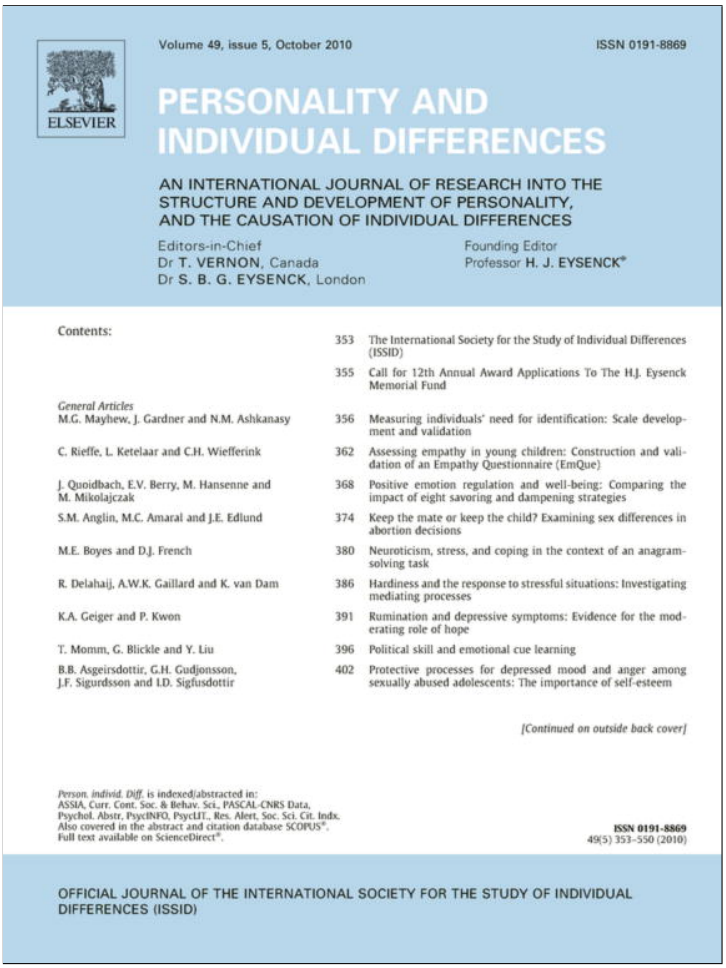

Volume 49, issue 5, October 2010 ISSN 0191-8869

ELSEVIER

PERSONALITY AND INDIVIDUAL DIFFERENCES

AN INTERNATIONAL JOURNAL OF RESEARCH INTO THE STRUCTURE AND DEVELOPMENT OF PERSONALITY, AND THE CAUSATION OF INDIVIDUAL DIFFERENCES

Contents:

[Continued on outside back cover]

Person. individ. Diff. is indexed/abstracted in:
ASSIA, Curr. Cont. Soc. & Behav. Sci., PASCAL-CNRS Data, Psychol. Abstr, PsycINFO, PsycLIT., Res. Alert, Soc. Sci. Cit. Indx. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.

ISSN 0191-8869
49(5) 353–550 (2010)

OFFICIAL JOURNAL OF THE INTERNATIONAL SOCIETY FOR THE STUDY OF INDIVIDUAL DIFFERENCES (ISSID)

Personality and Individual Differences 49 (2010) 531–536

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Validity of the Interest- and Deprivation-type epistemic curiosity distinction in non-students

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ARTICLE INFO

Article history:
Received 22 November 2009
Received in revised form 13 May 2010
Accepted 14 May 2010
Available online 9 June 2010

Keywords:
Epistemic curiosity
I/D model
Intrinsic motivation
Extrinsic motivation

ABSTRACT

Two studies were conducted to evaluate the validity of the Interest (I) and Deprivation (D) type epistemic curiosity (EC) distinction in non-students. In Study 1 ($N = 263$), responses to two EC measures, the Epistemic Curiosity Scale (ECS; Litman & Spielberger, 2003) and the Curiosity as a Feeling-of-Deprivation Scale (CFDS; Litman & Jimerson, 2004) were submitted to confirmatory factor analysis. A 2-factor model comprising the 10 items previously identified by Litman (2008) had the best fit as compared to several competing models. In Study 2 ($N = 202$), correlations between 5-item I- and D-type EC scales and intrinsic and extrinsic work-related motives were evaluated. As hypothesized, I-type EC correlated with intrinsic motivation, whereas D-type EC was related to both intrinsic and extrinsic motivation.

