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The Creation and Consequences of the Social World: An Interactional Analysis of Extraversion

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Abstract

Seventy-six previously unacquainted, opposite-sex pairs of undergraduate participants engaged in a 5 min videotaped interaction, then provided their mutual impressions. Research assistants coded 64 behaviours from the videotapes; these ratings were combined into behavioural factors. Participants provided self-descriptions of personality and were described by two acquaintances. Path analyses indicated that targets' extraversion was associated with their behavioural involvement, which in turn was associated with partners' subsequent ratings of their personality. Targets' interpersonal positive affectivity was associated with their partners' extraversion. Similar patterns of behavioural associations were found in relation to self-reported, partner-reported, and acquaintance-reported extraversion. These results demonstrate how extraverts may create a positive social environment through their own positivity and by creating a social press for positivity in return. Copyright © 2003 John Wiley & Sons, Ltd.

INTRODUCTION

An individual's every action has an effect—intentional or not—on the physical and social environment that surrounds him or her. By the same token, the environment has an important if not all-determining influence on every action that an individual takes. The relationship between a person and his or her environment therefore is a dynamic interaction, in which each changes the other in a constant, ongoing, and cumulative fashion.

For example, consider someone whose personality leads him or her to characteristically behave in a manner that is cheerful, talkative, and enthusiastic. Behaviours like these can be expected to affect those people with whom this individual interacts. They may respond by becoming more cooperative, more relaxed, or simply by expressing their liking. To the extent that this happens, the individual's social environment has changed: more

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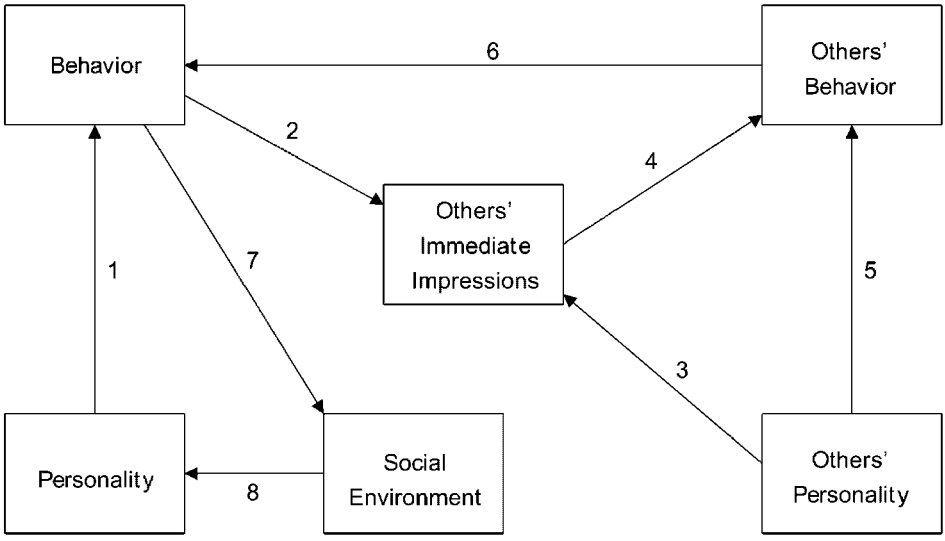

Figure 1. A conceptual model of the process by which personality may affect and be influenced by the social environment.

cooperative, relaxed, and likable people have surrounded him or her. This change in the social environment may have an effect that feeds back on his or her behaviour, perhaps causing him or her to become even more cheerful, talkative, and enthusiastic.

This process can cut the other way as well. An individual whose characteristic behaviour is irritable, insecure, or fearful may lead the people with whom he or she interacts to respond by becoming uncooperative, awkward, and less likable. This change in the social environment would seem more likely to feed back with a negative effect on the individual's subsequent behaviour.

Figure 1 presents a simplified diagram of the processes involved.[1] An individual's personality (i.e. a psychological property of a person) to some degree influences a behaviour (path 1), which affects the way another person perceives him or her (path 2). The perception of any single personality trait may also be affected by the degree to which that trait is possessed by the other person, a phenomena sometimes referred to as 'projection' (path 3; which is intended to indicate *only* the possibility that extraverted individuals may tend to view others as extraverted). This impression, together with the other person's own personality, affects how the other person treats our individual (paths 4 and 5), which, in turn, influences his or her own behaviour (path 6). Over time, persistent influences such as these can be expected to affect the individual's social reputation, the way he or she is consistently viewed by the people with whom he or she interacts on a daily basis (path 7). This reputation comprises part of the individual's social environment, and may thereby enhance the original behavioural tendency (path 8).

