment) as strongly as the Fascinated or Problem-Solvers. They spend more time on Facebook and several other social media sites than the other profiles, and in turn their online social network is large, only lagging behind the Fascinated subgroup.

The Avoiders are the lowest on nearly every curiosity dimension. They are the least educated and make the least money of the profiles. Half (48.2%) of The Avoiders are not employed full-time. The Avoiders describe themselves as low on extraversion, agreeableness, openness, and conscientiousness, along with being neurotic and stressed out most of the time (even more so than The Empathizers). The Avoiders report the least amount of passions and expertise and the smallest online social network. Being incurious is reflected in the lack of passion and development of skills, knowledge, and expertise in various domains.

Table 7
Curiosity clusters with outcomes (Study 3).

Outcome	Total Sample	Fascinated	Problem-solvers	Empathizers	Avoiders	*F*/-2LL change	*p*-value
Demographics							
Gender (% male)	49.0%	55.6%	55.0%	39.4%	43.1%	63.03	<.01
Age (years)	41.04	39.73	43.44	38.88	42.30	20.45	<.01
White (%)	80.9%	82.3%	78.2%	83.6%	79.4%	9.00	.03
Education	3.87	4.09	3.91	3.97	3.36	13.74	<.01
Income (in dollars)	66,379.2	74,057.1	66,769.1	65,789.4	55,686.2	8.24	<.01
Political Party (% Democrat)	54.0%	56.4%	60.5%	59.5%	39.6%	2.21	.53
Political Party (% independent)	31.5%	36.2%	31.2%	28.3%	29.3%	13.21	<.01
Employment (% full-time employee)	63.3%	70.9%	65.6%	60.8%	51.8%	58.43	<.01
Married	54.9%	56.0%	55.9%	53.7%	56.2%	1.23	.75
Parent	33.6%	38.5%	32.1%	32.4%	31.1%	11.82	.01
Personality							
Extraversion	31.65	42.32	33.87	26.58	19.46	141.65	<.01
Neuroticism	19.41	16.24	16.67	22.90	23.45	25.35	<.01
Conscientiousness	43.59	44.38	46.01	45.90	36.04	18.83	<.01
Agreeableness	39.80	41.32	40.58	41.57	35.59	6.60	<.01
Openness	17.88	21.62	18.23	17.85	11.80	25.13	<.01
Outspokenness	28.70	31.13	28.23	29.23	25.08	4.72	<.01
Apathy	9.65	10.22	7.72	10.12	10.94	5.44	<.01
Values							
Tradition	60.06	58.50	62.06	58.48	61.47	1.22	.30
Duty	82.51	84.66	82.37	83.55	79.60	2.23	.08
Independence	85.37	86.18	87.99	84.85	81.18	13.51	<.01
Status	54.81	55.49	52.58	56.35	54.59	0.66	.58
Hedonia	73.11	78.94	73.19	71.99	66.25	27.18	<.01
Social Justice	75.75	80.11	76.49	74.81	70.32	10.90	<.01