1. Introduction

Epistemic curiosity (EC) is the desire to obtain new knowledge expected to stimulate positive feelings of intellectual *interest* (I-type) or reduce undesirable states of informational *deprivation* (D-type) (Berlyne, 1954; Litman, 2005). I-type EC appears to be maximally activated when individuals recognize opportunities to discover something completely new, whereas D-type EC is optimally stimulated when people lack a specific piece of information that will be incorporated into an existing knowledge-set or used to solve a complex problem (Litman, Hutchins, & Russon, 2005). I- and D-type EC are theorized to reflect different orientations towards seeking new information: I-type EC involves focusing on the intrinsic enjoyment of new discoveries, whereas D-type EC is concerned with the reduction of undesirable states of uncertainty; this distinction is hypothesized to have important consequences for how individuals approach opportunities to learn new information (Litman, 2008; Litman & Jimerson, 2004).

Because I-type EC motivates knowledge-acquisition simply for the inherent joy of it, it is hypothesized to play a role in the formation of *mastery-oriented* achievement goals in regard to learning (Elliot & Church, 1997; Litman, 2008). When I-type EC is activated, learning new information is expected to result in subjectively rewarding experiences of increased interest and subsequent engagement. Thus, I-type EC may be conceptualized as essentially a purely intrinsic motive to obtain new knowledge (Ryan & Deci, 2000). Like I-type EC, D-type EC also involves taking intrinsic pleasure in learning, but experiences of reward are achieved through different mechanisms.

When D-type EC is activated, acquiring new information is rewarding only if it successfully reduces uncertainty and facilitates understanding. Therefore, the reward-value of new information is determined by the information's potential to resolve a specific unknown rather than its ability to stimulate situational interest. Consequently, the correctness and relevance of newly acquired knowledge is critical to the satisfaction of D-type EC. By contrast, in order to satisfy I-type EC, new information has to be interesting, but does not necessarily have to be factually accurate or useful. For these reasons, D-type EC is theorized to play a greater role in setting *performance-oriented* learning goals, for which achievement is determined on the basis of objective and demonstrable criteria (Elliot & Church, 1997; Litman, 2008). Thus, D-type EC is theorized to be a more "integrated" motive that involves *both* the intrinsic pleasure of learning as well as extrinsically regulated concerns about the accuracy or fit of newly gathered information (Litman, 2008; Ryan & Deci, 2000).

Once activated, the degree to which each type of curiosity is experienced and behaviorally expressed varies according to individual differences in relatively stable I- and D-type curiosity traits (Litman, 2005). To assess individual differences in trait I-type EC, Litman and Spielberger (2003) developed the Epistemic Curiosity Scale (ECS; α range = .82–.87); to assess individual differences in trait D-type EC, Litman and Jimerson (2004) developed the Curiosity as a Feeling-of-Deprivation Scale (CFDS) (α range = .85–.88). Although both scales assess levels of dispositional wanting for

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doi:10.1016/j.paid.2010.05.021

new knowledge, the content and tone of their items differ considerably; the I-type ECS items all refer to the *enjoyment* associated with the expectation of learning something new, whereas all of the D-type CFDS items describe being greatly *bothered* by lacking sufficient information for one's needs.

