
Predicting the Subjective Experience of Intrinsic Motivation: The Roles of Self-Determination, the Balance of Challenges and Skills, and Self-Realization Values

Alan S. Waterman

The College of New Jersey

Seth J. Schwartz

University of Miami School of Medicine

Edie Goldbacher

Hope Green

Christine Miller

Susheel Philip

The College of New Jersey

A series of studies was conducted to investigate the contributions of self-determination, perceived competence, and self-realization values to the subjective experience of intrinsic motivation. Using varying sets of instructions in these studies, college undergraduates generated and subsequently evaluated panels of identity-related activities. Three measures of the subjective experience of intrinsic motivation were used as outcome variables: (a) interest, (b) flow experiences, and (c) feelings of personal expressiveness. These subjective experience measures were strongly intercorrelated. Across studies, self-determination was found to be strongly associated with all of the subjective experience measures. In contrast, self-realization values made larger contributions to flow experiences and to personal expressiveness than to interest. Perceived competence, although significantly correlated with all subjective experience measures, played a considerably smaller role in the prediction of intrinsic motivation.

Keywords: *intrinsic motivation; self-determination; competence; self-realization; interest; flow; personal expressiveness*

Intrinsic motivation is generally considered to be central to positive psychological functioning (Haworth & Hill, 1992; Ryff, 1999). Much of what is known about intrinsic motivation derives from cognitive-evaluation/self-determination theory and the research supporting it (Deci & Ryan, 1985, 1987, 2002). This research has typi-

cally involved the use of puzzles and games, under carefully controlled laboratory conditions, to evaluate the role of contextual variables such as rewards, feedback, and choice in intrinsic motivation. The trade-off for being able to control relevant variables has been the use of activities of limited personal importance or salience in the lives of research participants.

A second body of research literature on intrinsic motivation consists of studies employing the Experience-Sampling Method (Csikszentmihalyi & Larson, 1987) to investigate naturally occurring behaviors. Studies following this paradigm have usually been guided by Csikszentmihalyi's (1975, 1988, 1990) teleonomic theory of the self. In contrast to laboratory studies of intrinsic motivation, these studies have emphasized ecological validity in addressing both the nature of intrinsically

Authors' Note: This research was conducted with support from The College of New Jersey to the first author. Edie Goldbacher is now in the Department of Cardiovascular Behavioral Medicine, the University of Pittsburgh Medical College. Hope Green and Christine Miller are now at Carrier Foundation, Belle Mead, New Jersey. Susheel Philip is now at Technometrica Market Intelligence, Inc., Oradell, New Jersey. Correspondence concerning this article should be addressed to Alan S. Waterman, Department of Psychology, The College of New Jersey, P.O. Box 7718, Ewing, NJ 08628-0718; e-mail: water@tcnj.edu.

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motivated activities and the contextual variables associated with such activities. Although the Experience-Sampling Method does generate a proportion of personally important and salient behaviors for evaluation, the frequency of such behaviors in the panel of activities generated may be quite low in comparison to self-maintenance, required, or downtime activities. The latter types of activities may be neither important nor salient in the lives of the research participants.

Cognitive-evaluation/self-determination theory and the teleonomic theory of the self, and their associated bodies of research, have provided a basis for understanding both the contextual variables associated with intrinsic motivation and the subjective experiences associated with such motivation. However, given the limited personal importance of the activities typically studied in intrinsic motivation research, it should be beneficial to examine such motivation in activities of high personal relevance. The research reported here has its origins in the study of psychosocial identity (Erikson, 1968; Marcia, Waterman, Matteson, Archer, & Orlofsky, 1993) and in eudaimonistic identity theory (Waterman, 1990, 1992). As it pertains to intrinsic motivation, eudaimonistic identity theory builds on both cognitive-evaluation/self-determination theory and the teleonomic theory of the self. It provides both a description of the subjective experience of intrinsic motivation and specifies predictor variables contributing to such motivation. The methodological approach to the study of intrinsic motivation derived from identity research differs from other research designs in that the activities studied are selected by the respondents, with personal importance or salience constituting one of the criteria for selection.

The research reported here was guided by three objectives:

- a. to ascertain the extent to which theoretically based measures of the subjective experience of intrinsic motivation are interrelated in the context of activities selected for their personal importance and salience;
- b. to ascertain the extent to which theoretically based predictor variables of intrinsic motivation are interrelated in the context of such activities; and
- c. to ascertain the extent to which the predictor variables of intrinsic motivation account for variability in the various measures of the subjective experience of intrinsic motivation.

Theoretical Perspectives on Intrinsic Motivation

Cognitive-evaluation/self-determination theory. In a summary statement on intrinsic motivation, Deci and Ryan (1985) wrote, "When people are intrinsically motivated,

they experience interest and enjoyment, they feel competent and self-determining, they perceive the locus of causality for their behavior to be internal, and in some instances they experience flow" (p. 34). In this statement, Deci and Ryan provide both (a) a description of the subjective, affective experiences present when people are engaged in intrinsically motivated activities (specifically, interest, enjoyment, and flow) and (b) a set of perceived attributes of the activities that contribute to making those activities intrinsically rather than extrinsically motivating (specifically, perceived competence and self-determination).

In considering subjective experiences of intrinsic motivation from this perspective, the focus here will be placed on the element of "interest" (Deci, 1992).¹ Interest is an expression of "feeling like doing" an activity (Sansone & Harackiewicz, 1996). It is a disposition to involve oneself selectively in some activities rather than others (Krapp, Hidi, & Renninger, 1992). Rathunde (1993), following Dewey (1933), identified interest with the dialectical synthesis of "serious play." Interest is a subjective experience that can range in intensity from relatively mild engagement to passionate involvement. A given activity, for example bird watching, that is of mild interest to one person may be the subject of passionate involvement for another (and it may be aversive to yet another person).

