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The Relationship between Extraversion and Happiness: A Day Reconstruction Study

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Abstract

A known link between extraversion and happiness has existed for decades. While this relationship is largely not understood, several theories have emerged recently to help explain this link. R.E. Lucas and E. Diener (2001) have recently argued that extraverts may be more sensitive to rewarding social situations than introverts, and that this may manifest itself as greater feelings of happiness by extraverts. Additionally, Pavot, Diener, and Fujita (1990) suggested that extraverts and introverts both enjoy social situations, though extraverts select more social situations, resulting in greater happiness. In the present study, the Day Reconstruction Method (Kahneman, 2003) was utilized to test both the reward-sensitivity hypothesis as well as the situation-selection hypothesis. Data from a sample of 109 respondents were used to test the 2 hypotheses with a repeated measure of happiness on multiple reconstructed episodes. The results clearly show support for the situation-selection hypothesis with no significant support for reward-sensitivity.

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Features of Extraversion

In an effort to uncover the primary components of personality, an expansive body of research has formed using primarily large sets of adjectives or questionnaire items from numerous personality inventories. These studies have frequently converged to reveal evidence of five broad dimensions of personality, now defined in the Big Five model of personality (Goldberg, 1990; John, 1989). However, despite the general agreement on the presence of five dimensions, there is still disparity with regard to the features defining these personality dimensions (Hofstee, de Raad, & Goldberg, 1992).

The dimension of Extraversion has a long history in research, and the essential features comprising it have evolved over the years, though the defining feature of extraverts as being sociable has generally remained intact. When Jung (1921) first coined the term *extraverted*, individuals with this personality type were described as friendly and accessible people who are on good terms with the world. More recently, the facets of extraversion have been adjusted to include gregariousness, warmth, assertiveness, activity, excitement seeking, and happiness, which all still reflect one's aptitude and tendency toward being sociable (Costa & McCrae, 1992). In a related theory of extraversion proposed by Eysenck (1981), arousal is considered a key facet of extraversion in that extraverts are motivated to engage in stimulating social activities because of their inherent underarousal. By contrast, introverts are disinclined to engage in stimulating social activities either because such actions are unnecessary or may cause introverts to quickly become over-stimulated. While the facets of extraversion may vary

slightly amongst different theories, the most agreed upon feature of extraversion is the tendency to be sociable, and therefore to consider social situations as being pleasurable.

Links between extraversion and happiness

In addition to sociability, prior studies into extraversion have consistently found evidence of a strong relationship between extraversion and happiness. In an early study, Watson (1937, as cited in Lucas & Diener, 2001) discovered that social relations and feelings of sociability were correlated with admissions of happiness. Later, researchers proposed that affect (positive and negative) are not opposite poles of one facet, but rather are independent, and that pleasant affect correlates more strongly with social activities than does unpleasant affect with social activities (Bradburn, 1969). Additional research has found evidence of a positive relationship between extraversion and happiness, whereas negative affect was more strongly correlated with neuroticism (Costa & McCrae, 1980).

Reward-Sensitivity Model

In an effort to more fully explicate the relationship between extraversion and happiness, several studies have emerged, and multiple theories have been proposed. One theory proposed by Gray (1981, 1991) suggests that extraverts are more sensitive to rewarding stimuli (social and not) than introverts. In this theory, an individual's Behavioral Activation System (BAS) informs their reaction to conditioned rewards and non-punitive stimulus, and similarly the Behavioral Inhibition System (BIS) informs an individual's reaction to conditioned punishment and non-rewarding stimulus. According to Gray, the greater happiness reported by extraverts may be due to a higher sensitivity to rewarding stimuli and a stronger BAS pattern in extraverts than introverts. Gray further

asserts that the increased sensitivity to rewarding stimuli may in turn result in the higher levels of happiness reported by extraverts. Some support for Gray's theory was found in a study by Larsen and Rusting (1997) in which extraverts were shown to react to positive emotional stimuli in different ways than introverts. In response to unpleasant emotional stimuli, there was no significant difference between extraverts and introverts.

Furthermore, Derryberry & Reed (1994) have shown extraverts to be more sensitive to positive stimuli than introverts. Their study also showed that when subjects willfully shifted their attention away from positive stimuli, extraverts delayed longer than introverts.