Litman and Spielberger's (2003) 10-item ECS includes two 5-item subscales (α range = .71–.81) that assess diversive and specific EC. The EC-Diversive subscale measures enjoying the intellectual exploration of unfamiliar topics (e.g., "I enjoy exploring new ideas"), while the EC-Specific subscale measures tendencies to enjoy figuring out how things work (e.g., "When I see a complicated piece of machinery, I like to ask someone how it works"). Litman and Jimerson's (2004) CFDS is a 15-item measure consisting of three 5-item subscales (α range = .64–.78). The first CFDS subscale assesses a desire to increase feelings of Competence (CFD-C) through the reduction of ignorance (e.g., "I don't like not knowing things, so I try to learn new information about even the most complex topics."), the second subscale measures expressions of Intolerance (CFD-I) for unsolved problems or unanswered questions (e.g., "It really gets on my nerves when I know that I'm close to solving a puzzle, but still can't figure it out."), and the third subscale inquires about an individual's level of Persistence (CFD-P) in seeking out missing information (e.g., "I can spend hours on a single problem because I just can't rest without knowing the answer").

Supportive of the theorized distinction between I- and D-type EC, several important differences have been found between the ECS and CFDS. First, consistent with the view that the activation of D-type EC involves some negative emotional experiences, the CFDS is found positively correlated with scales that measure anxiety, depression, and anger, whereas the positively valenced I-type ECS is found to be negatively correlated or unrelated to measures of these three negative affective conditions (Litman, 2010; Litman & Jimerson, 2004; Litman & Spielberger, 2003) and is found to be positively correlated with positive psychological constructs such as aesthetic appreciation, vitality, and humor (Litman, 2005). Second, while both the ECS and CFDS predict engaging in information-seeking behavior, the CFDS is associated with the activation of higher levels of state-curiosity and a greater degree of information-seeking behavior than the I-type ECS. Additionally, the ECS and CFDS appear to be associated with different metacognitive states, "don't know" and "tip-of-the-tongue", respectively (Litman et al., 2005).

Of course, given that I- and D-type EC both motivate knowledge-seeking behavior, they are not conceptualized as orthogonal dimensions. Not surprisingly, despite several important theoretical and empirical differences between the CFDS and ECS, scores on these two scales tend to be very highly correlated (r range = .68–.70), and in confirmatory factor analyses of the CFDS and ECS subscales, conducted to test the validity of the I/D distinction, model fit has been found to improve slightly by allowing the ECS EC-Specific subscale to load on both the I- and D-type factors (Litman & Silvia, 2006). Findings such as these raised the question of whether more clearly differentiated I- and D-type EC measures could be developed.

In keeping with this goal, Litman (2008) recently conducted a number of factor analyses of responses to the ECS and CFDS by several thousand undergraduate students, and found that the 5-item EC-Diversive and 5-item CFD-P subscales were the most differentiated measures of I- and D-type curiosity, respectively. Moreover, confirmatory factor analyses demonstrated that a 2-factor, 10-item I/D model comprising the EC-Diversive and CFD-P items had the best overall fit of several competing models tested. In reviewing the items that defined each factor, Litman (2008) concluded that I-type EC emphasized the fun of broadly learning new ideas, whereas D-type EC primarily involved concerns about finding solutions to specific problems. Additionally, consistent with hypotheses about the motivational nature of each type of curiosity, correlations with different intrinsically or extrinsically motivated learning-achievement goals indicated that I-type EC involves feelings of enjoyment associated with the intrinsic motive to improve intellectual mastery, while D-type EC is associated with both seeking mastery and also with extrinsically motivated performance-oriented achievement.

Although Litman's (2008) findings help clarify the differences between measures of I- and D-type curiosity, the research suffers from a major limitation: Because it was conducted exclusively on samples of university students, it is unknown whether these findings can be meaningfully generalized to non-students, who may differ in regard to their attitudes about seeking new information. Likewise, the observed relationships with measures of intrinsic and extrinsic learning-achievement motives were specifically concerned with academic achievement, and thus it is unclear as to whether the conclusions about the motivational nature of I- and D-type EC are equally relevant to non-academic settings such as the workplace. Therefore, the major goals of the present study were to evaluate the factor structure of measures of I- and D-type curiosity using non-student samples, and to examine relationships between I- and D-type curiosity and intrinsic and extrinsic motives, such as desiring opportunities to be pleasurably engaged in job-related tasks and being concerned about extrinsically mediated rewards, respectively.

