

Trait as Default: Extraversion, Subjective Well-Being, and the Distinction Between Neutral and Positive Events

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On the basis of prior work suggesting that trait self-knowledge serves a “fill-in” function when event-specific information is missing (M. D. Robinson & G. L. Clore, 2002a), we sought to demonstrate that extraversion is a more reliable predictor of subjective well-being (SWB) judgments among certain individuals than among others. Four studies involving a total of 260 participants revealed that the extraversion–SWB relation was relatively weaker among those quick to appreciate the distinction between neutral and positive events in a choice reaction-time task; by contrast, it was stronger among those slow to recognize this distinction. The findings suggest that extraversion scales measure (among other things) beliefs about SWB that differentially contribute to judgments among those less capable of making evaluative distinctions at encoding.

Most people, most of the time, are somewhat happy (Watson, 2000). In other words, they feel something but do not feel it very intensely, and what they feel is somewhere in between neutrality and joy. Similarly, when asked, most people, most of the time, would say that they are “somewhat” satisfied with their lives rather than indifferent or thrilled (Diener, Suh, Lucas, & Smith, 1999). Thus, the typical range of subjective well-being (SWB) is somewhere between neutral and positive on a bipolar scale.

On the basis of these considerations, it is reasonable to think that the distinction between neutral and positive events is important for SWB. A conversation with an acquaintance, for example, might be viewed as a mundane daily event by one person and as a source of pleasure by another. Over time, such discrepant construals of life events could well contribute to individual differences in SWB. That is, a life full of (subjectively) mundane events would not engender a great deal of SWB. By contrast, a life full of (subjectively) positive events would.¹

Extraversion and SWB

What determines whether an individual experiences events as neutral or positive? One important individual-difference variable is extraversion. Extraverts, relative to introverts, tend to report higher SWB (DeNeve & Cooper, 1998; McCrae & Costa, 1991; Zelenski & Larsen, 1999). Furthermore, the relation between extraversion

and positive affect is often considered to be one of the most robust in the literature (Diener et al., 1999). Moreover, there is a good deal of evidence to support the idea that the same events, particularly those that are normatively positive, engender more happiness among extraverts than among introverts (e.g., Zelenski & Larsen, 1999).²

Findings involving the correlation between extraversion and SWB have been taken as support for a temperamental view of the extraversion–SWB relation (Clark & Watson, 1999; Lucas & Fujita, 2000). Exactly what this means varies somewhat from author to author, but some principal assumptions are that (a) extraverts will always be happier than introverts (e.g., McCrae &

¹ The interaction that we report in this article is particular to the distinction between neutral and positive events. Results involving the distinction between neutral and negative events will be reported in a later article.

² The construct of extraversion was proposed by Carl Jung (1913/1971). He proposed that the dimension of extraversion distinguishes between people who invest their energies in the internal world (introverts) versus those who invest their energies in the external world (extraverts). Later, Hans Eysenck (1952, 1967) developed systematic procedures for measuring extraversion. He also offered a new biological theory of extraversion. According to this theory, extraversion relates to the degree of arousal within the brain (and particularly as triggered by the reticular activating system). These original theories of extraversion, particularly Eysenck's, have been extremely influential in modern conceptions of the trait of extraversion. However, neither of these prior theories has much to say about the rather ubiquitous correlations that are often reported between extraversion and positive affect (Matthews & Gilliland, 1999; Watson, 2000). On the basis of such robust correlations, modern conceptions of extraversion tend to link it to reward sensitivity specifically or to positive affect more generally (Depue & Collins, 1999; Gray, 1991). The present investigation is more germane to the affective correlates of extraversion than to the theories of Jung and Eysenck. For a useful history of the extraversion construct, see McAdams (2001, pp. 306–322).

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Costa, 1991), (b) the same positive event will trigger more happiness in extraverts than in introverts (e.g., Zelenski & Larsen, 1999), and (c) there may be a biological mechanism responsible for the extraversion–SWB relation (e.g., Depue & Collins, 1999).³

Trait as Belief

Recently, several articles (Robinson & Clore, 2002a, 2002b; Robinson, Vargas, & Crawford, 2003; Tamir, Robinson, & Clore, 2002) have suggested an alternative, cognitive view of personality traits. Specifically, it has been suggested that traits can be conceptualized as generalized beliefs about the self and the world (see also Epstein, 1973). This conceptualization has led to testable predictions concerning (a) the process of self-report and (b) the consequences of trait self-knowledge.

Related to the process of making trait judgments, Klein and colleagues (e.g., Klein & Loftus, 1993; Klein, Loftus, & Kihlstrom, 1996) have repeatedly shown that people do not appear to access specific behavioral information when making trait self-judgments. For example, a person who endorses the trait adjective *introverted* does so without accessing knowledge about his or her activity preferences on a Friday night. Robinson and Clore (2002b) recently extended this line of inquiry to the process of judging one's emotions. Three studies, using reaction time (RT) and priming paradigms, converged on the conclusion that people access event-specific emotion knowledge when reporting on their recent emotions but emotion-related beliefs when reporting on their emotions over long time frames (e.g., "last few months") or in general.

In combination with a literature review (Robinson & Clore, 2002a), Robinson and Clore (2002b) suggested that people access trait self-knowledge when the emotion judgment at hand does not allow them to access relevant experiential (i.e., event-specific) emotion knowledge. Such an account can explain why retrospective and prospective judgments of emotion tend to be more consistent with emotion-related beliefs than are online reports. For example, Feldman Barrett (1997) found that neuroticism predicted the discrepancy between online reports of distress and retrospective reports. Specifically, individuals high in neuroticism retrospectively overestimated the amount of distress that they had experienced during a 90-day period. A similar, although less robust, tendency was found for extraversion. The study is consistent with the following conclusions: (a) Extraversion and neuroticism measure, among other things, a person's beliefs about his or her own emotions, and (b) such beliefs differentially contribute to retrospective reports of emotion relative to online reports of emotion (for related evidence, see Christensen, Wood, & Feldman Barrett, 2003).⁴

Prior work (Robinson & Clore, 2002a, 2002b) has emphasized the contribution of trait self-knowledge to retrospective self-reports of emotion. However, it is notable that emotional traits (e.g., extraversion) are often correlated with momentary experiences of emotion (Lucas & Fujita, 2000; Matthews & Gilliland, 1999). Such a relation might indeed suggest a temperamental contribution. Does our trait-as-belief framework have anything to say about this relation between emotional traits and emotional states? In the present investigation, we sought to provide evidence that it does. Because our findings also suggest a new method for examining individual differences in appraising life events, we describe this method next.