In order to test the reward-sensitivity theory of extraversion, Lucas and Diener (2001) proposed that a careful examination of both social and solitary situations which extraverts and introverts both deem pleasant, is necessary. Lucas and Diener suggested that some of the best methodologies available for studying situational choices and their corresponding affective experiences in real world conditions are experience sampling methods, while other methods such as hypothetical situational choice inventories may be used in the lab. In two such studies on situation choice, Emmons, Diener, and Larsen (1986; Diener, Larsen, & Emmons, 1984, a cited in Lucas, Diener, 2001) discovered a relationship between degree of extraversion and time spent in social activities. However, few studies in the past have focused on how pleasant and unpleasant situations, both social and solitary, relate to extraversion. In hopes of bridging this gap, Lucas and Diener (2001) used pencil-and-paper inventories of a large number of situations, many of which came from the subject's life, in order to test the hypothesis that reward sensitivity and happiness together comprise the main features of extraversion. The study found that

extraverts rated social and solitary situations more positively than introverts only when situations were pleasant. Also, in one of the studies most interesting findings, cases where situations were unpleasant, there was no significant difference in the ratings reported by extraverts and introverts. In other words, extraverts are only happier than introverts when there is something positive about which to be happy.

Situation-Selection Model

Although, another theory already exists that may provide the best explanation for the relationship between extraversion and happiness. Pavot, Diener, and Fujita (1990) proposed that social activities increase happiness in both extraverts as well as introverts. However, by virtue of a predisposition in extraverts to seek social activities, they are more likely to report greater happiness due to more frequent episodes of participation in social activities, when compared to introverts. According to this situation-selection theory, participation in social situations mediates the relationship between extraversion and happiness. Therefore, social situations make both introverts and extraverts happy, though extraverts seek these social situations significantly more often than introverts. There is further support for this theory in that social activity has been found to increase positive affect in both introverts as well as extraverts (Clark & Watson, 1988). Other studies have also shown that extraverts do indeed participate in social activities more often than introverts (Lucas, 2000). Conversely, Pavot et al. (1990) found evidence in a daily-diary study which suggested that extraverts were roughly equal to introverts in the amount of time spent participating in social activities. The study further found that extraverts still experienced higher positive affect than introverts even when excluding the presence of others.

This model of extraversion, although different from the BAS suggested by Gray (1981, 1991), is not a competing model and may in fact serve as a complementary theory. According to Gray's theory, extraverts demonstrate a stronger behavioral activation in response to rewarding stimulus than do introverts. Thus, extraverts might be more prone to not only experience more happiness from rewarding social situations, but should also be expected to seek rewarding social situations more often than introverts due to the stronger BAS found in extraverts. In other words, Gray's theory positions reward sensitivity as a main feature of extraversion whereby happiness may be manifested in response to rewarding social situations. As a result, extraverts may seek social situations more than introverts simply due to the fact that social situations can offer more rewarding stimuli than non-social situations (Pavot et al., 1990). By offering an explanation for the cause of greater happiness in extraverts, this theory allows a more complete model of extraversion to coalesce.

The Present Study

The available evidence shows that extraverts report more feelings of happiness than introverts. Currently, two of the most viable theories to explain this relationship are the reward-sensitivity theory proposed by Gray (1991), and the situation-selection theory proposed by Pavot, Diener, and Fujita (1990). Our particular interest in the present study is to assess these two theories using a daily-diary type methodology with real world situations extracted from the subject's own life. Considering the expense and time required for most experience sampling methods, our study will utilize the more efficient Day Reconstruction Method (DRM) recently developed by Kahneman et al. (2004). The advantage of this method is that it is able to assess where people devote their time and

how they experience the numerous events of their lives, while combining attributes of experience sampling methods with time-budget measurements (Kahneman et al., 2004). With this method, subjects create a diary of their previous day, and systematically reconstruct the day into multiple detailed episodes in a way that reduces recall biases. Kahneman has further shown that the DRM has a low risk of retrospection biases by comparing the method with real-time experience sampling studies. In these comparisons, no appreciable difference in reporting norms could be detected, thereby supporting the effectiveness of the DRM as an acceptable substitute for other experience sampling methods. By using the DRM in this study, we will be able to assess how reward-sensitivity and situation-selection affects the correlation between extraversion and experienced happiness in the actual lives of subjects.

In this study, we will investigate both the situation-selection and reward-sensitivity hypotheses not as competing models, but rather as potentially complementary theories. The situation-selection hypothesis will represent the first hypothesis of our study. In testing the situation-selection hypothesis, it is necessary to restructure the mediation model into smaller predictions. The first prediction is that extraversion is a positive predictor of reported happiness. Second, extraverts will select and participate in social situations (with at least one other) more frequently than introverts. And third, that social situations are a positive predictor of reported happiness. In order for the situation-selection theory to be supported, all three of these predictions will likewise need to be confirmed. Finally, the reward-sensitivity hypothesis will comprise the second hypothesis of our study. In this hypothesis we predict that extraverts will report greater

experienced happiness than introverts in leisure activities, both social and solitary as originally found by Lucas and Diener (2001).