Environment	66.24	70.57	67.10	65.47	60.12	10.00	<.01
Romance	67.26	75.52	68.90	64.75	56.50	11.47	<.01
Attitudes							
Give impression life under control	88.1%	88.2%	85.0%	91.3%	89.2%	8.38	.04
Friends are most important in life	63.6%	67.7%	62.3%	63.4%	59.5%	5.69	.13
I avoid confrontation when possible	80.8%	71.3%	82.0%	82.3%	91.6%	51.39	<.01
Better off having what you want now	69.7%	72.8%	66.1%	69.1%	71.4%	4.87	.18
I feel stressed out a lot of the time	48.8%	36.0%	40.7%	53.6%	70.4%	97.28	<.01
I have a short attention span	43.1%	42.3%	41.0%	38.6%	52.9%	15.31	<.01
I am in touch with my emotions	89.0%	93.7%	89.8%	91.2%	78.3%	40.14	<.01
I handle difficult situations	84.9%	89.0%	88.0%	84.8%	74.4%	30.93	<.01
Passionate interests							
Health and fitness	30.4%	32.4%	33.3%	31.1%	22.5%	11.34	.01
Movies and TV	46.7%	50.6%	43.4%	46.8%	45.9%	3.92	.27
Politics	22.3%	25.4%	20.9%	25.5%	15.8%	12.02	<.01
Music	44.0%	47.9%	44.3%	45.0%	36.2%	9.34	.03
Travel	41.0%	51.7%	40.3%	39.5%	28.5%	36.55	<.01
Technology	27.6%	33.3%	29.8%	28.4%	15.3%	31.12	<.01
Fashion	17.2%	21.9%	17.6%	17.0%	10.1%	17.92	<.01
Cooking	47.3%	52.9%	47.1%	49.0%	37.7%	16.08	<.01
Decoration	14.0%	18.1%	11.0%	13.7%	12.6%	9.18	.03
Sports	30.6%	38.9%	31.0%	26.1%	24.5%	21.06	<.01
Finance	20.5%	26.0%	22.5%	17.7%	13.5%	19.05	<.01
Fishing	10.5%	16.6%	11.5%	5.6%	6.1%	33.30	<.01
Total Passion	3.48	4.13	3.57	3.50	2.72	34.35	<.01
Expertise							
Health and fitness	27.6%	30.2%	28.1%	30.4%	19.7%	12.22	.01
Movies and TV	46.6%	50.7%	44.5%	50.9%	38.5%	13.62	<.01
Politics	25.7%	34.2%	23.0%	27.9%	14.9%	36.38	<.01
Music	33.5%	36.7%	30.3%	35.6%	29.8%	5.92	.12
Travel	34.5%	46.0%	29.5%	34.6%	25.1%	37.33	<.01
Technology	32.8%	40.9%	31.5%	34.2%	21.4%	29.46	<.01
Fashion	18.2%	23.7%	17.3%	17.8%	12.0%	16.71	<.01
Cooking	42.9%	52.3%	36.9%	44.4%	36.0%	26.37	<.01
Decoration	16.1%	20.3%	12.9%	17.2%	12.7%	11.77	<.01
Sports	27.5%	36.7%	29.0%	22.7%	18.7%	33.53	<.01
Finance	23.6%	28.8%	25.1%	22.5%	15.7%	16.71	<.01
Fishing	8.7%	12.0%	10.2%	6.4%	4.6%	16.13	<.01
Total Expertise	3.38	4.23	3.30	3.48	2.51	43.35	<.01
Social Media Use							
Facebook	81.7%	85.2%	77.9%	87.6%	75.9%	42.88	<.01
YouTube	73.8%	80.5%	67.7%	81.8%	65.0%	55.58	<.01
Twitter	60.7%	70.9%	54.1%	68.8%	49.0%	46.96	<.01
Instagram	62.9%	72.0%	55.7%	73.6%	50.3%	57.27	<.01
Pinterest	61.9%	69.2%	54.0%	73.9%	50.6%	53.53	<.01