The present article has three aims. First, we will briefly survey previous theorizing and research relevant to dynamic interactions between the person and situation of the sort just described. The upshot will be that while such interactions have often been discussed in the literature, they have less often been empirically demonstrated even in part and—as far as we know—the complete interactive process such as just described has never been

[1]This is a conceptual model, not a formal path model.

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demonstrated. We shall consider some reasons why. Second, we shall report data that demonstrate several steps of this complex interaction. Finally, we shall discuss the future research that will be needed to fully demonstrate the dynamic person–situation interaction and to increase our understanding of the way individuals simultaneously produce and are the products of their interpersonal worlds.

A brief history of the person–situation interaction

For about two decades (1968–1988), the fields of social and personality psychology engaged in a heated debate about the relative primacy of personality and situational factors in the determination of behaviour (for a review, see Kenrick & Funder, 1988). Personality psychology had developed a rich tradition of assessing personality traits and using them to predict and understand behaviour, and much of the debate concerned the practical and theoretical utility of this approach. The debate was fueled by influential assertions that situational factors generally overwhelm personal ones in the determination of behaviour, and that therefore personality traits are of small importance (see e.g. Mischel, 1968).

The debate gradually ended with the acceptance of a compromise: behaviour is largely a function of the *interaction* between the person and the situation. This compromise seemed almost obvious, in retrospect, and indeed was reminiscent of the earlier resolution of the nature–nurture debate that found the person is a function both of his or her genetic endowment and the developmental environment. Less obvious, however, was exactly what the term 'interaction' means in this context. In the hands of different writers, the person–situation interaction had come to refer to at least three distinct phenomena (Buss, 1977), only one of which received detailed empirical attention.

The ANOVA interaction

The interaction that received the most attention was the 'ANOVA' form, in which the person–situation interaction was conceptualized exactly like the interaction term in a standard two-factor analysis of variance. In such an interaction, the effect of a personality variable depends on the level of a situational parameter, or vice versa. Initially this phenomenon was demonstrated by questionnaire studies that asked participants how they would respond to a variety of situational circumstances (e.g. the 'S–R Inventory' studies of Bowers, 1973; Endler & Hunt, 1968). A standard analysis of variance then assessed the degree to which the variance in response was a function of the situation, the person, and their interaction—and the interaction term usually accounted for the largest portion of the variance. Unfortunately, these studies turned out to be plagued by technical problems that undermined the generality of the variance estimates they produced (Golding, 1975). Furthermore, S–R models of person–situation interactions did not offer insight into more complex and dynamic forms of person–situation interaction (Hettema & Kenrick, 1989; Magnusson & Torestad, 1993).

Selection and evocation

As interesting and important as the ANOVA form of the person–situation interaction has long been recognized to be, it remains essentially a passive process. That is, individuals are (conceptually) placed arbitrarily into a range of situations with fixed properties and each individual's own properties are likewise treated as fixed.

A more active form of person–situation interaction can be seen in the way that people actively select the situations they encounter. Not always, but sometimes, individuals can choose among different situations that, if they were to enter them, would affect what they

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do in different ways (e.g. Emmons, Diener, & Larsen, 1986). For example, parties may constrain people to behave in a relatively extraverted manner, but perhaps extraverts are more likely to go to parties in the first place. Or, it is also possible that extraverts choose to spend most of their time with other extraverts, and it is the presence of extraverted partners that to some degree evokes and maintains their own extraverted behaviour.

Reciprocal determinism

The remaining sense of the term person–situation interaction refers to the process by which individuals change their environments and are, in turn, changed by them, in a manner that may be both continuous and importantly cumulative (Bandura, 1978; Buss, 1987; Scarr & McCartney, 1983; Runyan, 1978). This general idea, which is the basis of the conceptual model in Figure 1, generated some conceptual analysis even in the years that preceded the person–situation debate, dating back to the very beginning of social psychology (Lewin, 1935).