Personality as Categorization

We are not the first to suggest that different people categorize events in different ways. In fact, Kelly's (1963) theory of personality was primarily based on the idea that individuals differ in the dimensions that they use to categorize objects. For example, one person might classify people in terms of whether they can be trusted or not. Another person, by contrast, might classify people in terms of whether they are "fun-loving" or not. As a psychologist, Kelly was interested in the consequences of adopting certain categorization tendencies versus others. As a therapist, Kelly was interested in replacing maladaptive ways of categorizing objects with adaptive ones.

It is helpful to think of Kelly's (1963) theory of personality in terms of category accessibility (Bruner, 1957). As a consequence of using a particular category (e.g., "people who can be trusted") frequently, it is more likely to be activated in the presence of a relevant exemplar (e.g., an honest person). When it is activated, it is activated more quickly and effortlessly. Finally, it can be used more efficiently in making new discriminations. These same qualities (i.e., likelihood of activation, speed of activation, and efficiency of use) are compatible with Fazio's research on attitude accessibility (for a review, see Fazio, 1995).

It is important to note that Kelly's (1963) personality theory is dimensional. A dimension separates the world into two categories, like black versus white, trustworthy versus untrustworthy, or neutral versus positive. To the extent that a person uses a certain dimension, he or she is more likely to use both poles of the dimension. For example, the habitual use of the trustworthy dimension would render it more likely that some people are viewed as trustworthy. However, it would also render it more likely that some people are viewed as untrustworthy. In this sense, habitual distinctions imply that both poles (e.g., trustworthy and untrustworthy) are recognized and used at least somewhat frequently. In Kelly's words, "We see the construct as composed essentially of a similarity–contrast dimension which strikes through a part of his field of experience" (p. 71).

³ The higher order construct of SWB is composed of three related yet distinct lower order constructs: positive affect, negative affect, and life satisfaction (Diener et al., 1999). *Positive affect* refers to the tendency to experience pleasant mood states like excitement, *negative affect* refers to the tendency to experience unpleasant mood states like distress, and *life satisfaction* refers to the tendency to report satisfaction with various aspects of one's life.

⁴ Extraversion scales, including the one used here (International Personality Item Pool, 2002), do not exclusively (or often even primarily) ask about experiences of positive affect. Rather, extraversion scales often tap one's preferences for social or solitary activities. Nevertheless, Lucas, Diener, Grob, Suh, and Shao (2000; see also Lucas & Diener, 2001) have demonstrated that extraversion relates more to preferences for pleasurable activities (which are often social) than to preferences for social activities per se. Lucas et al. (2000) supported this contention on the basis of structural equation modeling of data from a large, multinational study. Given this result, as well as other evidence suggesting that extraverts routinely report a higher level of SWB than introverts (Diener et al., 1999), we felt safe in assuming that extraverts and introverts differ in their beliefs about their own levels of SWB (see also Feldman Barrett, 1997; Robinson & Clore, 2002a).

In Kelly's (1963) view, finally, it is important to note that habitual constructs are implicit rather than explicit personality tendencies. This means that people do not, in principle, know how they categorize social objects (Robinson et al., 2003). Rather, habitual categories are reflected in ease and chronicity of use and must be measured indirectly rather than on the basis of self-report (for a review, see Higgins, 1996). Indeed, there is very little reason to believe that emotional traits, based on self-report, correspond with particular tendencies of processing affective information, at least without regard to contextual variables (Matthews & Gilliland, 1999; Rusting, 1998).

In the present context, we expected that the distinction between neutral and positive events would be an important one in predicting SWB. In developing a procedure for measuring the habitual use of this distinction, we capitalized on the idea that habitual use would be reflected in the speed with which individuals could distinguish neutral and positive events. In this connection, we know that practice (i.e., prior experience in making a given distinction) is a robust and sizable predictor of RT performance in choice RT tasks (Sanders, 1998). Accordingly, we asked participants to classify words as neutral or positive as quickly (but as accurately) as possible. We expected that speed in making the distinction would predict SWB. We also expected extraversion to predict SWB. Finally, on the basis of previous work suggesting that trait self-knowledge plays a "fill-in" role when event-specific information is missing (Robinson & Clore, 2002a, 2002b), we expected extraversion and speed on the neutral versus positive task to interact in predicting SWB. These predictions are discussed more thoroughly in the next section.

Trait as Default

The Robinson and Clore (2002a) model makes several assumptions relevant to the current context. One, people prefer to base their emotion judgments on event-specific knowledge. Two, certain factors (e.g., retrospective reporting) render such knowledge relatively inaccessible. And three, lacking event-specific knowledge, people are likely to consult their trait self-knowledge instead in making emotion judgments. The model, in this sense, contrasts bottom-up (from events to evaluation) and top-down (from trait self-knowledge to evaluation) paths to emotion judgments.

We sought to investigate this model here by assessing expertise in bottom-up evaluation. To do well at our categorization task, a person must be able to appreciate neutral events, positive events, and their distinction. Because some life events are neutral and some are positive, we expected that individuals fast at the task would report relatively moderate levels of SWB. Equally important, because such individuals apparently make evaluations in a bottom-up manner (as indicated by their categorization speed), we predicted that trait self-knowledge (specifically extraversion) would be less predictive of their SWB judgments.

What about those slow on the categorization task? According to the Robinson and Clore (2002a) model, an inability to make evaluations at encoding renders it likely that the person will have to access trait self-knowledge in making SWB judgments. Extraversion, because it relates to beliefs about SWB, is one useful source of trait self-knowledge that the individual can access. We therefore predicted that trait extraversion would be relatively predictive of their SWB judgments.

Altogether, we predicted an interaction of the following form: The tendency for extraverts to report greater SWB than introverts should be diminished among those fast to distinguish neutral and positive events and enhanced among those slow to distinguish neutral and positive events. In other words, fast individuals will make judgments in a bottom-up fashion (from events to SWB judgments), whereas slow individuals will make judgments in a top-down fashion (from extraversion to SWB judgments). Such results would be consistent with the trait-as-default theory offered in this article.