(*continued on next page*)

Table 7 (*continued*)

Outcome	Total Sample	Fascinated	Problem-solvers	Empathizers	Avoiders	*F*/-2LL change	*p*-value
Snapchat	50.8%	61.8%	43.4%	62.4%	35.4%	53.09	<.01
Tumblr	35.3%	43.2%	25.2%	45.4%	27.3%	28.08	<.01
Reddit	33.3%	43.9%	19%	49.3%	21.0%	62.17	<.01
Online Friends or Followers	375.95	479.63	328.24	394.17	301.74	10.84	<.01
Magazines							
Fashion and Style	21.5%	27.0%	19.6%	22.7%	14.80%	33.41	<.01
Celebrity and Entertainment	31.7%	36.2%	28.7%	33.9%	26.50%	20.36	<.01
Home Decorating	17.4%	21.4%	17.3%	17.7%	11.50%	24.29	<.01
Food and Cooking	25.1%	31.3%	25.2%	24.1%	17.10%	38.01	<.01
Health and Fitness	21.7%	27.9%	22.9%	19.0%	14.50%	41.79	<.01
Sports	19.1%	25.8%	21.4%	14.7%	11.6%	59.84	<.01
Business	18.3%	26.5%	20.8%	13.8%	8.8%	91.29	<.01
Money and Finances	7.8%	10.3%	8.7%	5.0%	6.3%	18.50	<.01
Travel	11.0%	16.5%	10.2%	9.5%	5.9%	43.74	<.01
Total Genres	1.74	2.23	1.75	1.60	1.17	40.68	<.01
Websites							
Fashion and Style	3.1%	4.0%	3.2%	2.4%	2.3%	4.81	.19
Celebrity and Entertainment	13.6%	17.7%	10.9%	14.9%	9.7%	26.16	<.01
Home Decorating	4.3%	6.2%	3.7%	4.0%	2.9%	10.92	.01
Food and Cooking	27.3%	32.1%	28.5%	25.6%	20.5%	25.66	<.01
Sports	18.4%	22.6%	21.3%	15.4%	12.3%	34.60	<.01
Business	14.6%	18.6%	16.8%	12.3%	8.6%	35.89	<.01
Money and Finances	7.6%	10.6%	8.2%	6.6%	3.7%	26.02	<.01
Travel	3.3%	6.4%	2.1%	1.8%	2.4%	31.65	<.01
News	2.3%	3.5%	1.2%	2.1%	2.1%	10.78	.01
Total Genres	0.94	1.22	0.96	0.85	0.65	30.53	<.01

Notes. Numbers with a % can be interpreted as a typical percentage. For example, 55.7% of individuals in The Fascinated cluster are male. Numbers reported without a% are percentage of maximum possible units (POMP; Cohen, Cohen, Aiken, & West, 1999) where 0 corresponds to the lowest value of the item and 100 corresponds to highest value of the item. The ΔF and Δ-2LL (log likelihood) are used to determine significant differences between clusters, indicated by *p* value. For Education, the following scale was used: 0 = some high school or less, 1 = high school graduate, 2 = some college, but no degree, 3 = vocational associate degree, 4 = academic associate degree, 5 = bachelor's degree, 6 = post-graduate work, but no degree, 7 = master's degree, 8 = professional degree, 9 = doctoral degree. For income, the data were collected in dollar range categories (e.g., 65,000–74,999) and the group median was calculated for each cluster. To computer the linear regression model, the income categories were recoded as their interval medians with the lowest value being 10,000 and the highest 500,000. For Political Party (% Democrat), independent and other political parties were recoded as missing to allow for a direct comparison between Democrat and Republican. For Political Party (% Independent), any political party other than independent was recoded as 0 with no missing data.

13. General discussion

Given that curiosity is a fundamental human motive (e.g., Berlyne, 1954; Maslow, 1943) with relevance to social, personality, developmental, clinical, cognitive, and industrial/organizational psychology (among other disciplines), it is essential that researchers have access to a precise assessment strategy. The purpose of this program of research was to test and validate a structural framework that captures the multidimensional nature of curiosity.

It is archaic to continue the path of researchers and practitioners who refer to a psychological strength that lies on a single dimension from incurious to extremely curious (Boyle, 1983; Peterson & Seligman, 2004; Spielberger & Reheiser, 2004). A 5-dimensional model of curiosity was developed to document the fact that human beings have different ways of experiencing and expressing curiosity. These differences are relevant to how people represent things in their minds, and why they are motivated to seek out new information and experiences, discover, learn, and grow. It is of value to address the importance of scores on curiosity dimensions and from this, compile profiles of types of curious people in a heterogeneous population (Muthen & Muthen, 2000).