According to cognitive-evaluation/self-determination theory, activities are likely to be experienced as interesting and enjoyable in part because they are self-selected (Deci & Ryan, 1987; Ryan, 1993; Zuckerman, Porac, Lathin, Smith, & Deci, 1978) and because one feels competent in performing them (Harackiewicz & Larsen, 1986; Reeve & Deci, 1992; Sansone & Morgan, 1992). Although it is plausible for individuals to feel like doing something when they believe they lack competence, it is far more likely they will seek out, and choose to engage in, activities that they anticipate performing with adequate success and at which success is valued (Elliot et al., 2000). Lack of interest may be used as a rationale to account for the desire to avoid activities at which a person feels likely to fail (Sansone & Harackiewicz, 1996).

The teleonomic theory of the self. Csikszentmihalyi (1975, 1988, 1990) has described intrinsic motivation in terms of "autotelic," or self-reinforcing, activities. His goal was to understand what is taking place on those occasions when individuals feel "fully involved" in the activities in which they are engaged. In his initial research, Csikszentmihalyi (1975) obtained reports from individuals experiencing intense involvement in such activities as rock climbing, chess, dance, and basketball. Instances in which respondents felt fully involved were characterized by two elements: (a) an intense, positive subjective state, which he termed "flow," and (b) a perceived

balance of the challenges posed by the task and the skills that the person brought to it.

Csikszentmihalyi (1975, 1988, 1990) has described flow as a cognitive-affective state present during the performance of intrinsically motivated, fully involving activities. Flow is characterized by (a) the presence of clear goals; (b) an awareness of clear, immediate, and unambiguous feedback about the outcomes of the actions taken; (c) a merging of action and awareness; (d) the centering of attention on a limited stimulus field with the exclusion of distractions from consciousness; (e) a feeling of being in control of one's actions and of the immediate environment; (f) the absence of concern about failure; (g) the loss of ego or self-consciousness; and (h) a distortion in the sense of time. In comparison to the subjective experience of interest, flow is more intense and should be experienced in association with fewer activities than should interest. As Deci and Ryan (1985) indicated, when individuals are intrinsically motivated, they regularly experience interest, but only in some instances do they experience flow. Similarly, Sansone and Harackiewicz (1996) referred to flow as the epitome of intrinsic interest. Rathunde (1993) referred to flow as the "paradigmatic case of serious play."

The principal task characteristic associated with flow was identified as the perceived balance of challenges and skills. This represents a refinement of the concept of perceived competence discussed by Deci and Ryan (1985). Within cognitive-evaluation/self-determination theory, the emphasis was placed on task success. In contrast, within teleonomic theory, it is not success, per se, but rather success when the perceived level of skills matches the level of challenges that is associated with intrinsic motivation. In Csikszentmihalyi's (1975) initial conceptualization, this balance was seen as operating across the full range of challenges and skills, from low to high levels of both variables. Later, the conceptualization was refined into a fourfold classification system in which the flow state is viewed as generated only when the levels of challenges and skills are balanced and relatively high (Csikszentmihalyi, 1988). The balance of perceived challenges and skills when both are relatively low is seen as giving rise to the cognitive-affective state of apathy. The combination of high challenges and low skills is associated with anxiety. The combination of low challenges and high skills is associated with boredom, despite the success and therefore competence that a person evidences on a task.

Csikszentmihalyi's teleonomic theory of the self is compatible with cognitive-evaluation theory with respect to the association of self-determination with experiences of intrinsic motivation (Graef, Csikszentmihalyi, & Giannino, 1983), although a greater causal role is attached to self-determination within the cognitive-

evaluation framework. From a subjective perspective, activities experienced in the flow state are seen as being freely chosen and as preferred over other activities equally available to the person.

Eudaimonistic identity theory. A third perspective on intrinsic motivation is rooted in the study of identity formation. The concept of psychosocial identity refers to the goals, values, and beliefs that are central to a person's self-definition and that can provide direction and meaning to the person's activities (Erikson, 1968). Waterman (1992) highlighted the distinction between identity-related activities experienced as personally expressive and those directed toward instrumental outcomes, such as earning others' approval or improving one's material well-being. This distinction parallels that between intrinsically and extrinsically motivated activities. Feelings of personal expressiveness accompany activities that reflect one's core sense of being. When engaging in personally expressive activities, individuals experience (a) an unusually intense involvement, (b) a special fit or meshing with the activities, (c) a feeling of intensely being alive, (d) a feeling of completeness or fulfillment, (e) an impression that this is what the person was meant to do, and (f) a feeling that this is who one really is. In contrast to experiences of flow, where the emphasis is placed on the immediate task-related feelings present when activities are performed, for personal expressiveness, the emphasis is on the subjective perception of self-definition afforded by intrinsically motivating activities. Similar to flow, personal expressiveness appears to constitute a more intense form of the subjective experience of intrinsic motivation than does interest.

In philosophical terms, personal expressiveness was interpreted as the equivalent of Aristotle's concept of *eudaimonia* (a term that has been traditionally translated as "happiness") (Waterman, 1990). Eudaimonism is an ethical theory that calls on individuals to recognize and to realize their true potentials (Aristotle, 1985; Norton, 1976). Aristotle (1985) distinguished *eudaimonia* from hedonic enjoyment, defining *eudaimonia* as "activity expressing virtue" (p. 284), where virtue is understood as excellence or the best within us (Ackrill, 1973; McDowell, 1980). Norton (1976), a contemporary philosopher, described *eudaimonia* as the subjective state of "being where one wants to be, doing what one wants to do" (p. 216), where what is wanted is to be taken as "worth having." It is the subjective state associated with acting to fulfill personal potentials.

Waterman (1993b) demonstrated that while feelings of personal expressiveness and hedonic enjoyment are highly interrelated positive affective states, they are differentially associated with the extent to which activities are seen as furthering the realization of what are perceived to be one's best potentials. Furthermore, per-

sonal expressiveness and hedonic enjoyment were found to be differentially associated with activity-related variables such as perceived challenge, competence, effort, and concentration. In research on the role of personally expressive activities in identity formation, Schwartz, Mullis, Waterman, and Dunham (2000) established a link between personal expressiveness and the reflective consideration of life alternatives in the process of identity formation.