Overview of Studies

Four groups of participants were asked to determine, as quickly and accurately as possible, whether particular words (i.e., *events*) were neutral or positive in valence. On the basis of previous research on choice RT (Donders, 1868/1969; Fazio, 1995), we expected that such a task would index the (a) discriminability and (b) habitual use of the neutral versus positive distinction in encoding new events. Participants were also asked to report on their level of extraversion. It is generally assumed that extraverts experience higher SWB than introverts (Diener et al., 1999; Lucas & Fujita, 2000) and that temperamental mechanisms mediate this relation (Clark & Watson, 1999; Zelenski & Larsen, 1999). Finally, participants were asked to report on momentary (Studies 1 and 3), week-retrospective (Study 2), and trait (Study 3) mood states as well as their life satisfaction (Studies 2 and 4). Mood states and life satisfaction are often considered as the key markers of SWB (Diener et al., 1999). In total, the four studies provided a relatively comprehensive test of our hypotheses.

Study 1

Method

Participants

Participants were 45 undergraduates from the University of Illinois who did the study for course credit.

Procedure

The experiment was conducted with groups of 2–4 at a time. However, each participant was given a private cubicle. Following informed consent, participants completed the choice RT task described below. Then they completed measures of mood and extraversion, in that order.

Measures

Self-report. To measure mood state, we asked participants to rate their current experience (1 = *none*, 5 = *an extreme amount*) of 12 feelings (e.g., pleased, bored). Because items were designed to tap a bipolar conception of mood state (Larsen & Diener, 1992), we created a measure of hedonic balance by reverse-scoring the negative mood items and averaging them with the positive items ($\alpha = .80$). A higher score thus indicates more pleasant feelings. Extraversion was measured by the International Personality Item Pool's (2002) 10-item Extraversion Scale ($\alpha = .83$).

Categorization. Neutral (e.g., *jelly*, *dime*) and positive (e.g., *flower*, *smile*) words were chosen from the norms of Toggia and Battig (1978). There were 12 words of each type. They were equal in familiarity ($M = 6.16$), concreteness ($M = 5.75$), and number of letters ($M = 5.13$) ($F_s < 1$). On the 7-point pleasantness (1 = *unpleasant*, 7 = *pleasant*) scale

used by Toglia and Battig, however, the positive words ($M = 5.39$) were judged more pleasant than the neutral words ($M = 4.53$), $F(1, 22) = 15.40$, $p = .00$.

To measure individual differences in the capacity to distinguish neutral and positive events, we created a choice RT computer program specifically designed for the study. Participants were told that there would be several categorization blocks and that instructions would be presented on the computer screen. In the first set of blocks, participants were asked to hit the 9 key for animal words (e.g., *lion*, *fox*) and to hit the 1 key for “not animal” words. These blocks were solely to give participants some experience with the procedures of the task. In the second set of blocks, participants were asked to hit the 1 key for neutral words and to hit the 9 key for positive words. There was an initial 16-trial practice block followed by the 30-trial block of interest. In the final set of blocks (16 practice trials followed by 30 real trials), the animal blocks were repeated to get a measure of the participants’ baseline speed in responding.

In all blocks, category labels (either *not animal* vs. *animal* or *neutral* vs. *positive*) were presented on the screen throughout the trials. Following a 150-ms blank period, each trial began with the presentation of the trial word in the center of the screen. The trial was terminated by the participant’s response. If the response was correct, the next trial began. If the response was incorrect, the participant received a computer-generated beep and a 2-s delay.

Average accuracy rates were 92% and 98% for the neutral/positive and not animal/animal blocks, respectively. Thus, the distinction between neutral and positive events was somewhat more difficult. Participants who were relatively accurate at the neutral/positive categorization task were also faster ($r = -.41$, $p = .01$). This negative correlation indicates that there was no speed–accuracy tradeoff. Rather, some people found the task easier (i.e., fast and accurate) whereas some found it harder (i.e., slow and inaccurate).

In the computation of RT means, we excluded error trials, replaced extremely long (over 3.0 s) and extremely short (under 0.3 s) times with cutoff values (0.6% of RTs), and log transformed them to normalize the distribution. For each participant, we obtained means for the 30-trial neutral versus positive block on the one hand and for the second 30-trial not animal versus animal block on the other. The animal block was used as a control for the individual’s baseline speed in responding (Fazio, 1990). Residualized neutral/positive categorization scores were created by statistically removing the variance common to target and control blocks. Thus, a negative score means that a person was faster to distinguish neutral and positive events than one would expect on the basis of his or her animal-block performance; a positive score indicates the opposite. For the sake of parsimony, we refer to the neutral versus positive residualized speed measure as NEUP. Extraversion was uncorrelated with NEUP ($r = -.01$, $p = .95$).

Results

We expected the capacity to distinguish neutral and positive events to be relevant to mood. We also thought that the NEUP measure might interact with extraversion in predicting mood. To assess these predictions, we z scored extraversion and NEUP, computed an interaction term, and entered all three into a multiple regression in predicting mood scores (Aiken & West, 1991). The main effect for extraversion was not significant ($\beta = .18$, $p = .23$), and the main effect for NEUP was also not significant ($\beta = .13$, $p = .42$). However, the interaction was significant ($\beta = .36$, $p = .03$).

To determine the nature of the Extraversion \times NEUP interaction, we used the regression equation to estimate mood means for four groups created by crossing extraversion (introverts = -1 SD; extraverts = $+1$ SD) with NEUP (fast = -1 SD; slow = $+1$ SD).

As Figure 1 shows, extraversion predicted mood states among those who were slow on the NEUP measure but not among those who were fast.

Discussion

How can we characterize individuals who are slow to distinguish neutral and positive events? It is unclear, given their performance on the categorization task, whether they tend to view events as predominantly neutral or predominantly positive given that they do not routinely make this distinction at encoding. According to the trait-as-default theory (Robinson & Clore, 2002a, 2002b), this lack of event-specific knowledge renders it likely that trait self-knowledge will be used as a default in making judgments. In particular, it seemed likely that extraversion, an important predictor of SWB judgments (Diener et al., 1999; Lucas & Fujita, 2000), would be an important source of fill-in information that slow participants could rely on. Study 1 provides support for this view in that introverts slow at the NEUP task reported the worst mood states, whereas extraverts slow at the NEUP task reported the best mood states. Although prior work (e.g., Robinson et al., 2003) led us to test for this interaction, replication seemed desirable.