In Study 1, the dimensionality of the 10 ECS and 15 CFDS items was examined with confirmatory factor analyses, which were conducted to assess the fit of several plausible I/D EC models in non-students, as has been done with student samples (Litman, 2008). In Study 2, relationships between the I- and D-type EC measures and different motives related to workplace achievement motivation (Amabile, Hill, Hennessey, & Tighe, 1994) were examined. As previously noted, I-type EC is hypothesized to be a fully intrinsic motive, whereas D-type EC is conceptualized as an integrated motive that also involves extrinsically regulated concerns about the accuracy and usefulness of newly gathered information (Litman, 2008; Ryan & Deci, 2000). Thus, I-type curiosity was theorized to be positively related only to measures of intrinsic motivation while D-type curiosity was expected to be associated with *both* intrinsic and extrinsic motivation. However, it was also hypothesized neither I- nor D-type curiosity should be associated with specific concerns about wholly extrinsic rewards, such as compensation or praise, given that curiosity is theorized to be regulated by internalized feelings of satisfaction, either in the form of increased interest or reduced uncertainty. Additionally, the potential relationship between educational attainment and I- and D-type curiosity was evaluated, as were potential relationships of curiosity with age and gender.

2. Study 1: Evaluating the validity of the 10-item, 2-factor I/D model in a non-student sample

2.1. Method

2.1.1. Participants

The participants were 263 community members (132 women and 131 men) from the Southwestern United States who were not currently enrolled in a college or university. Participants' ages ranged from 18 to 70 (M = 35.35, SD = 13.10). Overall, the sample tended to be fairly well educated, as approximately 49% of participants reported having either attended college or completing a college degree, while approximately 45% reported having attended at least some graduate school. All participants were recruited by graduate students of the second author.

2.1.2. Instruments

Demographic questions. All participants provided data on their sex, age, and highest level of educational attainment (1 = some high school; 2 = high school degree or equivalent; 3 = some college; 4 = bachelor's degree; 5 = graduate or professional school).

The Epistemic Curiosity Questionnaire was comprised of the 10-item ECS and the 15-item CFDS as previously described. Participants were instructed to report how they "generally feel" regarding each item statement by rating themselves on the following 4-point frequency scale: 1 = almost never; 2 = sometimes; 3 = often; 4 = almost always.

2.1.3. Procedure

Persons agreeing to participate in the study were given the 28-item questionnaire containing the demographic questions and curiosity scale items, a letter from the second author describing the research project, and notification that more information would be made available after the study was completed. These materials were intentionally kept very brief in order to minimize potential attrition due to non-response; only 10–15 min were required to participate. Upon completing the questionnaire, participants returned them to the graduate student researcher who recruited them.

2.2. Results

Means, standard deviations, alpha coefficients, and Pearson product moment correlations for the ECS and CFDS measures are reported in Table 1. Alphas were generally acceptable for all of the EC measures ($\alpha \geqslant .70$), with the exception of the CFD-C subscale. Alphas were somewhat lower for the subscales relative to the total scales due in part to their smaller number of items. All of the correlations were moderate to very strong and positive, particularly between each scale and its subscales, as would be expected given that all seven instruments were designed to assess different aspects of trait-EC. An ANOVA indicated that education level was significantly associated with the EC-Diversive subscale, $F(4, 268) = 4.87$; post hoc tests revealed that the "graduate/professional school" group had higher EC-Diversive scores ($M = 15.63$, $SD = 2.76$) than the other groups ($M = 14.27$, $SD = 2.76$). Separate t tests indicated no significant gender differences; no significant correlations were found with age.