13.1. Five curiosity dimensions

Across three studies, we determined that a correlated five-factor model is the most valid way to understand the structure of curiosity. People scoring high on Joyous Exploration were shown to be open to experiences, in possession of a strong personal growth initiative, show tenacity when pursuing opportunities to learn and grow, and derive positive emotions and meaning from learning new information and experiences. This is the archetype of curiosity as a motivational drive that enables rewards for seeking out the new. This fits with the majority of assessment approaches that assume feeling curious and subsequent acts of exploration are pleasurable (Kashdan et al., 2004, 2009; Naylor, 1981; Peterson & Seligman, 2004). This dimension had the second highest positive associations with indices of well-being, from happiness to meaning in life to satisfying the need for competence, autonomy, and relatedness; of all the dimensions, Joyous Exploration had the strongest links to believing that a good life is a function of personal growth and contributing to others – a belief system that is about caring for the development of the self and one's tribe. This belief system provides evidence that curiosity is an intrapersonal motive and with some manifestations, a commerce for social good (Kashdan, Dewall, et al., 2013; Kashdan, McKnight, Fincham, & Rose, 2011; Kashdan et al., 2013).

People scoring high on Deprivation Sensitivity were shown to be intellectually engaged to think about abstract or complex ideas, solve problems, and seek necessary information to eliminate knowledge gaps. This fits with a series of measures that designate individual differences in the need for cognition and epistemic curiosity (e.g., Cacioppo et al., 1996; Litman & Jimerson, 2004; Litman & Spielberger, 2003). This variant of curiosity is not as widely discussed or employed by researchers and practitioners. Deprivation Sensitivity had the weakest link with the ability to cope with the stress of confronting the new.

The attentional focus and motives central to Deprivation Sensitivity reflect the discomfort of not knowing and the urge to reduce this tension. Joyous exploration is an appetitive, approach motivation whereas Deprivation Sensitivity is an aversive, avoidance motivation. Scoring high on Deprivation Sensitivity might lead to exploration and aid in the development of insights and knowledge but without any evidence of well-being enhancement.

Although a few theorists captured these two dimensions of curiosity (e.g., Litman, 2005), additional manifestations warrant inclusion: the perceived potential to cope with the new (Silvia, 2008a, 2008b), Social Curiosity (Litman & Pezzo, 2007; Renner, 2006), and Thrill Seeking (Arnett, 1994; Farley, 1991; Zuckerman, 1994). Only one published empirical study integrates Joyous Exploration, Social Curiosity, and Thrill Seeking (Reio et al., 2006).

People scoring high on Stress Tolerance were less deterred by doubt, confusion, and other forms of distress when exploring new places, and willing to embrace the inherent anxiety of a new, unexpected, complex, mysterious, obscure event, that often evokes a motivational conflict of whether to approach or avoid (properties first introduced by Berlyne, 1960).

Prior researchers have created momentary assessments of the ability to tolerate anxiety when exposed to novel stimuli such as paintings and poetry (e.g., Silvia, 2005; Turner & Silvia, 2006). To our knowledge, this is the first attempt to measure a person's perceived potential to cope with the stress and strain of confronting the new – a precursor to exploring in response to feeling curious. This is a huge gap in the curiosity literature as our results show that of the five curiosity dimensions, Stress Tolerance has the strongest correlations with every dimension of well-being: happiness, meaning in life, satisfaction of needs for competence, autonomy, and relatedness, and positive emotions (from 0.38 to 0.51). These findings beg for examinations of how Stress Tolerance influences other curiosity dimensions on the development of well-being.

People scoring high on Social Curiosity want to know what other people are thinking and doing whether it is through overt means such as observing and probing questions or covert means such as listening into conversations or gathering second-hand information. Our findings fit with work suggesting that socially curious people show a behavioral preference to seek out and contribute gossip (e.g., Renner, 2006) – an adaptive evolutionary strategy to define and navigate social relations including the norms and behaviors that are rewarded and punished in a tribe, and who is worthy of trust and suspicion (e.g., Wert & Salovey, 2004). This manifestation of curiosity is an efficient strategy to gain information compared with the labor intensiveness of first-hand, trial-and-error social behavior. Despite prior research on the measurement of Social Curiosity (Litman & Pezzo, 2007; Reio et al., 2006; Renner, 2006), there are no published studies on the link to personality dimensions, emotion, and well-being. Our results suggest that Social Curiosity has a small, positive association with agreeableness, negative emotions and an intolerance and avoidance of these distressing states. A near-zero correlation was found with other indices of well-being. Despite being agreeable, Social Curiosity might only be relevant to adaptive social functioning in the presence of other curiosity dimensions, and prosocial motives and goal pursuits.