Working from eudaimonist premises, Waterman (1990, 1992, 1993a) advanced a theoretical perspective linking feelings of personal expressiveness with acting on the basis of self-realization values. Specifically, activities are postulated to give rise to feelings of personal expressiveness to the extent that they are perceived as associated with the values of (a) furthering the development of one's best potentials and (b) advancing one's purposes in living. Self-realization values thus constitute a third theoretical contributor to intrinsic motivation, along with self-determination and perceived competence (in the form of the balance of challenges and skills).

Research Questions and Hypotheses

Interrelationships among variables representing the subjective experience of intrinsic motivation. Subjective reports of interest, flow experiences, and personal expressiveness each represent possible outcomes or consequences of performing intrinsically motivated activities. As such, there should be significant positive correlations of at least moderate strength among measures of these three subjective conditions.

Although a substantial degree of interrelationship among various aspects of the subjective experience of intrinsic motivation is expected, it is also likely that there will be asymmetries in their associations. The term "interest" should be reported in connection with a wider range of activities than are the descriptors of flow. The associated asymmetry would take the form of reporting that virtually all activities characterized by flow also are described as being of interest, whereas a substantially lower percentage of activities described as interesting would be reported as involving flow. A parallel asymmetry is expected with regard to the relationship between interest and personal expressiveness. It is also possible that an asymmetry may exist with regard to the relationship between flow and personal expressiveness.

Interrelationships among predictors of intrinsic motivation. Although self-determination, the balance of challenges and skills, and self-realization values are all seen as predictors of intrinsic motivation, there is no compelling theoretical rationale for anticipating significant interrelationships among them. Activities entailing a high level of challenges and a high level of skills may or may not be

perceived as self-determined. Similarly, activities that are self-determined may or may not be consistent with self-realization values. Thus, no hypothesis is advanced with respect to the interrelationships among the predictors of intrinsic motivation.

Self-determination, the balance of challenges and skills, and self-realization values as predictors of the subjective experience of intrinsic motivation. Self-determination, the balance of challenges and skills, and self-realization values are hypothesized to predict the three subjective measures of intrinsic motivation. Evidence for this hypothesis would take the form of positive correlations, of at least moderate strength, between the predictor and outcome variables. One focus of this research was to assess the relative contributions of the three predictor variables to the various forms of subjective experience of intrinsic motivation. Given that the theories of intrinsic motivation appear compatible with respect to the potential roles of the various predictors, the relative contributions of self-determination, the balance of challenges and skills, and self-realization values were treated as a research question rather than a set of specific hypotheses.

The relative contributions of the predictor variables to the outcome measures were investigated by three means. First, *t* tests for differences in the strengths of paired zero-order correlations were conducted. This approach allows for determining whether one predictor accounts for significantly more variability in a given outcome measure than do the other predictors. Second, the unique variability explained by each predictor for each outcome variable was determined. Each of the predictors accounts for some variability in an outcome variable uniquely and shares another portion of explained variability with other variables in the predictor set. Because the *t* test comparisons are based on the total variability explained by each predictor, the level of unique variability explained provides a different type of index of the relative importance of each predictor variable (Norusis, 1990). The third technique employed is structural equation modeling. It is anticipated that given the hypothesized interrelationships among the three subjective experience measures, these measures will constitute a latent variable reflecting intrinsic motivation. The relative strength of the standardized path coefficients predicting the latent variable can thus serve as an additional basis for evaluating the contributions of the predictor variables to intrinsic motivation.

Overview of the Reported Research Studies

Data from four studies were used to address the hypotheses and research questions under investigation. In all studies, the same set of measures was used to assess interest, flow experiences, personal expressiveness, self-determination, the balance of challenges and skills, and

self-realization values. The data collection procedures differed in the number and basis of selection of the activities to be evaluated and in the populations from which the samples were drawn. Studies 1 and 2 involved use of the standard form of the Personally Expressive Activities Questionnaire (PEAQ-S) (Waterman, 1998). Respondents are asked to select five activities of importance to them that they might use to describe themselves to another person. No other constraints are placed on the choice of activities to be evaluated. Studies 1 and 2 differed mainly in sample composition. Study 1 was conducted at The College of New Jersey and Study 2 at Florida International University. The two schools differ markedly in the racial/ethnic composition of their student populations. Study 3, conducted at The College of New Jersey, involved use of a modified version of the PEAQ in which students were asked to identify six activities representing various pairings of effort (high and low) and affect (liked, neutral, and disliked) (PEAQ-EA). No constraint was placed on the domains from which activities were to be selected. In Study 4, also conducted at The College of New Jersey, each respondent was asked to select four specific activities differing in levels of effort (high and low) and affect (liked and disliked), with all activities drawn from a single leisure time or hobby domain (PEAQ-LH).

A substantial proportion of the activities generated by respondents on each of the three PEAQ versions should be of high personal importance because of their relevance for personal identity. However, the range of personal importance of activities listed on the PEAQ-S was likely to have been higher and narrower than the range generated on the PEAQ-EA or PEAQ-LH. Whereas most, if not all, of the activities a respondent lists on the PEAQ-S will be related to personal identity, this is not the case for the PEAQ-EA or PEAQ-LH. On both of the latter instruments, liked activities, particularly high effort-liked activities, have a high probability of being identity related. In contrast, low effort-disliked activities are unlikely to be identity related. The use of instruments providing different ranges of activities of personal importance allows for a more rigorous evaluation of the hypotheses advanced here.

METHOD

Participants

Study 1. Participants in Study 1 were 120 undergraduate students (98 women, 19 men, and 3 unidentified by gender) enrolled in psychology courses at The College of New Jersey. The gender distribution reflects the approximate gender distribution within those courses. Approximately 90% of the student population at the school is Caucasian, about 10% other ethnic groups.

Study 2. Participants in Study 2 were 228 undergraduate students (155 women, 54 men, and 19 unidentified by gender) enrolled at Florida International University. Because the student population at Florida International University is largely Hispanic, the sample participating in Study 2 was largely Hispanic as well (131 Hispanics, 33 Caucasians, 12 other ethnic groups, and 52 unidentified by ethnicity).