In keeping with the data analytic procedures of previous research that assessed the fit of various I/D EC models (Litman, 2008), and to facilitate comparability between those findings and the findings of the present study, the covariance matrix of the ECS and CFDS items was submitted to confirmatory factor analysis using maximum likelihood estimation.[1] Two sets of models were tested; the first consisted of all 25 ECS and CFDS items; the second set included only the 5 EC-Diversive and 5 CFD-P items recently identified by Litman (2008) as the most differentiated measures of I- and D-type EC, respectively. For the first set, three models were evaluated. The first model was a 1-factor model designed to evaluate whether the 25 curiosity items were more appropriately conceptualized as comprising a unitary EC construct. The second model was a 2-factor I/D model consisting of correlated I-type (10 ECS items) and D-type (15 CFDS items) factors. The third model included five correlated 5-item factors made up of the two ECS and three CFDS subscales. For the second set, only two models were tested. The first was a 10-item single factor model, similar to the 1-factor model of the first set, while the second was a 10-item 2-factor model in keeping with the results of Litman (2008), which specified correlated I-type (5 EC-Diversive items) and D-type (5 CFD-P items) factors.

Table 1
Means, standard deviations, alpha coefficients, and correlations* between the ECS and CFDS measures ($N = 263$).

	M (SD)	α	1	2	3	4	5	6
1. ECS	29.79 (7.14)	.84						
2. EC-Diversive	15.93 (3.76)	.80	.86					
3. EC-Specific	13.87 (4.07)	.75	.89	.54				
4. CFDS	43.66 (10.57)	.86	.68	.54	.64			
5. CFD-C	15.35 (3.71)	.61	.69	.66	.55	.81		
6. CFD-I	15.49 (3.86)	.70	.49	.36	.50	.86	.52	
7. CFD-P	12.82 (4.23)	.83	.56	.40	.57	.90	.60	.67

* All r's, $p < .01$.

Several goodness-of-fit indices (GFI) were examined including chi-square, for which smaller values are superior, even when significant (James, Mulaik, & Brett, 1982); the comparative fit index (CFI) and non-normed fit index (NNFI), for which values $\geqslant .95$ indicate close fit; McDonald's centrality fit index (MFI), for which values $\geqslant .90$ are acceptable (Hu & Bentler, 1999); and the root mean square error of approximation (RMSEA), for which values between $\leqslant .08$ are acceptable (Browne & Cudeck, 1992; Hu & Bentler, 1999). To compare nested models, the parsimony fit index (PFI), for which values >.50 are acceptable, (James et al., 1982) was examined, while the expected cross-validation index (ECVI), for which lower values are desirable (Hatcher, 1994), was evaluated for non-nested models.

GFI for each analysis are reported in Table 2; chi-squares were significant for all five models. GFI for all of the Set 1 models (25 items) indicated generally poor fit, with the exception of RMSEA for the 5-factor model. For Set 2 (10 items), the 1-factor model (2A) had very poor fit, while fit for the 2-factor I/D model (2B) was very good; both CFI and NNFI were >.95, MFI was >.90, and RMSEA was <.08. Additionally, the 10-item 2-factor I/D model had the highest PFI, the lowest chi-square and the lowest ECVI of all five models tested, indicative of the best fit overall. Thus, consistent with the findings from previous research on student samples (Litman, 2008), the five items that comprised the EC-Diversive subscale were found to be the best items for assessing I-type curiosity, while the five items that formed the CFD-P subscale were found to be the best measures of D-type curiosity for non-students as well. Fig. 1 graphically displays the 10-item 2-factor I/D model (2B), where it may be noted that the two curiosity factors were moderately correlated ($r = .47$), and all factor loadings were significant ($p < .001$) and strong, ranging from .54 to .79.