People scoring high in Thrill Seeking are on the hunt for varied, novel, complex, and intense experiences and to have them, are ready to risk physical, social, and financial safety. High scorers found it rewarding to be the recipient of social attention (the core of extraversion; Ashton, Lee, & Paunonen, 2002), and viewed hedonism as a primary element of living a well-lived life. Of the five dimensions, Thrill Seeking has a duality of outcomes –high scorers are at risk for impulsive problems such as chemical substance use and abuse, gambling, aggression, and unsafe sexual behaviors (e.g., Coventry & Brown, 1993; Donohew et al., 2000; Hittner & Swickert, 2006; Joireman, Anderson, & Strathman, 2003) yet are also prone to being effective leaders in volatile environments such as first line responders, military, government politics, and entrepreneurship (e.g., Davis, Peterson, & Farley, 1974; Nicolaou, Shane, Cherkas, & Spector, 2008).

Whether high scorers on Thrill Seeking experience healthy or unhealthy outcomes probably depends on the presence of factors spanning culture, social networks, values, goals, luck, and other personality features. An exploration of curiosity dimensions is insufficient to understand humanity. It is necessary to combine these dimensions together to examine potentially distinct profiles, moving from variables to people.

13.2. Four types of curious people

The standard question asked by researchers interested in curiosity is "how curious are you?" A person-centric approach challenges this view by instead asking "given what we know about the multi-dimensional nature of curiosity, in what ways do you experience and express curiosity?" By studying a 3000 person representative sample of the United States, we found evidence for four distinct profiles of people. As the first study to explore the heterogeneous nature of curious people in the population, it is worth detailing these profiles.

Representing 28% of the general population, individuals in the Fascinated group have inquisitive minds and a *joie de vivre*. These individuals are social, enthusiastic, assertive, aspiring people who love to be in-the-know and are influential leaders and do-ers, who thrive on the unpredictable and see life as an adventure. They have a variety of passions that translate into wide-ranging expertise. This group is the most educated and affluent, with values that span prosocial concerns about other people and the environment along with hedonism and romance.

Representing 28% of the general population, individuals in the Problem Solvers group are hard-working individuals, with a core value of independence, who love to learn while working relentlessly at problems they feel must be solved. They do not tend to ask a lot of questions and are spartan - showing less interest in luxurious activities such as accessing social media and fashion magazines, and less interested in understanding people.

Representing 25% of the general population, individuals in the Empathizers group love to know what makes them tick. Despite being socially perceptive, they prefer to observe what is going on around them instead of participating (Hartung & Renner, 2013; Litman & Pezzo, 2007). This group is the second most "feeling stressed" profile, describing themselves as anxious and introverted - the thought of going on a vacation without everything planned out is unnerving.

Representing 19% of the general population, individuals in the Avoiders group are the least curious, confident, educated and affluent. They shy away from things they don't know or don't understand. This group feels stressed more often than any other group and endorse an inability to handle difficult situations, avoid confrontation when possible, and lack understanding of their emotional life. Perhaps as a consequence, this group has substantially fewer passionate interests and areas of expertise than other groups.

A profile view of curiosity offers new insights about human beings that extend beyond the prototypical approach of examining how someone scores on singular curiosity dimensions. In particular, Stress Tolerance appears to be an important defining feature of the adaptive psychological and social functioning of groups. The Fascinated, with the healthiest outcomes, possess the highest scores on Joyous Exploration, Stress Tolerance, and Thrill Seeking, and the lowest scores on Deprivation Sensitivity. The Avoiders are not simply the lowest scorers on Stress Tolerance and Thrill Seeking but high scores on Deprivation Sensitivity. Being unable to handle the tension of the unknown while restlessly searching for the answers appears to be a malicious influence on nearly every psychosocial outcome.