Study 2

Method

Participants

Participants were 72 undergraduates from the University of Illinois who did the study for course credit.

Procedure

After informed consent, participants completed a version of the categorization task described above. For reasons that are irrelevant to current concerns, participants then viewed emotional slides and performed one of several RT tasks while watching these slides. Finally, they completed several questionnaires described below. Experimental sessions consisted of one participant at a time.

Measures

Self-report. Diener et al. (1999) have shown that there are three overlapping but partially independent components of SWB: positive affect, negative affect, and life satisfaction. In the present study, we sought to

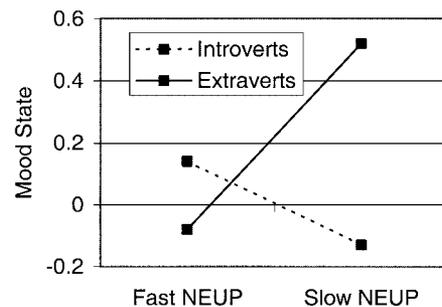


Figure 1. Extraversion and categorization performance as predictors of mood state, Study 1. NEUP = neutral versus positive residualized speed measure.

measure all three components. Specifically, we asked participants to report on their experience of positive and negative affect during the “past few weeks” using the Positive and Negative Affect Schedule (PANAS) scales (Watson, Clark, & Tellegen, 1988). Furthermore, we asked them to report on their satisfaction with their lives as a whole using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Finally, they completed International Personality Item Pool’s (2002) 10-item Extraversion Scale. Alphas were .88, .76, .79, and .92 for Positive Affect (PA), Negative Affect (NA), SWLS, and extraversion, respectively.

Categorization. The categorization task was quite similar to the one used in Study 1, with several minor differences. Specifically, we (a) chose 7 of the 12 words from each of the four categories (i.e., neutral, positive, not animal, and animal), (b) omitted the 16-trial practice blocks, and (c) presented 44 (rather than 30) trials in the target blocks. As in Study 1, outliers (< 0.3 s or > 3.0 s) were replaced (0.7%), times were log transformed, and means were taken across the two blocks. As in Study 1, those who were fast at the neutral/positive block were also more accurate ($r = -.38, p = .00$), indicating that there was no speed–accuracy tradeoff. Accuracy rates were 96% and 98% for the neutral/positive and not animal/animal blocks. Residualized NEUP scores were created as in Study 1. Also as in Study 1, extraversion and NEUP were uncorrelated ($r = .10, p = .41$).

Results

Mood

As in Study 1, mood scores were examined as a function of extraversion, NEUP, and the interaction of these two variables. Because we expected opposite Extraversion \times NEUP interactions pertaining to PA and NA, we analyzed mood scores using the general linear model procedures of SAS 8.1 (SAS Institute, 2000). In this analysis, we treated mood type (PA vs. NA) as a within-subject repeated measure, with extraversion, NEUP, and their interaction as continuous between-subjects variables. The intensity of the mood state was the dependent measure. Among the possible two-way interactions, there was no significant NEUP \times Mood Type interaction, $F(1, 68) = 1.00, p = .32$. By contrast, there was a significant Extraversion \times Mood Type interaction, $F(1, 68) = 6.98, p = .01$, reflecting the fact that extraverts reported more PA and less NA than introverts.

More important, however, was the significant Extraversion \times NEUP \times Mood Type interaction, $F(1, 68) = 5.17, p = .03$. To understand the nature of this interaction, we computed estimated means based on the regression equations for PA and NA. The relevant means, depicted in Figure 2, indicate support for our trait-as-default theory. Specifically, in each case, the effect for extraversion on mood state was considerably stronger among individuals who were slow to distinguish neutral and positive events. By contrast, effects for extraversion were absent among those fast to make this distinction.

Life Satisfaction

SWLS scores were obtained by averaging over items. In predicting SWLS, we entered extraversion, NEUP, and their interaction, into a multiple regression (Aiken & West, 1991). There was no main effect for extraversion ($\beta = .16, p = .18$). There was, however, a main effect for NEUP ($\beta = -.29, p = .02$), such that those fast to distinguish neutral and positive events were more satisfied with their lives. More important, the Extraversion \times NEUP interaction was also significant ($\beta = .23, p = .05$). As

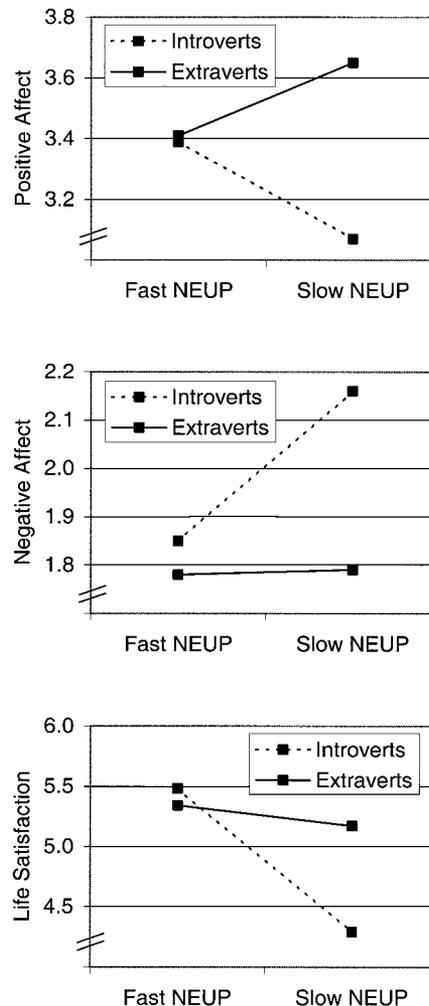


Figure 2. Extraversion and categorization performance as predictors of positive affect (top panel), negative affect (middle panel), and life satisfaction (bottom panel), Study 2. NEUP = neutral versus positive residualized speed measure.

indicated by the means shown in Figure 2 (bottom panel), extraversion predicted SWLS only among individuals who were slow to distinguish neutral and positive events.