3. Study 2: I- and D-type EC and their relationships with intrinsic and extrinsic motivation in a non-student sample

3.1. Method

3.1.1. Participants

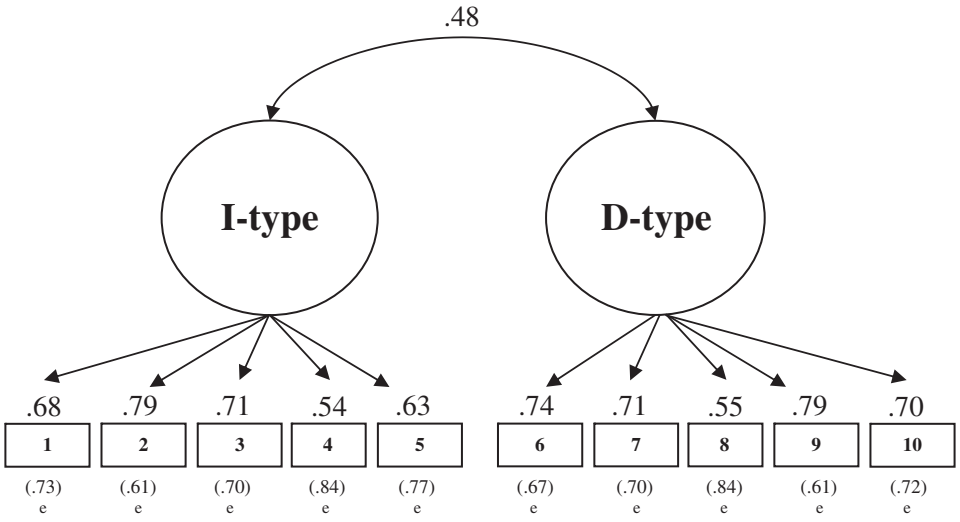
The participants were 202 (102 women and 100 men) non-student adults employed with the Pinellas County, Florida Board of County Commissioners under the County Administrator, who ranged in age from 28 to 69 ($M = 48.58$, $SD = 9.41$). The participants were volunteers recruited by the third author, and represented a wide range of county employees including management, professionals, service workers, and administrative support. As in Study 1, the Study 2 sample tended to be well educated, with approximately 65% reporting they either attended some college or completed a college degree, and about 20% indicating they had attended graduate school.

[1] For Likert-scale data, some researchers recommend analysing Polychoric correlations. However, analysis of covariances is equally appropriate for latent variable models, especially with small samples, and will yield correct estimates (Coenders & Saris, 1995).

Table 2
Goodness-of-fit indices (GFI) for five EC models ($N = 263$).

GFI index	Models[a]				
	1A	1B	1C	2A	2B
χ^2 (df)**	987.32 (275)	879.54 (274)	639.74 (265)	315.25 (35)	79.06 (34)
CFI	.702	.750	.845	.696	.951
NNFI	.705	.753	.848	.700	.952
MFI	.253	.316	.490	.596	.920
RMSEA [95% CI]	.10 [.09–.11]	.09 [.08–.10]	.07 [.06–.08]	.17 [.16–.18]	.07 [.05–.09]
PFI	.581	.618	.681	.525	.694
ECVI [95% CI]	4.23 [3.86–4.63]	3.79 [3.45–4.10]	2.95 [2.67–3.65]	1.32 [1.12–1.55]	0.45 [0.37–0.56]

[a] *Notes:* 1A, 1-factor 25-item curiosity model; 1B, 2-factor 25-item I/D model; 1C, 5-factor 25-item I/D subscale model; 2A, 1-factor 10-item curiosity model; 2B, 2-factor 10-item I/D model.
** Chi-square statistics are significant ($p < .01$).



I-type (EC-Diversive subscale items)
1. Enjoy exploring new ideas
2. Find it fascinating to learn new information
3. Enjoy learning about subjects that are unfamiliar
4. Enjoy discussing abstract concepts
5. Learn something new, like to find out more about it

D-type (CFD-P subscale items)
6. Hours on a problem, I can't rest without answer
7. Brood for a long time to solve problem
8. Conceptual problems keep me awake thinking
9. Frustrated if I can't figure out problem, so I work harder
10. Work like a fiend at problems I feel must be solved

Fig. 1. Diagram of the 10-item 2-factor I/D EC model ($N = 263$).

3.1.2. Instruments

Demographic questions. All participants indicated their sex, age, and highest level of educational attainment (1 = high school degree or equivalent; 2 = some college; 3 = bachelor's degree; 4 = graduate or professional school; all participants had at least a HS diploma).