Study 3. Participants in Study 3 were 173 undergraduate students (129 women, 42 men, and 2 unidentified by gender) enrolled in psychology courses at The College of New Jersey.

Study 4. Participants in Study 4 were 97 undergraduate students (81 women, 14 men, and 2 unidentified by gender) enrolled in psychology courses at The College of New Jersey.

Instruments

In all four of the studies, the PEAQ, in varying formats, was the principal instrument for data collection. The formats used across studies differed with respect to how respondents were directed to select the activities to be rated.

PEAQ-S. For Studies 1 and 2, the standard version of the PEAQ was employed. On the PEAQ-S, a free-choice format is used to have respondents identify five activities to be evaluated. The instructions on the PEAQ-S read as follows: "If you wanted another person to know about who you are and what you are like as a person, what five (5) activities of importance to you would you describe?"

PEAQ-EA. For Study 3, the standard version of the PEAQ was modified to have respondents identify six activities to be rated, constrained by crossing two levels of effort (high and low) and three levels of affect (liked, neutral, and disliked). The instructions on the PEAQ-EA read as follows:

This questionnaire is designed to assess how individuals feel about various types of activities in which they regularly engage. Currently, we are interested in learning about how both effort and enjoyment affect the ways in which activities are experienced. In the spaces below, you are asked to list six activities in which you regularly engage that are characterized by different combinations of effort and enjoyment.

Six versions of the questionnaire were created to counterbalance the sequence in which activities were to be listed and then rated. Each combination of effort and affect was represented once in each ordinal position.

PEAQ-LH. For Study 4, the standard version of the PEAQ was modified so that respondents first identified a domain of leisure time or hobby activity. The activity to

be selected was to have the following characteristics: (a) There was a strong interest in engaging in it, (b) it was considered to be an important part of one's life, (c) it was engaged in with some regularity or frequency, and (d) it was not a paid activity or one engaged in for course credit. Next, respondents were asked to break the leisure time or hobby activity into its component elements, that is, activities that were a part of the larger activity. Examples were provided as to how two leisure or hobby activities (playing a musical instrument and playing on a football team) could be broken down into component activities. Respondents were asked to list a minimum of 10 component activities. Finally, respondents were asked to choose four of the component activities listed that were characterized by different combinations of effort (high and low) and enjoyment (liked and disliked).

The wording of the items for assessing the three aspects of the subjective experience of intrinsic motivation and the three predictors of intrinsic motivation was consistent across the PEAQ-S, PEAQ-EA, and PEAQ-LH. A 7-point scale was used for all items with the endpoints of the scale labeled. The endpoint labels varied as a function of the scale content.

Measures of the Subjective Experience of Intrinsic Motivation

Interest. Interest was assessed with one item pertaining to the usual level of interest experienced when engaged in the activity. The response scale ranged from *very low* to *very high*.

Flow experiences. Flow was measured using an eight-item scale, the items corresponding to elements identified by Csikszentmihalyi (1990). The items were phrased as completions of a common stem: "When I engage in this activity ____." The item completions for this scale were the following: (a) I feel I have clear goals, (b) I feel self-conscious (reverse scored), (c) I feel in control, (d) I lose track of time, (e) I feel I know how well I am doing, (f) I have a high level of concentration, (g) I forget personal problems, and (h) I feel fully involved. These items were embedded among a series of other sentence completions not specific to flow experiences. Each item was responded to on a scale ranging from *not at all characteristic of me* to *very characteristic of me*.

Personal expressiveness. Feelings of personal expressiveness were assessed using six items. Respondents were asked the extent to which they agreed or disagreed with a series of 12 statements. The items tapping feelings of personal expressiveness, embedded within this series, were the following: (a) "This activity gives me my greatest feeling of really being alive"; (b) "When I engage in this activity I feel more intensely involved than I do when engaged in most other activities"; (c) "This activity gives

me my strongest feeling that this is who I really am"; (d) "When engaged in this activity I feel this is what I was meant to do"; (e) "I feel more complete or fulfilled when engaging in this activity than I do when engaged in most other activities"; and (f) "I feel a special fit or meshing when engaged in this activity." The scale for these items ranged from *strongly disagree* to *strongly agree*.

Predictor Measures of Intrinsic Motivation

Self-determination. Self-determination was assessed by two items adapted from Graef et al. (1983). The first item read, "To what extent do you usually feel that engaging in this activity is something you are required to do or is your choice to do?" The endpoints of the scale were *required to do* and *my choice to do*. The second item read, "When engaging in this activity, to what extent do you wish you were doing something else?" with the endpoints of the scale labeled *not at all* and *very much* (reverse-scored).

Balance of challenges and skills. Perceived competence, in the form of the balance of challenges and skills, was measured by the sum of two items. The first referred to the usual level of challenges encountered when engaged in the activity, the second to the level of skills the respondent usually brings to the activity. For both items, the scale endpoints were *very low* and *very high*. High scores on this measure can only be obtained when the level of challenges and skills are both balanced and high, corresponding to the condition Csikszentmihalyi (1988) termed "flow." Low scores are obtained when the levels of both elements are low, corresponding to the condition associated with apathy. Intermediate scores are obtained when both variables are intermediate or when one is high and the other low, corresponding to either the conditions for boredom or anxiety.

Self-realization values. Self-realization values were assessed by two items, embedded within a series of items with the stem, "To what extent does this activity provide you with each of the following types of opportunities?" The relevant completions were "the opportunity for me to develop my best potentials" and "the opportunity for me to make progress toward my goals." Each item was associated with a scale with the endpoints identified as *not at all* and *very extensively*.