Discussion

Study 2 provided further confirmation of the trait-as-default theory pursued in this article. Whereas Study 1 involved a momentary rating of mood state, Study 2 asked participants to rate their mood during the previous week. Additionally, whereas Study 1 involved a bipolar measure of mood, Study 2 used mood scales that allowed us to disentangle positive and negative affect. Regardless of these variations, the same pattern was found across both positive and negative affect scales. Specifically, among participants fast to distinguish neutral and positive events, extraversion did not predict mood states, either those associated with positive affect or those associated with negative affect. By contrast, extraversion predicted both types of affect among those who

were slow to distinguish neutral and positive events. Study 2 also included a measure of life satisfaction, and it too revealed the same interaction: Extraversion predicted life satisfaction among those who were slow to distinguish neutral and positive events but not among those quick to do so. In total, the data offer consistent support for our hypotheses.

Study 3

A weakness of both Studies 1 and 2 is that all measures were obtained during one laboratory session. This makes it possible that the interaction was state dependent to a certain extent. In Study 3, therefore, we sought further, more convincing evidence for the dispositional nature of the Extraversion \times NEUP interaction.

Method

Participants

Participants were 50 undergraduates from the University of Illinois. As part of a course requirement, they completed labs every week. The data reported below were collected during these labs.

Procedure

Participants completed a lab every week of the semester-long course. Most of the weeks involved questionnaires and were completed within a classroom setting. The extraversion and mood scores discussed below came from these regular lab sessions. During a session approximately in the middle of the semester, however, participants were asked to sign up for a computer session, during which we assessed their NEUP discrimination abilities. The computer-based lab was conducted in small groups.

Measures

Self-report. During labs, participants completed three different mood questionnaires more than once each during the semester. Each questionnaire involved a different set of items and response scales. They were also completed during different laboratory sessions spanning the semester. For these reasons, each questionnaire was treated separately in analyses.

The first type of mood questionnaire, completed six times during the semester, asked participants to estimate the percentage of time (from 1 = 0% to 8 = 100%) that they experienced each of 60 affect terms (e.g., *distressed*, *pleasant*) during a "typical" day. The second type of mood questionnaire, completed four times during the semester, was the PANAS (Watson et al., 1988) paired with trait (i.e., "in general") instructions. The third type of mood questionnaire, also completed four times during the semester, included 18 terms (e.g., *calm*, *tense*) and asked about momentary mood states (1 = *do not feel it*, 4 = *feel it strongly*). Thus, whereas the first two types of questionnaires were based on a trait-reporting format, the third was based on mood states at the time of reporting.

For each questionnaire type separately, we computed two scale scores, one for PA and one for NA. All items were included in one of the two scales. Alphas ranged from .78 to .96; thus, all scale scores demonstrated adequate internal reliability. Because participants responded to each questionnaire type multiple times, we also examined test-retest coefficients. The average test-retest correlations were .44, .70, and .71 for PA (questionnaire Types 1, 2, and 3, respectively) and .30, .61, and .59 for NA (questionnaire Types 1, 2, and 3, respectively). The fact that all correlations were positive encouraged us to average across occasions of measurement to create six mood scores for each participant (PA vs. NA by questionnaire type). Averaging insured that missing occasions (only 3%) did not affect mood scores. Correlations between PA and NA were $-.72$, $-.17$, and $-.30$ for questionnaire Types 1, 2, and 3, respectively. Correlations among

PA scores averaged .71, whereas correlations among NA scores averaged .70. Once during the semester, participants completed the same 10-item Extraversion Scale (International Personality Item Pool, 2002) used in Studies 1 and 2 ($\alpha = .90$).

Categorization. The categorization task used in Study 3 was, for all practical purposes, the same as the one used in Study 1. For example, the words were the same, and there were practice blocks of 16 trials and target blocks of 30 trials. Also as in Study 1, accuracy rates were slightly higher for the not animal/animal block ($M = 97%$) than for the neutral/positive one ($M = 91%$). As in both prior studies, particularly short (< 0.3 s) or long (> 3.0 s) RTs were replaced (1.0% of RTs). Unlike in the prior studies, there was no correlation between neutral/positive block speed and neutral/positive accuracy ($r = .19$, $p = .17$).

As in the prior studies, we created residualized NEUP scores by removing the shared variance between neutral/positive and not animal/animal block speed. As in the prior studies, extraversion and NEUP were uncorrelated ($r = -.14$, $p = .35$).

Results

To determine whether extraversion and NEUP interact in predicting people's mood states over time, we z scored both extraversion and NEUP and then computed an interaction term. As in Study 2, we used the general linear model procedures of SAS, which allowed us to include both (a) continuous between-subjects variables (extraversion, NEUP, and their interaction) and (b) a within-subject variable of mood type (PA vs. NA). The intensity of the relevant experience (either PA or NA) was the dependent measure. We performed three separate analyses, one for each questionnaire type.

In the analyses involving questionnaire Type 2, $F(1, 46) = 22.64$, $p = .00$, and Type 3, $F(1, 46) = 12.51$, $p = .00$, there was an Extraversion \times Mood Type interaction reflecting the fact that extraverts, relative to introverts, reported more PA and less NA. However, this interaction was not replicated in the analysis involving questionnaire Type 1, $F(1, 46) = 2.10$, $p = .15$. There was no Mood Type \times NEUP interaction for any of the questionnaire types (all $ps > .15$). Finally, the critical Mood Type \times Extraversion \times NEUP interaction was significant in all analyses: $F(1, 46) = 4.87$, $p = .03$, for questionnaire Type 1; $F(1, 46) = 7.68$, $p = .01$, for questionnaire Type 2; and $F(1, 46) = 9.54$, $p = .00$, for questionnaire Type 3.

To determine the nature of the three-way interactions, we used regression equations to estimate predicted PA and NA scores for all four groups created by crossing extraversion (introverts = -1 SD; extraverts = $+1$ SD) with NEUP (fast = -1 SD; slow = $+1$ SD). The relevant means indicate similar patterns across all questionnaire types. Consistent with trait-as-default theory, the tendency for extraverts (relative to introverts) to report more PA and less NA occurred only among those slow to distinguish neutral and positive information. Because means for all three interactions show a similar pattern, Figure 3 presents the means for questionnaire Type 3 exclusively.