13.3. Research and practice implications

If we all had exactly the same kind of mind and there was only one kind of intelligence, then we could teach everybody the same thing in the same way and assess them in the same way and that would be fair. But once we realize that people have very different kinds of minds, different kinds of strengths – some people are good in thinking spatially, others are very logical, other people need to be hands-on and explore actively and try things out – then education, which treats everybody the same way, is actually unfair. Because it picks one kind of mind, which might be called the law professor mind – somebody who's very linguistic and logical – and says, "If you think like that, great; if you don't think like that, there's no room on the train for you."

Our program of research implies the same attitude about curiosity. We do an injustice by offering blanket statements that someone is curious or incurious. In education and occupational settings, it might prove fruitful to understand in what ways is a person curious and then determine whether their profile is aligned with subsequent demands. New questions can be asked with this framework. We found some evidence for the temporal stability of the curiosity dimensions but what is the trajectory of these dimensions and profiles across child, adolescent, and adult development? To what degree can interventions, from life events to psychological training, alter these dimensions and profiles? How does culture play a role in shaping these dimensions and profiles?

Prospective and experimental studies should continue to address well-being as an outcome while extending into other domains such as work engagement, productivity, creativity, innovation, social networks, and leadership (Silvia & Kashdan, 2009). In child and adult development, further work can examine whether particular curiosity dimensions and profiles, with their unique forms of exploratory behavior and discovery set the stage for the development of cognitive abilities, intellectual performance, practical intelligence, and wisdom; initial data are suggestive that certain manifestations of curiosity lead to intellectual development with little evidence for the reverse (Raine, Reynolds, Venables, & Mednick, 2002).

13.4. Strengths and limitations

With the existence of a vast number of curiosity measures, why should someone use the 5DC? The goal of this research program was to unify existing theory and research to create the best items for the core dimensions of curiosity. Curiosity possesses a unique appraisal structure. First, people evaluate an event as new, unexpected, complex, hard to process, surprising, mysterious, or obscure. This is an appraisal of the novelty-challenge of an object, person, or situation. Second, people evaluate whether themselves as to whether they possess the capacity to handle the stress/distress of confronting this novelty and/or challenge. Together, these two judgments form the appraisal structure of trait curiosity (Silvia, 2005, 2008a, 2008b; Silvia & Kashdan, 2009). Unlike other curiosity scales (e.g., Litman, 2008; Mussel, 2013a; Reio et al., 2006), the 5DC explicitly measures this neglected, second appraisal, termed Stress Tolerance. The 5DC also improved the wording, reading level, and specificity of items that capture Deprivation Sensitivity (reducing the complexity of prior items; Litman, 2008) and Joyous Exploration (improving the problematic psychometric properties of measures such as the Curiosity and Exploration Inventory-II - the embracing of stress in novel and challenging situations subscale had smaller correlations with distress and healthy emotion regulation strategies than the stretching subscale; Kashdan et al., 2009). We also provided a stronger test of social curiosity than other researchers (e.g., Renner, 2006) by exploring this dimension in conjunction with four other curiosity dimensions. This allowed us to uncover items unique to social curiosity as opposed to conceptually overlapping features of Joyous Exploration or Thrill Seeking (Reio et al., 2006). There is conceptual overlap with Mussel's (2013) model of Intellect as he mentions the uniqueness of deficit-type curiosity and uses the term Seek/Learn as the mental operation enacted –analogous to our Deprivation Sensitivity subscale. Mussel mentions interest-type curiosity and uses the term Conquer/Learn as the mental operation enacted – analogous to our Joyous Exploration subscale. Where our model diverges is that we are focused on curiosity/openness, which is only partially handled by Mussel's (2013) model of Intellect. Without Stress Tolerance, one of the two core appraisals of state and trait curiosity (Silvia, 2008a, 2008b), any model of curiosity can be deemed incomplete.