Procedures

In Studies 1, 3, and 4, research materials were distributed to participants in psychology classes with instructions to complete the questionnaires under conditions of relative privacy where they lived. The materials were to be returned to their course instructor the following week. In Study 2, participants completed the questionnaires in a research laboratory. In all studies, respon-

TABLE 1: Zero-Order Correlations Among Measures of the Subjective Experience of Intrinsic Motivation and Predictor Variables: Studies 1-2 ($n = 348$) and 3-4 ($n = 270$)^a

	<i>Interest</i>	<i>Flow Experiences</i>	<i>Personal Expressiveness</i>	<i>Self-Determination</i>	<i>Balance of Challenges and Skills</i>	<i>Self-Realization Values</i>
Interest	—	.41***	.51***	.47***	.19**	.42***
Flow experiences	.61***	—	.50***	.33***	.34***	.23**
Personal expressiveness	.74***	.66***	—	.37***	.29***	.53***
Self-determination	.73***	.55***	.64***	—	-.05	-.04
Balance of challenges and skills	.39***	.41***	.46***	.13*	—	.49***
Self-realization values	.44***	.54***	.66***	.26***	.58***	—

a. There were approximately 1,740 activities rated in Study 1-2 and 692 activities rated in Study 3-4. The number of activities varies somewhat for each pairing of variables due to missing data. Significance levels were determined by the number of participants contributing data rather than the number of activities rated. Correlations for Study 1-2 appear above the diagonal; those for Study 3-4 appear below the diagonal.

* $p < .05$. ** $p < .001$. *** $p < .0001$.

dents received points toward their course grade as a reward for participation.

RESULTS

Organization of the Samples for Data Analysis

Given that identical sets of measures for the predictor variables of intrinsic motivation and the subjective experience variables were used in all four studies, a decision was made to reduce the total number of analyses conducted by combining studies in which similar procedures were used to generate the activities to be evaluated. Because Studies 1 and 2 both involved use of the PEAQ-S with different samples, these studies were combined into Study 1-2. Studies 3 and 4 both involved the identification of activities along the dimensions of effort and affect and so were combined into Study 3-4. The activities generated in Study 3 that were described as “neither liked nor disliked” were dropped from the analyses to facilitate combining activity lists for Studies 3 and 4.

Intercorrelations Among Measures of the Subjective Experience of Intrinsic Motivation

The zero-order correlations among measures of interest, flow experiences, and feelings of personal expressiveness associated with the activities rated in Studies 1-2 and 3-4 are reported in Table 1. The correlations ranged in magnitude from .41 to .74. All were highly significant.² The findings, replicated across studies, provide strong support for the hypothesis that interest, flow experiences, and personal expressiveness are interrelated subjective states.

To investigate the possibility of asymmetrical relationships among the measures of the subjective experience of intrinsic motivation, each measure was dichotomized as high or low based on a priori criteria. Scores on the measures of interest, flow experiences, and personal

expressiveness were categorized as high if the mean item score for the scale was 6 or greater and low otherwise.

As expected, asymmetries were present for the relationships between (a) interest and flow experiences and (b) interest and personal expressiveness. In Study 1-2, 88.4% of activities high on flow were reported to be high on interest, whereas 25.6% of activities reported high on interest were reported to be high on flow. The corresponding percentages in Study 3-4 were 78.2% and 52.6%. The results were stronger for the asymmetries of interest and personal expressiveness. In Study 1-2, 95.2% of activities identified as personally expressive were reported as high on interest, whereas 26.6% of activities experienced as interesting were viewed as personally expressive. The corresponding percentages in Study 3-4 were 92.5% and 36.1%. For the relationship of flow experiences and personal expressiveness, there was no asymmetry in Study 1-2. Of activities high on flow experiences, 46.0% were high on personal expressiveness, whereas 47.6% of activities high on personal expressiveness also were high on flow experiences. A modest asymmetry was found in Study 3-4, with 44.9% of activities high on flow experiences also high on personal expressiveness, whereas 77.4% of activities high on personal expressiveness also were high on the measure of flow experiences.

Interrelationships Among Variables Serving as Predictors of Intrinsic Motivation

The zero-order correlations among self-determination, perceived competence (as a balance of challenges and skills), and self-realization values, across the four studies, also are contained in Table 1. In the absence of a compelling theoretical rationale for anticipating associations among the variables, no a priori hypotheses were advanced with respect to these relationships. The correlation matrix revealed a consistent, significant positive association of moderate strength between the balance of

challenges and skills and self-realization values. The relationships of self-determination to the other predictors of intrinsic motivation were inconsistent across studies, with both positive and negative correlations obtained. The differences across studies may have been a function of differences in the distribution of activities across the ranges on either or both variables. It appears appropriate to conclude that self-determination of behavior is not reliably related to either perceived competence or self-realization values.

Self-Determination, the Balance of Challenges and Skills, and Self-Realization Values as Predictors of the Subjective Experience of Intrinsic Motivation

It was expected that self-determination, the balance of challenges and skills, and self-realization values each would serve as predictors of intrinsic motivation. They were predicted to yield significant positive correlations with each of the measures of the subjective experience of intrinsic motivation. Consistent with expectations, all 18 zero-order correlations between the predictor variables and the subjective experience measures were statistically significant. Only 1 correlation was less than .20, 2 were between .20 and .29, 4 were between .30 and .39, 5 were between .40 and .49, 3 were between .50 and .59, and 3 were greater than .60 (see Table 1).

It also was anticipated that these predictors might make differential contributions to the different measures of the subjective experience of intrinsic motivation. As indicated in the Introduction, three strategies were employed to evaluate the relative contributions of the predictor variables to the various measures of subjective experience: (a) *t* tests for differences in the strengths of paired zero-order correlations, (b) determination of the unique variability explained by each predictor for each outcome subjective experience variable, and (c) structural equation modeling.