Discussion

There were several aspects of Study 3 that provide a strong test of our hypotheses. Extraversion, NEUP, and mood scores were all obtained in different sessions. This rules out interpretations of the interaction in terms of order effects or state dependence. In addition, we obtained both state and trait mood ratings and averaged

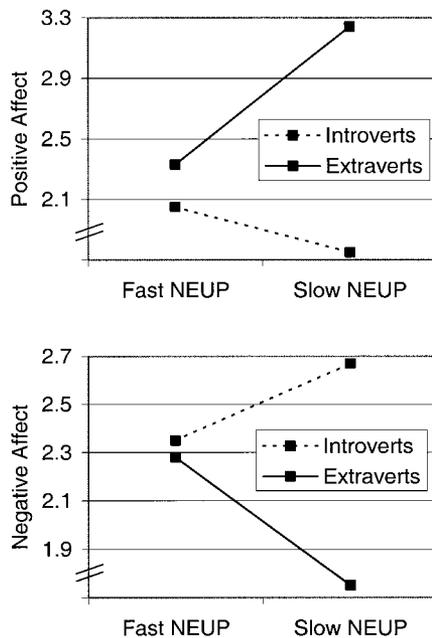


Figure 3. Extraversion and categorization performance as predictors of positive affect (top panel) and negative affect (bottom panel), Study 3. NEUP = neutral versus positive residualized speed measure.

scale scores across multiple occasions. Thus, there can be little doubt that we obtained a relatively comprehensive picture of our participants' mood states, at least during the semester that they were in the class. As in Studies 1 and 2, the tendency for extraverts to report more PA and less NA than introverts was only true for those who were slow in distinguishing neutral and positive events. Having fairly convincing evidence for the robust nature of the interaction, we turned to examining the test-retest stability of NEUP in Study 4.

Study 4

Method

Participants

Participants were 93 undergraduates from the University of Illinois who received course credit.

Procedure

Participants were informed that the study involved multiple sessions and that they should only complete the Time 1 tasks if they planned to come back for Time 2. Time 1 sessions involved 2–6 participants working individually on computers. After a couple of unrelated computer tasks (e.g., lexical decision), we measured neutral versus positive discrimination abilities. Following the computer tasks, participants rated their satisfaction with life domains and then completed a measure of extraversion. One month later, participants were asked to return to complete a Time 2 session. Of the 104 participants who completed the Time 1 session, 93 returned. The Time 2 session was identical to the Time 1 session except that we did not ask for extraversion ratings again.

Measures

Self-report. Our primary purpose in this study was to examine the test-retest stability of NEUP (as well as other implicit measures not reported here). However, we did ask participants during both sessions to rate their satisfaction with 10 life domains (e.g., classes, friends) during the previous week. They did so on a 6-point scale (1 = *very dissatisfied*, 6 = *very satisfied*). We created a life satisfaction score by averaging over the domains. The internal reliability of the domain satisfaction scale was high (Cronbach's $\alpha = .92$ at Time 1 and $.90$ at Time 2). Because the measure also displayed adequate test-retest stability ($r = .63$, $p = .00$), we took a mean across Time 1 and 2 ratings. Participants at Time 1 but not Time 2 also completed the International Personality Item Pool's (2002) 10-item Extraversion Scale ($\alpha = .85$).

Categorization. Neutral and positive words were the same 24 used in Study 1. As in Study 1, we included practice blocks of 16 trials, in this case followed by target blocks of 35 (rather than 30) trials. Collapsing across sessions, mean accuracy was 97% for the not animal/animal block and 95% for the neutral/positive block. As in the other studies, RTs shorter than 0.3 s or longer than 3.0 s were replaced with these values (0.6% of trials across sessions). Times were then log transformed and averaged within blocks. Participants who were fast at distinguishing neutral and positive events tended to be more accurate as well ($r = -.22$, $p = .02$ in Session 1 and $r = -.08$, $p = .42$ in Session 2). Residualized NEUP scores were created by removing the variance common to speed on the neutral/positive and not animal/animal blocks. As in prior studies, extraversion and NEUP were uncorrelated ($r = -.07$, $p = .52$ for Session 1 NEUP scores and $r = -.02$, $p = .87$ for Session 2 NEUP scores).

Results

NEUP Stability

Participants completed the NEUP task at two times separated by over a month. Given issues centered on the variability of individual RTs and practice effects on categorization, we were pleased to discover that the test-retest stability of NEUP was moderate ($r = .47$, $p = .00$). This result, like those reported in this article, point to the viability of a choice RT approach to personality. In addition to examining the test-retest stability of NEUP, we also examined the stability of the interaction term that we have been reporting in this article. As expected, the test-retest stability of this Extraversion \times NEUP interaction term was also moderate ($r = .44$, $p = .00$).

Domain Satisfaction

As noted above, domain satisfaction scores were averaged across two reports separated by a month. Thus, we get a fairly good idea of the person's typical (self-reported) satisfaction with his or her life. To determine whether the same Extraversion \times NEUP interaction pattern was significant, we ran three parallel analyses, one involving Time 1 NEUP scores, one involving Time 2 NEUP scores, and one involving NEUP scores that were averaged across the two sessions. In each analysis, there was a main effect for extraversion ($\beta = .21$, $.30$, and $.25$, $ps = .03$, $.01$, and $.01$ for analysis with Time 1 NEUP, Time 2 NEUP, and overall NEUP scores, respectively). In each analysis, there was no main effect for NEUP ($\beta = .09$, $-.01$, and $.03$, $ps = .32$, $.95$, and $.72$).

Of most importance, the Extraversion \times NEUP interaction was significant in each analysis ($\beta = .33$, $p = .00$ for Session 1 NEUP scores; $\beta = .26$, $p = .01$ for Session 2 NEUP scores; and $\beta = .33$,

$p = .00$ for average NEUP scores). Predicted means were obtained as described in prior studies. As in prior studies, extraverts (vs. introverts) reported higher SWB only if they were slow on the NEUP task. Because the interactions show the same pattern regardless of whether Time 1, Time 2, or combined NEUP scores are used, Figure 4 depicts the means resulting from the analysis involving combined (i.e., averaged) NEUP scores.

Discussion

Implicit measures are routinely less stable than explicit measures (Bornstein, 1999; McClelland, 1987). There may be several reasons for this lower stability. First, individual trials in implicit tests are often more variable, and thus less stable, than individual items within self-report tests (Buchner & Wippich, 2000). Second, there is evidence, at least with implicit measures of motivation, that participants feel compelled to give different answers on test and retest (McClelland, 1987). Third, implicit tests may be less stable because they are more influenced by transitory but relevant factors than explicit tests, a quality that is typically ascribed to the greater validity rather than the greater invalidity of implicit (vs. explicit) tests (Dasgupta & Greenwald, 2001; McClelland, 1987). And fourth, face-valid (i.e., explicit) tests may be higher in reliability because these tests activate relatively stable belief systems (Bornstein, 1999; Knowles & Byers, 1996). The latter two factors, in particular, suggest that implicit tests may be more valid than they are reliable, whereas the opposite may be true of explicit tests (Bornstein, 1999; McClelland, 1987).