We believe the comprehensiveness of our measurement approach [relying on steps outlined by Clark and Watson (1995)], including the use of representative samples from a broad swath of the adult population (instead of being limited to university classrooms) and a large battery of curiosity, personality, and well-being scales, allows for confidence in construct validity. With large samples spanning socioeconomic status, we are not concerned about the range restriction that is often found in studies of personality in college students or other narrow populations. We also showed that the dimensions of curiosity offer incremental value above and beyond the most robust, cross-cultural taxonomy of personality – The Big Five (John & Srivastava, 1999). Our research also has limitations. We relied exclusively on self-report survey technologies and all of the limitations to this approach are relevant. An additional concern is that our data are correlational and cannot be generalized to populations outside of the United States.

14. Conclusion

William James (1890) was the first to propose that curiosity is a fundamental psychological motive, with an argument for more than one dimension. Although pervasive in everyday life and psychological models of motives and strengths, curiosity has rarely been empirically studied as a multi-dimensional individual difference variable. Too often, curiosity is explored as a single, aggregate dimension (e.g., Kashdan & Steger, 2007; Mussel, 2013b; Spielberger & Reheiser, 2004), with exceptions that inspired this research program (e.g., Litman & Silvia, 2006; Reio et al., 2006). Our findings show that particular dimensions of curiosity are especially linked to well-being and healthy outcomes whereas other dimensions are unrelated or negatively related to healthy outcomes. We also found that the five dimensions of curiosity that exist can be combined into meaningful profiles to capture the heterogeneity of people in the population. Importantly, these profiles differentially predicted attitudes, values, and the use of attention, money, and time in daily life on interests and the emergence of expertise. To our knowledge, these results are the first to clarify the fundamental role of stress tolerance as a dimension of curiosity with the strongest links to healthy outcomes. We hope that this research will inspire researchers and practitioners to explore the bandwidth of curiosity, to unravel the mechanisms and paths to adaptive and maladaptive functioning.

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Author contributions

T.B. Kashdan designed the three studies. T.B. Kashdan, M.C. Stiksma developed the broader empirical protocol, and the two of them collaborated with J. Bekier, J. Kaji, and R. Lazarus on the data collection. T.B. Kashdan, D.D. Disabato, P.E. McKnight, and J. Bekier devised the data-analytic plan, which J. Bekier and D.D. Disabato executed. T.B. Kashdan wrote the first draft of the manuscript, and all authors contributed substantively to the revisions. All authors approved the final version of the manuscript for submission.

Appendix A

Final 25 Items of the 5DC

Joyous exploration:
I view challenging situations as an opportunity to grow and learn.
I am always looking for experiences that challenge how I think about myself and the world.
I seek out situations where it is likely that I will have to think in depth about something.
I enjoy learning about subjects that are unfamiliar to me.
I find it fascinating to learn new information.

Deprivation sensitivity:
Thinking about solutions to difficult conceptual problems can keep me awake at night.
I can spend hours on a single problem because I just can't rest without knowing the answer.
I feel frustrated if I can't figure out the solution to a problem, so I work even harder to solve it.
I work relentlessly at problems that I feel must be solved.
It frustrates me not having all the information I need.

Stress tolerance: (entire subscale reverse-scored)
The smallest doubt can stop me from seeking out new experiences.
I cannot handle the stress that comes from entering uncertain situations.
I find it hard to explore new places when I lack confidence in my abilities.
I cannot function well if I am unsure whether a new experience is safe.
It is difficult to concentrate when there is a possibility that I will be taken by surprise.

Social curiosity:
I like to learn about the habits of others.
I like finding out why people behave the way they do.
When other people are having a conversation, I like to find out what it's about.
When around other people, I like listening to their conversations.
When people quarrel, I like to know what's going on.

Thrill seeking:
The anxiety of doing something new makes me feel excited and alive.
Risk-taking is exciting to me.
When I have free time, I want to do things that are a little scary.
Creating an adventure as I go is much more appealing than a planned adventure.
I prefer friends who are excitingly unpredictable.

Appendix B. Supplementary material

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.jrp.2017.11.011.

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