Comparisons of the strength of zero-order correlations. If the predictor variables make differential contributions to the measures of subjective experience, this will be reflected in significant differences in the strengths of zero-order correlations. For the prediction of interest, in Study 1-2, self-determination and self-realization values had significantly stronger associations than did the balance of challenges and skills, $t(345) = 4.19, p < .001$, and $t(345) = 4.69, p < .001$, respectively. In Study 3-4, self-determination was more strongly associated with interest than was either the balance of challenges and skills, $t(267) = 6.87, p < .001$, or self-realization values, $t(267) = 8.72, p < .001$. For the prediction of flow experiences, in Study 1-2, the balance of challenges and skills made a somewhat stronger contribution than did self-realization values, $t(345) = 2.15, p < .05$, whereas in Study 3-4, both self-determination and self-realization values made sig-

nificantly stronger contributions in comparison to the balance of challenges and skills, $t(267) = 2.36, p < .05$, and $t(267) = 4.71, p < .001$, respectively. For the prediction of personal expressiveness, in Study 1-2, self-realization values made a stronger contribution than did either self-determination, $t(345) = 2.75, p < .01$, or the balance of challenges and skills, $t(345) = 5.18, p < .001$. In Study 3-4, self-realization and self-determination had significantly stronger associations with personal expressiveness than did the balance of challenges and skills, $t(267) = 4.78, p < .001$, and $t(267) = 3.33, p < .01$, respectively.

Determination of the unique variability explained (UVE) by each predictor. Following the procedure recommended by Norusis (1990), multiple correlations were used to determine the UVE for each of the three predictor variables for each of the three subjective experience variables. The UVE is obtained from the increase in R^2 when a variable is entered into a regression equation last (thus partialing out the variability associated with other predictors in the equation). In Study 1-2, for the outcome variable of interest, the total R^2 was .30, and the UVE was largest for self-determination (.24) and was minimal for both the balance of challenges and skills (.01) and self-realization values (.03). Parallel results were found in Study 3-4: The total R^2 was .64 with the largest UVE for self-determination (.42) and minimal UVEs for the balance of challenges and skills (.03) and self-realization values (.01). With flow experiences as the outcome variable, in Study 1-2, the total R^2 was .32, with the largest unique contribution again made by self-determination (.13), followed by self-realization values (.09), with the balance of challenges and skills making a minimal unique contribution (.03). Parallel results were obtained in Study 3-4: The total R^2 was .49 with the UVEs as follows: self-determination (.18), self-realization values (.08), and balance of challenges and skills (.01). With personal expressiveness as the outcome variable, in Study 1-2, the total R^2 was .44. Self-realization values made the largest unique contribution (.21), followed by self-determination (.15), with virtually no unique contribution made by the balance of challenges and skills (.00). In Study 3-4, for personal expressiveness, the total R^2 was .64, with the largest unique contribution made by self-determination (.25), followed by self-realization values (.09) and the balance of challenges and skills (.02).

Structural equation modeling (SEM). The theoretical model of intrinsic motivation evaluated in these studies has self-determination, the balance of challenges and skills, and self-realization values serving as predictors of intrinsic motivation, a latent variable defined in terms of the subjective experiences of interest, flow experiences, and personal expressiveness. Based on the correlational findings, a bidirectional pathway between the balance of

challenges and skills and self-realization values was introduced, but paths between self-determination and the other predictors were not drawn (see Figure 1). This model was evaluated using AMOS structural equation modeling software, Version 4.0 (Arbuckle & Wothke, 1999). The maximum likelihood procedure was employed to obtain standardized path coefficients, with the goodness of fit evaluated by the Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA). CFI values greater than .95 and RMSEA values less than .10 are considered to represent a good fit. The chi-square statistic is reported for all models but is not used to evaluate model fit because it is vulnerable to inflation with large sample sizes (Kline, 1998). Differences in chi-square values were, however, used to evaluate differences in fit between models.

For both Study 1-2 and Study 3-4, the model provided adequate fit to the data (although the RMSEA values indicated considerable misspecification): Study 1-2: $\chi^2(8) = 167.64$, with CFI = .994 and RMSEA = .112; Study 3-4: $\chi^2(8) = 209.55$, with CFI = .987 and RMSEA = .153.

Gender was then evaluated as a possible moderating variable in the model. With gender included in the model for Study 1-2, misspecification decreased but overall model fit deteriorated (as evidenced by the increase in chi-square), $\chi^2(16) = 214.04$, $p < .001$, with CFI = .993 and RMSEA = .087. Comparisons of the model with the paths for the genders constrained to be equal and without that constraint yielded a significant difference in chi-square values, $\Delta\chi^2(5) = 15.40$, $p < .01$, indicating the presence of gender differences in the path coefficients. This gender difference was specific to the path from the balance of challenges and skills to the latent variable for intrinsic motivation. As shown in Figure 1, perceived competence played a larger role in explaining intrinsic motivation in men than in women. For Study 3-4, the model with gender included remained an adequate fit, $\chi^2(16) = 216.67$, with CFI = .987 and RMSEA = .109. Here, the comparison of the solutions with the gender paths constrained to be equal and not subject to that restraint was not statistically significant, $\Delta\chi^2(5) = 0.95$, *ns*, indicating that all paths in the model were comparable for men and women. Although the RMSEA value for the final model in Study 3-4 was greater than .10, the standardized path coefficients in the model were consistent with those from Study 1-2 and with the results of the *t* tests and UVE analyses.

With one exception, the standardized path coefficients for Study 1-2 and Study 3-4 shown in Figure 1 were those obtained when the model was estimated without inclusion of the gender variable. For Study 1-2, for the path between the balance of challenges and skills and intrinsic motivation, the coefficients for men and women are reported separately.

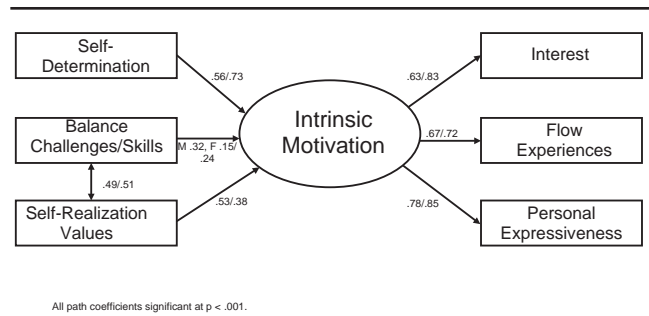


Figure 1 Predicting intrinsic motivation (Study 1-2/Study 3-4).

NOTE: Standardized path coefficients are reported separately by gender only where significantly different.