The I/D Curiosity Questionnaire included the 5-item EC-Diversive subscale of the ECS (Litman & Spielberger, 2003) and the 5-item CFD-P subscale of the CFDS (Litman & Jimerson, 2004). In Study 1 and in previous research (Litman, 2008), these instruments were empirically found to be the best measures of I- and D-type curiosity, respectively. Participants were instructed to report how they "generally feel" regarding each item statement by rating themselves on a 4-point frequency scale ranging from "almost never" to "almost always".

The Work Preference Inventory (WPI; Amabile et al., 1994) is a 30-item measure of the extent to which adults perceive themselves as intrinsically and extrinsically motivated toward their job. The WPI consists of two 15-item scales that measure expressions of intrinsic motivation (IM; e.g., "What matters most to me is enjoying what I do.") and extrinsic motivation (EM; e.g., "I am strongly motivated by the recognition I can earn from other people"), with each 15-item scale comprising two subscales. The IM subscales include a 7-item measure of seeking Enjoyment (e.g.," It is important for me to be able to do what I most enjoy") and an 8-item subscale that measures a desire for Challenge (e.g., "I enjoy tackling problems that are completely new to me"). The EM scale is divided into a 10-item Outward subscale, which assesses tendencies to perform tasks in order to receive praise or recognition (e.g., "I am concerned about how other people are going to react to my ideas"), and a 5-item Compensation subscale, which emphasizes seeking tangible rewards for one's efforts (e.g., "I am keenly aware of the income goals I have for myself"). Participants responded to each WPI item using a 4-point Likert-type scale anchored by "Always True of Me" and "Never True of Me"; scale and subscale scores were derived by averaging the relevant item scores. Alphas between .71 and .79 are reported for the WPI measures (Amabile et al., 1994).

3.1.3. Procedure

A brief memo was circulated by the third author describing the research project, and participants were informed that additional information would be provided after they had finished responding.

Table 3
Partial correlations* between the 5-item I-type and 5-item D-type EC measures and the Work Preference Inventory (WPI) scales ($N = 202$).

Scale	*M* (*SD*)	α	I-type (EC-Diversive subscale)	D-type (CFD-P subscale)
WPI intrinsic motivation (IM)	3.06 (0.26)	.70	**.36**	**.24**
WPI IM-Enjoyment	3.09 (0.29)	.68	.10	**.25**
WPI IM-Challenge	3.02 (0.36)	.71	**.45**	.12
WPI extrinsic motivation (EM)	2.55 (0.32)	.69	−.05	**.18**
WPI EM-Outward	2.44 (0.33)	.65	**−.15**	**.28**
WPI EM-Compensation	2.77 (0.54)	.74	.08	−.02

* For partial *r*'s $\geqslant \pm .14$, $p < .05$. Significant coefficients are bold.

The questionnaire materials were administered to participants in large-group testing sessions at the workplace. As with Study 1, the questionnaire materials were intentionally kept brief so as to minimize the potential for non-response; approximately 15–20 min were required to participate.

3.2. Results

The brief, 5-item I-type EC scale ($M = 14.6$, $SD = 3.31$; and D-type EC scale ($M = 12.90$, $SD = 3.35$) both had acceptable internal consistency (I-type: $\alpha = .74$; D-type: $\alpha = .75$) and were moderately positively correlated ($r = .36$). Correlations between the 5-item I- and D-type EC scales (the EC-Diversive and CFD-P subscales, respectively) and the six WPI measures are reported in Table 3. In order to assess the unique relationships between each curiosity and WPI scale, partial correlations were computed. Thus, each correlation between I-type EC and the six WPI measures reflected the partialing out of D-type EC, while the variance accounted for by I-type EC was partialed out of each correlation between D-type EC and the other scales.