Although we should not expect implicit measures of personality to be as stable as explicit measures, we should still expect at least a moderate degree of stability (Robinson et al., 2003). The NEUP measure was moderately stable over a 1-month period ($r = .47$), as was the Extraversion \times NEUP interaction ($r = .44$). These coefficients are higher than those typically obtained for implicit memory as assessed by fragment completions (Buchner & Wippich, 2000). They are also higher than those typically obtained on the Thematic Apperception Test (a test of motivation; McClelland, 1987). They are comparable to recent test-retest correlations reported for priming-based measures of implicit prejudice (Kawakami & Dovidio, 2001). However, they are somewhat lower than those reported for the implicit association test (Greenwald & Nosek, 2001).

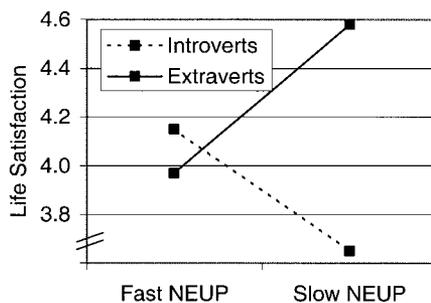


Figure 4. Extraversion and categorization performance as predictors of life satisfaction, Study 4. NEUP = neutral versus positive residualized speed measure.

It is feasible that the stability of categorization measures of personality could be increased by the addition of more target trials. This said, however, it is worth noting that Kelly (1963) viewed personal constructs as both trait and state. That is, categorization tendencies are in part habit and in part a construction based on recent events and considerations. They are modifiable, perhaps unlike personality traits (McCrae & Costa, 1994). If so, moderate rather than large stability coefficients are desirable. A comparison to SWB measures may be apt, because these too should reflect both trait and state factors, leading to moderate, rather than large, stability coefficients (Pavot & Diener, 1993).

Finally, Study 4 again demonstrates the same type of Extraversion \times NEUP interaction also reported in Studies 1–3. Specifically, extraversion predicted SWLS domains only among individuals slow to distinguish neutral and positive events. The effect for extraversion was diminished, indeed eliminated, among individuals who were fast to make this distinction. Both test and retest NEUP scores interacted with extraversion, attesting to the robust nature of the interaction.

General Discussion

Summary of Studies

Our article was motivated by two theoretical goals. One, we sought to develop a method for assessing the use of habitual distinctions in appraisal (Kelly, 1963). We reasoned that the distinction between neutral and positive events is an important one for SWB and also reasoned that the habitual use of this dimension could be measured by choice RT. Two, we sought to extend our understanding of the relationship between emotional traits and emotional states. Previous work has suggested that emotional traits might profitably be viewed as beliefs about oneself and one's emotions (Robinson & Clore, 2002a) that are used as a default when event-specific emotion knowledge is lacking (Robinson & Clore, 2002b). In combining these two theoretical goals, we expected extraversion to predict SWB, particularly among individuals slow to distinguish neutral and positive events, consistent with their generalized beliefs about themselves. By contrast, we expected extraversion to predict SWB to a lesser extent among individuals quick to distinguish neutral and positive events, consistent with their tendency to appreciate both neutral and positive events at encoding.

Four studies assessed our hypotheses. Study 1, using a bipolar measure of mood state in the laboratory, revealed the expected Extraversion \times NEUP interaction. Individuals fast on the NEUP task, regardless of whether they were introverted or extraverted, reported moderate levels of happiness. Individuals slow on the NEUP task reported levels of happiness that were consistent with their trait self-knowledge; in other words, extraverts reported greater happiness than introverts. Study 2 extended our analysis by showing that the same Extraversion \times NEUP interaction characterizes mood states over a longer time frame (i.e., "past few weeks") and does so both for markers of PA (e.g., "enthusiastic") and for markers of NA (e.g., "irritable"). Study 3 demonstrates that the same Extraversion \times NEUP interaction can predict mood states even when NEUP and mood states are separated in time. Study 3 also shows that extraversion and NEUP interacted in predicting mood states over the course of an entire semester.

Studies 2 and 4 provide evidence that the same interaction characterizes life satisfaction, a more cognitive facet of SWB. Study 4, finally, shows that NEUP discrimination abilities had a moderate test–retest stability over a 1-month time period. In sum, we are able to offer robust evidence for the idea that the extraversion–SWB relation is diminished among individuals fast to distinguish neutral and positive events and enhanced among individuals slow to make this distinction.

Implications for Understanding the Extraversion–SWB Relation

Current views of the extraversion–SWB relation emphasize the potential temperamental factors that may explain it (e.g., Depue & Collins, 1999; Lucas & Diener, 2001; Zelenski & Larsen, 1999). For example, authors have assumed that extraversion measures the strength of the behavioral activation or reward sensitivity system, a neurological system that may involve mesolimbic dopaminergic pathways and be associated with goal pursuit (Gray, 1991). One problem with such an explanation for the extraversion–SWB relation is that the putative neurological mediators are difficult to isolate and quantify, at least in humans (Depue & Collins, 1999; Matthews & Gilliland, 1999). In lieu of such evidence, all we really know is that extraverts are generally happier than introverts (McCrae & Costa, 1991) and that they are also more reactive to positive events than introverts (Zelenski & Larsen, 1999). These findings may be consistent with a temperamental explanation of the extraversion–SWB relation, but they may be consistent with other mechanisms as well.

Recent work (Robinson & Clore, 2002a, 2002b; Robinson et al., 2003; Tamir et al., 2002) has pursued a different explanation for the correlates of emotion-related traits. It is important to realize that trait scales ask individuals to make generalizations about themselves without specifying a distinct context or time frame. Such factors make it particularly likely that when people report on their emotion-related traits, they access beliefs about their emotions or semantic emotion knowledge. Like semantic knowledge more generally, trait self-knowledge is nonexperiential, symbolic, tightly organized, and protected from interference and forgetting (Tulving, 1984). Emotional experience, by contrast, is a form of episodic emotion knowledge that is experiential, time dependent, and loosely organized (Robinson & Clore, 2002b).