Methods

Participants and Procedure

The present study examined data from 75 female and 34 male participants ($N = 109$). The participant ages ranged from 18 to 55 years, with a mean age of 19.8 years. The ethnic and racial composition of this sample was 1% American Indian/Native Alaskan, 1% Pacific Islander, 2% African American, 13% Asian, 83% Caucasian, and 6% Other. All participants were students at the University of Oregon enrolled in a research pool. In compensation for their participation in the present study, subjects were awarded research credits.

The study was run in a single room with up to eight participants per session. Two hours were allowed for each session, although participants typically completed the study in one hour and thirty minutes. Upon arrival, participants were given a subject consent form and four envelopes containing questionnaires. Participants were asked to construct a short diary of the previous day: “Think of your day as a continuous series of scenes or episodes in a film. Give each episode a brief name that will help you remember it (for example, “commuting to work”, or “at lunch with B”, where B is a person or a group of people). Write down the approximate times at which each episode began and ended. The episodes people identify usually last between 15 minutes and 2 hours. Indications of the end of an episode might be going to a different location, ending one activity and starting another, or a change in the people you are interacting with.” Participants then answered structured questions about each episode: Time duration, what they were doing (checked

from a list of activities), if they were interacting with others, with whom they were interacting (checked from list), how they were interacting, and how they felt during episode (12 affect descriptors). Finally, participants completed a personality questionnaire and answered demographic information.

Independent Measure

Extraversion. Extraversion was measured with the Big Five Inventory (BFI) extraversion subscale (John & Srivastava, 1999). The BFI is a 45-item self-report measure of personality. For example, some items from the BFI extraversion subscale include “Is talkative” and “Is outgoing, sociable.” Responses were made on a 5-point Likert scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

Repeated Measures

Social versus non-social situations. Social and non-social situations were assessed in individual episodes from the previous day with a single item per episode. This item asked participants “Were you interacting with anyone?” Participants responded on a 3-point scale with 1 (*No Others*), 2 (*One Other*), and 3 (*Multiple Others*).

Leisure versus work activities. For each episode, activity type was assessed using a multi-item activity list (Kahneman, 2003). Items were scored into “leisure” and “work” for the present study. A sample of leisure activities includes “Socializing” and “Relaxing.” Some work activities include “Attending class” and “Working at a job.”

Happiness. Participant happiness was assessed for each episode using one item. The item asked participants to rate their feeling of happiness during individual episodes from the previous day. Respondents rated happiness on a 6-point scale with 1 (*Not at all*) to 6 (*Very Much*).

Results and Discussion

Hypothesis 1: Situation-Selection

Is extraversion a positive predictor of happiness?

In the situation-selection hypothesis, we expected that social situations would mediate the relationship between extraversion and happiness. In order to test this hypothesis, we must first establish that extraverts report higher levels of happiness than introverts over a given period of time. For this purpose, a multilevel model was constructed with happiness as the dependent variable and extraversion as the only independent variable. The results showed that extraversion is a positive predictor of happiness, $B = .01$, $SE = .004$, $t(105) = 2.39$, $p = .02$.

Do extraverts select and participate in social situations more than introverts?

A nominal regression was conducted using extraversion to predict participation in social situations (alone vs. with one other vs. with 2 or more others). The results indicated that extraversion is a positive predictor of participation in social situations, $X^2(df=2) = 9.19$, $p = .01$.

Does participation in social situations predict happiness?

In order to assess the relationship between social situations and happiness, a multilevel analysis was conducted with happiness as the dependent variable and social situations as the independent variable (treated as a factor with 3 levels). The results indicated that participation in social situations is a positive predictor of happiness in both extraverts and introverts, $F(2, 990) = 21.22$, $p < .001$. This result taken in concert with the previous two results provides support for the predictions made by the situation-selection hypothesis.

Hypothesis 2: Reward-Sensitivity

Our second hypothesis held that extraverts are more sensitive to rewarding stimuli than introverts. In order for the reward-sensitivity hypothesis to be confirmed, we would expect that the situational variables (social/non-social situation, leisure vs. work) would have significant interactions with extraversion. To test this theory, a multilevel analysis was conducted with social situations (alone vs. with one other vs. with 2 or more others), situation type (leisure vs. work), and extraversion as independent variables and happiness as the dependent variable. Significant main effects were found for social situations ($F(2,984) = 21.48, p < .001$), and for situation type ($F(1,979) = 216.22, p < .001$). Subjects preferred situations that are social, and not surprisingly, preferred leisure activities to work. There was no significant main effect found for extraversion in this analysis, $F(1,62) = 2.18, ns$. In other words, controlling for situational variables, extraversion was not a predictor of happiness. Also, a non-significant interaction between social situation and situation type was found ($F(2,978) = 2.70, ns$). The most important finding with regard to the reward-sensitivity hypothesis was that no significant interactions were found between extraversion and any other variable. As a consequence of no significant interactions being found between extraversion and situational variables, these results fail to support the reward-sensitivity hypothesis.