DISCUSSION

The goal of the research reported here was to expand the understanding of the subjective experiences associated with intrinsic motivation, as well as of the roles played by self-determination, perceived competence in the form of the balance of challenges and skills, and self-realization values in such experiences. This research differed from prior work in that the activities studied were generated so as to include a high proportion of personally important and salient identity-related activities. As hypothesized, the three forms of the subjective experience of intrinsic motivation (i.e., interest, flow experiences, and feelings of personal expressiveness) were all substantially interrelated. The correlations ranged in strength from moderate to strong, supporting the conclusion that they share a common referent and may be taken to represent a single latent construct.

However, despite the high correlations among the three subjective experience variables, they do not appear to constitute a unified subjective condition. The asymmetries observed in the association of interest with flow experiences and with personal expressiveness provide evidence for this conclusion. As predicted, a very substantial percentage of the activities rated as high on flow and personal expressiveness also were reported to be high on interest, whereas a substantially lower percentage of those activities rated high on interest also were rated high on flow or personal expressiveness. Evidence for an asymmetrical relationship between flow and personal expressiveness was less clear, emerging in Study 3-4 but not in Study 1-2. The pattern of associations obtained is consistent with the hypothesis that the subjective experience of intrinsic motivation may be represented in varying intensities. Expressions of interest appear to apply to a relatively wide range of activities, including those where the experience of intrinsic motivation is relatively mild. In contrast, the descriptors of flow and personal expressiveness apply to a smaller set of

activities that give rise to consistently stronger experiences of intrinsic motivation.

Although no hypothesis was advanced concerning interrelationships among the three predictor variables chosen for study, significant positive correlations of moderate strength were found between the measures of perceived competence and self-realization values. This association may reflect a comparable role played by effort in both flow-related competence and in the pursuit of self-realization values. According to Csikszentmihalyi (1988), high levels of both challenges and skills are necessary conditions to achieve flow experiences with a high level of effort needed to succeed in challenging activities. Similarly, a high level of effort is very likely required to make progress toward the realization of personal potentials and to further one's purposes in living. On the other hand, the measure of self-determination was not consistently related to either the balance of challenges and skills or self-realization values. This latter outcome suggests that individuals choose to engage in a range of activities irrespective of considerations associated with perceived competence or personal goals and potentials.

With regard to the relative contributions of the three predictor variables to the subjective experience outcome measures, how the question is addressed makes some difference in the answer obtained. At the level of zero-order correlations, all 18 correlations were positive and significant, most in the moderate to strong range. Thus, self-determination, the balance of challenges and skills, and self-realization values each serve as predictors of the various subjective aspects of intrinsic motivation. When the relative strengths of the zero-order correlations are compared, self-determination appears to serve as a particularly strong predictor of interest, whereas self-realization values serve as a particularly strong predictor of personal expressiveness. The findings for prediction of flow experiences were contradictory across studies. The significantly differing patterns of correlational associations for the three subjective experience measures provide further evidence that they do not represent a unitary subjective condition.

When looking at the unique variability in the subjective experience measures explained by each of the predictor variables, it emerges that self-determination alone accounts for substantial variance in all three subjective measures, whereas self-realization values makes substantial unique contributions only to the more intense experiences of flow and personal expressiveness. The balance of challenges and skills did not make a substantial unique contribution to any of the three measures. The findings from the SEM models indicate that when the three subjective experience variables were considered jointly as a latent intrinsic motivation variable, self-determination

and self-realization values make comparable and sizeable contributions to intrinsic motivation, whereas the balance of challenges and skills makes a significant but smaller contribution.

The differing impressions of the role of the balance of challenges and skills derived from the different analytic procedures deserve particular attention. Csikszentmihalyi (1975) observed that for activities in which individuals felt fully engaged, there was a consistent perception that these activities were characterized by a balance of challenges and skills. He postulated that the subjective experience of flow derives from that balance. The significant zero-order correlations of the balance of challenges and skills with flow experiences provide evidence for such an association. However, although the balance of challenges and skills may be a necessary condition for flow experiences, it does not follow that activities characterized by such a balance will necessarily be experienced as intrinsically motivating. It is easy to imagine assigned activities (i.e., activities where self-determination is absent) that are balanced for challenges and skills being perceived as drudgery rather than as engaging. If a sufficient number of such activities were included in the lists of activities generated by the respondents, this could have attenuated the relationships of perceived competence to the subjective experiences of intrinsic motivation and contributed as well to the UVE and SEM results obtained for this variable.

The results of this research appear to have potentially useful applications for the future study of intrinsic motivation. Much of the experimental research on intrinsic motivation has operationally defined intrinsic motivation using behavioral measures of task continuation or questions pertaining to interest, the form of subjective experience associated with the widest range of activities (including many not personally salient). The present research provides grounds for suggesting that assessments of flow experiences and personal expressiveness may be useful in further evaluating the contributions made by contextual and other variables to the experience of intrinsic motivation. The differing patterns of association for the predictor variables with the intrinsic motivation outcome variables provide a basis for the contention that variables making a strong contribution to interest may or may not make comparable contributions to flow and personal expressiveness. Furthermore, when the intent of an investigator is to study intrinsic motivation for personally relevant activities, it may not be possible to rely on task continuation as the measure of intrinsic motivation. Although the use of behavioral measures is desirable, in their absence, measures of the subjective experience of intrinsic motivation can provide a covariance mechanism for statistically equating respondent-

selected activities when the types of activities differ from person to person.

In research on intrinsic motivation as a personality, or individual difference, variable (Amabile, Hill, Hennessey, & Tighe, 1994), the focus has been on the frequency or regularity of intrinsic motivation as contrasted with extrinsic motivation. Differences in the subjective experiences or intensity of intrinsic motivation have not been included as a factor. Within a group of individuals characterized as intrinsically motivated, a further personality distinction can be made between those who regularly experience intrinsic motivation primarily as interest and those who more frequently experience flow and/or feelings of personal expressiveness.

In conclusion, the strength of intrinsic motivation experiences appears to vary as a function of the extent to which the behavior engaged in is self-determined, taps the perceived competencies of the person, and reflects the person's perceived potentials and purposes. When conducting research on intrinsic motivation, the findings from the present series of studies suggest the importance of identifying the strength of the motivation present. Whereas self-determination plays a central role in the subjective experience of intrinsic motivation across all its aspects, self-realization values contribute primarily to the more intense experiences of flow and personal expressiveness.