The distinction between episodic and semantic emotion knowledge makes it possible to explain why retrospective reports of emotion tend to be more consistent with emotion-related beliefs than online reports typically are (Robinson & Clore, 2002a). More generally, the research cited above proposed three principles that are highly relevant to the current predictions. One, it proposed that people prefer to base their SWB judgments on episodic emotion knowledge. For this reason, if both episodic and semantic knowledge are accessible and relevant to the judgment at hand, the person will favor the episodic knowledge. Two, it proposed that certain judgment contexts (e.g., retrospective reports) render it likely that the person will lack sufficient episodic knowledge to make the judgment at hand on this basis. And three, it proposed that, lacking sufficient episodic knowledge for the judgment at hand, people will default to semantic emotion knowledge. That is, they will report on their beliefs about their emotions rather than on their feelings themselves.

According to this model (Robinson & Clore, 2002a), any factor that lessens the diagnostic value of episodic emotion knowledge should render it more likely that the person will access semantic emotion knowledge instead. Conceived in these terms, the NEUP task used in the current study was intentionally designed to investigate people's ability to make episodic distinctions (between neutral and positive events) that should be highly relevant to SWB. As such, fast individuals derive hedonically useful information from life events. By contrast, slow individuals derive less hedonically useful information from life events. For these slow individuals, but not for the fast individuals, trait self-knowledge must be accessed to fill in the details. Accordingly, extraversion predicts SWB better for individuals slow at the NEUP task than for individuals fast at the NEUP task.

The findings, in sum, suggest that beliefs about emotion are a plausible mechanism for the extraversion–SWB relation. This idea, in itself, is not unprecedented. Others too have proposed that the extraversion–SWB relation may be affected by a common source of knowledge (usually item overlap or social desirability) that affects both variables, thereby raising the size of the correlation (e.g., Fossum & Feldman Barrett, 2000). What is new to this report is the way of testing these ideas. By assessing habitual distinctions, we were able to separate those individuals who seemed to be basing their SWB judgments on their trait self-knowledge (i.e., slow individuals) from those who did not (i.e., fast individuals).

Beyond suggesting a plausible mechanism for the extraversion–SWB relation (namely, trait self-knowledge), our results raise some intriguing questions about this relationship as well. Measures of extraversion and SWB are both based on self-report. Although self-report is potentially the best way to learn about a person's subjective experiences (e.g., Watson, 2000), there are also a number of problems with self-reports of emotion, as has been noted by multiple authors (Kihlstrom, Mulvaney, Tobias, & Tobis, 2000; Shedler, Mayman, & Manis, 1993). One important issue is the lack of an objective, physiological criterion against which to validate self-reports of subjective experience (Lang, 1994). Given such a situation, there is no guarantee that self-reports of emotion accurately reflect experience, even when they are concurrent with that experience (Kihlstrom et al., 2000). Viewed in this light, it is reasonable to wonder if the extraversion–SWB relation in fact reflects differences in subjective experience. Indeed, our trait-as-default model could be interpreted to suggest that the relation is due to nonexperiential (i.e., belief-based) rather than experiential sources, especially in light of the data reported here. However, we do not wish to push this suggestion too strongly at the present time. Instead, for now it is useful to note that the findings contribute to a growing body of evidence for the trait-as-belief perspective on the influence of emotional traits on SWB and behavior (Christensen et al., 2003; Feldman Barrett, 1997; Robinson & Clore, 2002a; Swann & Schroeder, 1995; Tamir et al., 2002).

Evaluating Kelly's Theory

The results of our investigation are both consistent and inconsistent with Kelly's (1963) theory. On the one hand, it is clear that participants quick to make the distinction appreciate both neutral events and positive events. In this connection, if the variance in the categorization task was primarily due to the ability to recognize

neutral events, we might have expected fast NEUP participants to report less SWB than slow participants; by contrast, we might have expected the opposite if categorization performance primarily reflected the ability to recognize positive events. Instead, there was typically no main effect for NEUP performance. Rather, fast participants tended to report moderate levels of SWB, consistent with the idea that these participants appreciate that some, but not all, events are hedonically irrelevant, whereas some, but not all, events are causes for celebration. In sum, the results support Kelly's idea that habitual categorization tendencies reflect distinctions in the phenomenal field rather than the use of particular (e.g., positive events) categories.

On the other hand, our results suggest several qualifications of Kelly's (1963) theory. Whereas Kelly felt that the distinctions typically made (vs. not made) by the person were more diagnostic of a person's personality, our results suggest that the distinctions typically not made by the person are equally, if not more, diagnostic of personality. In this respect, the lowest and highest levels of SWB were fairly consistently observed among those who were slow to distinguish neutral and positive events. Such results are somewhat consistent with the observation that the most extreme forms of personality (e.g., personality disorders, psychopathology) may reflect inflexible routines for categorizing new situations and events (Ellis, 1973; Epstein, 1973).

Additionally, our results clearly suggest that a study of the person in terms of categorization tendencies cannot replace a study of the person in terms of traits. Indeed, if we had measured only speed on the NEUP task, we would have been very discouraged because there were relatively few main effects of NEUP performance in predicting SWB. Rather, NEUP performance interacted with extraversion in a robust manner. This interaction was predicted by our personality-as-belief model that ascribes a fill-in role to trait self-knowledge when relevant event-specific information is missing (Robinson & Clore, 2002a). In sum, we suggest that the development of implicit ways of studying personality will not replace explicit (i.e., self-report) ways of studying personality. Rather, traits and processing tendencies give us unique, and often interacting, assessments of individual differences (Robinson et al., 2003).

Conclusions

Past research has indicated that there are both bottom-up (i.e., from events) and top-down (i.e., from traits) contributions to mood states (Robinson, 2000) as well as SWB more generally (Diener et al., 1999). Our findings suggest that people differ in the strength of these alternative inputs to SWB: Among those capable of rapidly distinguishing neutral and positive events, top-down influences from extraversion played a relatively small role in predicting SWB; by contrast, among those incapable of making such distinctions quickly, extraversion was a much stronger predictor of SWB. The findings provide insight into the mechanisms underlying the extraversion-SWB relation. More broadly, they point to the viability of a trait-as-belief approach to traits and a personality-as-categorization approach to appraisal.

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