General Discussion

In a day reconstruction study, we found that the relationship between extraversion and happiness was mediated by participation in social activities. Therefore social situations positively influence the happiness of extraverts and introverts. Additionally,

this study found no evidence to suggest that extraverts are significantly more sensitive to social leisure activities than introverts.

The Situation-Selection Hypothesis

Do social situations play a role in why extraverts are happier? This study has shed light on why extraverts typically report greater happiness than introverts, by confirming that selection of social situations mediates this relationship. Pavot, Diener, and Fujita (1990) first suggested that extraverts and introverts both enjoy social situations, though uneven participation in these situations by extraverts increases their experienced happiness. The results of this study provide further support for the situation-selection model.

At present, this model is not able to explain why extraverts prefer social situations more than introverts considering both have been shown to enjoy these situations about equally. It is possible that extraverts associate social activities with personal enjoyment more than introverts, and that this conceptualization leads them to seek social situations more frequently than introverts. Likewise, introverts may not be accurately conceptualizing their experienced happiness during previous social activities. If introverts tend to retrospectively associate prior social activities as being less satisfying, they may be less likely to seek additional social activities. This study showed that extraverts and introverts recall about equal levels of experienced happiness during prior social activities, when they were cued to recall the events of prior episodes in detail with their corresponding affect ratings in a way designed to minimize retrospection biases (Kahneman, 2004). Furthermore, in order to assess how introverts and extraverts conceptualize (as opposed to specifically recall) social situations, it would be necessary

in future studies to ask subjects hypothetical and more general questions about past social activities. Understanding how extraverts and introverts regard social situations may lead to the formation of more complete future models of extraversion. This limitation notwithstanding, these results do suggest that the link between extraversion and happiness is not necessarily exclusive to extraverts. In fact, from these findings we can predict that if introverts could be enticed into participating in more social situations, they would experience similar levels of happiness as extraverts.

The Reward-Sensitivity Hypothesis

Are extraverts more sensitive to the rewards of social situations? In this study, we did not find any interactions between extraversion and rewarding situations as would be predicted by the reward-sensitivity hypothesis (Lucas & Diener, 2001). We expected extraverts to be happier than introverts in social and non-social leisure activities, though similar to introvert ratings during social and non-social work activities. There were, however, significant effects found for the situational variables (situation and situation type) worth noting. What this meant for the model was that introverts and extraverts both preferred social activities to non-social ones, and that both groups preferred leisure to work activities. While not surprising by conventional thinking, this evidence serves to further support the situation-selection hypothesis by demonstrating that introverts (at least in direct recall) show more enjoyment of social activities over non-social. Nonetheless, because the interactions were non-significant, the reward-sensitivity model is not supported by the current study.

Limitations and Future Directions

Throughout this study, we have in essence been relying on how the events of the subject's previous day unfolded. This is a potential limitation of this and all DRM studies. The goal of the DRM is to collect data on a typical day in a person's life. It is theoretically possible that a number of subjects were reporting on a previous day that is not a typical day in their life. In an effort to address this concern, we imposed restrictions on the days subjects were run. We believed that the weekend (Friday night through Sunday) presented the highest chance for subjects to experience atypical day events. For this reason, subjects were not run through the study during the weekend or on Mondays. Furthermore, an item was included in the later portion of the subject questionnaires which asked participants to rate how typical they considered their previous day as being. Overall, subjects experienced days that were about average (84%), with only a few reporting days that were much worse (12%) or much better (4%). No participants were removed from the analysis due to experiencing a much worse or better day than average.

In the reward-sensitivity hypothesis, we effectively used leisure activities to assess pleasant activities and work to assess unpleasant activities. Although we found that extraversion did not significantly interact with situations to predict ratings of happiness, it is theoretically possible that we were not precisely assessing unpleasant activities. The fact that our study did not reproduce the effects found by Lucas and Diener (2001) may be due to work activities not consistently being considered fully unpleasant situations by participants. However, according to the large effect found for situation type, participants did find work significantly less pleasant than leisure activities. We therefore assert that unpleasant activities were sufficiently detected by the measures of this study.

In future studies of extraversion, we intend to focus on the first step in the situation-selection model—the link between extraversion and social situations. At present, the model is not sufficient for explaining why extraverts prefer social situations more so than introverts. To accomplish this, additional measures will need to be added to future studies which are designed to investigate whether differences exist in the way extraverts and introverts conceptualize hypothetical social situations. If future studies discover evidence that introverts are inconsistent between their happiness ratings of hypothetical and experienced social situations it will add considerable strength to the situation-selection model. Furthermore, if inconsistencies are found in the way introverts rate social situations, it may lead to new research into finding techniques that reduce these inconsistencies thereby increasing social participation in introverts, and in so doing, increase their experienced happiness or even their quality of life.

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