NOTES

1. The subjective state of "enjoyment" will be experienced under a broad range of conditions, only some of which can be said to be associated with intrinsic motivation. Enjoyment can be experienced while engaging in extrinsically motivated activities when the reward is great and the probability of attaining the reward is high. It also will be experienced in connection with consummatory behaviors (e.g., eating and drinking), the rewards for which are the gratification of physiological drives.

2. Because each respondent contributed four (Study 4), five (Studies 1 and 2), or six (Study 3) activities to a data set, the levels used to determine significance in the correlational analyses were conservatively based on the number of respondents participating in each study rather than the number of activities included in the analyses.

REFERENCES

- Ackrill, J. L. (1973). *Aristotle's ethics*. London: Faber and Faber.
- Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. (1994). The Work Preference Inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology*, *66*, 950-967.
- Arbuckle, J. L., & Wothke, W. (1999). *Amos 4.0 user's guide*. Chicago: SmallWaters Corporation.
- Aristotle. (1985). *Nicomachean ethics* (T. Irwin, Trans.). Indianapolis, IN: Hackett.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.
- Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology. In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.), *Optimal experience: Psychological studies of flow in consciousness* (pp. 15-35). Cambridge, UK: Cambridge University Press.

- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the Experience-Sampling Method. *Journal of Nervous and Mental Disease*, *175*, 526-536.
- Deci, E. L. (1992). The relations of interest to the motivation of behavior: A self-determination theory perspective. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 43-70). Hillsdale, NJ: Lawrence Erlbaum.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, *53*, 1024-1037.
- Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Dewey, J. (1933). *How we think*. Boston: D. C. Heath.
- Elliot, A. J., Falter, J., McGregor, H. A., Campbell, W. K., Sedikides, C., & Harackiewicz, J. M. (2000). Competence valuation as a strategic intrinsic motivation process. *Personality and Social Psychology Bulletin*, *26*, 780-794.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: Norton.
- Graef, R., Csikszentmihalyi, M., & Giannino, S. M. (1983). Measuring intrinsic motivation in everyday life. *Leisure Studies*, *2*, 155-168.
- Harackiewicz, J. M., & Larsen, J. R., Jr. (1986). Managing motivation: The impact of supervisor feedback on subordinate task interest. *Journal of Personality and Social Psychology*, *51*, 547-556.
- Haworth, J. T., & Hill, S. (1992). Work, leisure, and psychological well-being in a sample of young adults. *Journal of Community and Applied Social Psychology*, *2*, 147-160.
- Kline, R. B. (1998). *Principles and practices of structural equation modeling*. New York: Guilford.
- Krapp, A., Hidi, S., & Renninger, K. A. (1992). Interest, learning, and development. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 3-26). Hillsdale, NJ: Lawrence Erlbaum.
- Marcia, J. E., Waterman, A. S., Matteson, D. R., Archer, S. L., & Orlofsky, J. L. (1993). *Ego identity: A handbook for psychosocial research*. New York: Springer-Verlag.
- McDowell, J. (1980). The role of eudaimonia in Aristotle's ethics. In A. O. Rorty (Ed.), *Essays on Aristotle's ethics* (pp. 359-376). Berkeley: University of California Press.
- Norton, D. L. (1976). *Personal destinies*. Princeton, NJ: Princeton University Press.
- Norusis, M. J. (1990). *SPSS base system user's guide*. Chicago: SPSS.
- Rathunde, K. (1993). The experience of interest: A theoretical and empirical look at its role in adolescent talent development. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement: Motivation and adolescent development*. Greenwich, CT: JAI.
- Reeve, J., & Deci, E. L. (1992). Elements of the competitive situation that affect intrinsic motivation. *Personality and Social Psychology Bulletin*, *22*, 24-33.
- Ryan, R. M. (1993). Agency and organization: Intrinsic motivation, autonomy and the self in psychological development. In J. Jacobs (Ed.), *Nebraska symposium on motivation: Developmental perspectives on motivation* (Vol. 40, pp. 1-56). Lincoln: University of Nebraska Press.
- Ryff, C. D. (1999). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*, 1069-1081.
- Sansone, C., & Harackiewicz, J. M. (1996). "I don't feel like it": The function of interest in self-regulation. In L. L. Martin & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect, and self-regulation* (pp. 203-228). Mahwah, NJ: Lawrence Erlbaum.
- Sansone, C., & Morgan, C. (1992). Intrinsic motivation and education: Competence in context. *Motivation and Emotion*, *16*, 249-270.
- Schwartz, S. J., Mullis, R. L., Waterman, A. S., & Dunham, R. M. (2000). Ego identity status, identity style, and personal expressiveness: An empirical investigation of three convergent constructs. *Journal of Adolescent Research*, *15*, 504-521.
- Waterman, A. S. (1990). Personal expressiveness: Philosophical and psychological foundations. *Journal of Mind and Behavior*, *11*, 47-74.

- Waterman, A. S. (1992). Identity as an aspect of optimal psychological functioning. In G. R. Adams, T. Gullotta, & R. Montemayor (Eds.), *Advances in adolescent development: Vol. 4. Identity formation during adolescence* (pp. 50-72). Newbury Park, CA: Sage.
- Waterman, A. S. (1993a). Finding something to do or someone to be: A eudaimonist perspective on identity formation. In J. Kroger (Ed.), *Discussions on ego identity* (pp. 147-167). Hillsdale, NJ: Lawrence Erlbaum.
- Waterman, A. S. (1993b). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology*, 64, 678-691.
- Waterman, A. S. (1998). *The Personally Expressive Activities Questionnaire: A manual*. Unpublished manuscript.
- Zuckerman, M., Porac, J., Lathin, D., Smith, R., & Deci, E. L. (1978). On the importance of self-determination for intrinsically motivated behavior. *Personality and Social Psychology Bulletin*, 4, 443-446.

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