The I-type EC scale was moderately positively correlated with the IM scale and the IM-Challenge subscale, uncorrelated with the EM scale and EM-Compensation subscale, and negatively related to the EM-Outward subscale. These results supported the hypothesis that I-type curiosity is a fully intrinsic motive (Ryan & Deci, 2000). However, unexpectedly, the I-type scale was not significantly associated with the IM-Enjoyment subscale, although the correlation was in the hypothesized direction. In reviewing the items of the two IM subscales it is worth noting that more than half of the Challenge items referred explicitly to either enjoyment or curiosity, while ironically, enjoyment was mentioned in only two items for the Enjoyment scale.

Also consistent with hypotheses, the D-type EC scale was positively correlated to the IM scale and IM-Enjoyment subscale as well as the EM scale and EM-Outward subscale. Although the D-type scale was also positively related to the IM-Challenge subscale, this relationship was not significant. However, as previously noted, somewhat contrary to the subscale labels, more of the items of the IM-Challenge scale appeared to refer to positive feelings of enjoyment, whereas the IM-Enjoyment scale items primarily referred to finding out "how good I can be at my work" and preferring to "figure things out for myself", statements which are very consistent with the concept of D-type curiosity (Litman, 2008). Overall, these findings for the D-type scale support the hypothesis that D-type curiosity is an integrated motive that involves aspects of both intrinsic and extrinsic motivation (Ryan & Deci, 2000). That neither scale was correlated with concerns about explicitly extrinsic rewards (e.g., compensation or praise) was also consistent with hypotheses; curiosity is theorized to be regulated by internalized feelings of satisfaction rather than external rewards.

Consistent with the findings of Study 1, an ANOVA found that education level significantly predicted I-type curiosity scale scores (i.e., the EC-Diversive subscale), $F(3, 211) = 4.96$. Post hoc tests indicated significant differences between the "HS diploma" group ($M = 14.27$, $SD = 2.51$) and the other groups ($M = 15.92$, $SD = 2.38$). Also consistent with Study 1, no significant relationships were found for the curiosity measures with age or gender.

4. Discussion

The major goal of the present study was to examine the validity of the I/D model found in previous research with university students (Litman, 2008) using non-student samples. Confirmatory factor analyses indicated that a 2-factor I/D model comprised of the 5-item EC-Diversive and 5-item CFD-P items had the best overall fit of several competing models that were tested. These findings provide further evidence that the EC-Diversive subscale and the CFD-P subscale are the best, most differentiated measures of I- and D-type curiosity, respectively.

In Study 2, I-type EC correlated positively with intrinsic motivation, but was uncorrelated or negatively related to extrinsic motives, while D-type EC correlated positively with both intrinsic and extrinsic motivation. These findings provided evidence that I-type EC is a fully intrinsic motive, in which learning is energized solely by the prospect of increased enjoyment, whereas D-type EC is an integrated motive that involves both personal pleasure but also concerns about objective performance. These findings are quite consistent with previous research on students that showed I-type EC was significantly associated only with mastery-oriented learning goals, whereas D-type curiosity was associated with both mastery and performance-oriented goals (Litman, 2008). However, one major limitation of the present study was that we were unable to sample participants from a broader range of industrial/organizational settings; thus, it will be important to evaluate these relationships in more diverse groups of adults in future research.

In both studies, I-type EC was found to be generally higher for those with a higher education level. This finding is intriguing and suggests that taking pleasure in learning wholly new ideas may be associated, at least to some extent, with educational attainment. Unfortunately it is not possible from these data to determine whether higher levels of dispositional I-type EC help motivate academic pursuits or if spending more time in school tends to increase levels of the I-type trait, but further investigation of this relationship would be fertile ground for future research. One possibility might be to compare levels of I-type EC both at the beginning and completion of an academic program of study.

It will also be important in future research on I- and D-type EC in non-students to evaluate relationships between individual differences in these two curiosity traits and actual information-seeking behavior. Past research has demonstrated that D-type EC is a stronger motive for seeking knowledge than I-type EC in students (Litman et al., 2005), but it remains to be seen whether this phenomenon holds true for non-students as well.

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