More recently, within social learning theory, Bandura (1978) presented a model of 'reciprocal determinism', in which the individual, the environment, and behaviour are determinant of each other in a continual interlocking system. Runyan (1978) furthered this notion by arguing that a life course orientation should consider trajectories as a sequence of person–situation–behaviour interactions, and showed how data concerning the course of individuals' heroin use can best be explained from this perspective. Other examples include Coyne's 'interpersonal model' of depression (see e.g. Coyne, Burchill, & Stiles, 1991), which describes the way that a depressed individual may become such unpleasant company that he or she drives away the social support that he or she so desperately needs, which only makes his or her depression worse. Patterson and his colleagues have described how the behaviour of aggressive boys can create environments that promote further aggression (see e.g. Patterson, Dishion, & Bank, 1984).

In a similar vein, Thorne suggested that an individual's degree of extraversion–introversion influences the behaviour of others in a social context (Thorne, 1987). She pre-selected females, based on extreme scores on extraversion and introversion, to participate in a ten-minute social interaction (scheduling both matched and mis-matched introvert/extravert dyads), and coded the content of their communication, using a methodologically groundbreaking combination of qualitative and quantitative approaches. The results showed that extraverts created a positive social environment (communications were characterized as cheerful, enthusiastic, outgoing) and introverts created a negative social environment (communications were aloof, reserved, shy). The pattern of results revealed significant 'partner' effects, supporting the view that the behavioural expressions of extraversion–introversion on the part of the partner transforms a situation in ways that is consistent with that trait, probably changing the experience of that situation for anyone else who is present (see also Furr & Funder, 1998).

In another study, Caspi, Bem, and Elder (1989) used longitudinal data to show how personality affects the environment and thereby magnifies its effect on life outcomes over time. Their path analysis showed that ill tempered boys attained lesser occupational status in adulthood only because they had truncated their formal education, '*not* because they continued to be ill-tempered' (Caspi & Bem, 1990, p. 568, emphasis added). This important study may have been the first to use path analysis to show how a personality attribute affects the environment, which in turn mediates an important life outcome. However, because of the nature of the data upon which it was based, this analysis focused on distal, long-term outcomes rather than directly on proximal, short-term processes. This

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limitation should not be viewed as a weakness of the groundbreaking study by Caspi and Bem, but its recognition does underscore the desirability of further research to demonstrate the mutual interaction of the person and environment directly, while it happens.

Capturing the dynamic person–situation interaction

There are several reasons why the dynamic person–situation interaction, or evocation, has seldom been directly observed by empirical research. A full demonstration requires at least five features that have not usually been available.

(i) The behaviour of at least two individuals needs to be allowed to occur in a setting that is unstructured enough to allow their personalities some room to determine what they do; this behaviour has to be observed across enough pairs of individuals to yield a chance of detecting at least some of the effects that are present.
(ii) To best view this basic core process of impression formation from the outset, participants must not have been previously acquainted and their mutual impressions should be measured at the conclusion of their first interaction.
(iii) A considerable amount of information about the personalities of these individuals should be obtained using reliable and valid techniques.
(iv) The behaviour of these individuals should be recorded (e.g. on videotape); a tool must be developed to allow meaningful social behaviour to be captured from the record in a form that permits quantitative analysis.
(v) A data-analytic technique should to be employed that can see not just each step of the process of mutual influence in the dynamic person–situation interaction, but the whole, complex process in its entirety.

The first four conditions have not usually been obtained in previous research, we believe, because they are procedurally unorthodox as well as burdensome. Personality research has often focused on participants' responses to questionnaires rather than on direct observations and measurements of their behaviour. Social psychology research has more often viewed behaviour directly in laboratory settings, but usually (because of the purpose of this research) strong experimental manipulations have left little play for individual differences (see Snyder & Ickes, 1985), and personality measures are seldom employed by social psychologists. Moreover, the typical dependent variable in most social psychological research consists of a single behaviour; rarely are more than two or three behavioural dependent variables assessed (for a recent review, see Kenny, Mohr, & Levesque, 2001). Only recently have techniques for the observational measurement of a wide range of interpersonal behaviours become available (Funder, Furr, & Colvin, 2000). Using a wide range of behaviours is particularly advantageous because the same trait is often behaviourally expressed in a variety of ways, in different situations (Buss & Craik, 1983) and probably also within the same situation.

The present study

The purpose of the present paper is to report analyses of new data that fulfil the first four of the conditions above. Opposite-sex pairs of previously unacquainted undergraduates interacted for five minutes in an unstructured laboratory situation recorded on videotape. Independent raters used a new assessment technique, the 'Riverside Behavioural Q-sort' (RBQ), to code the relative salience of 64 different behaviours from each tape. We also gathered the participants' impressions of each other at the conclusion of the interaction,

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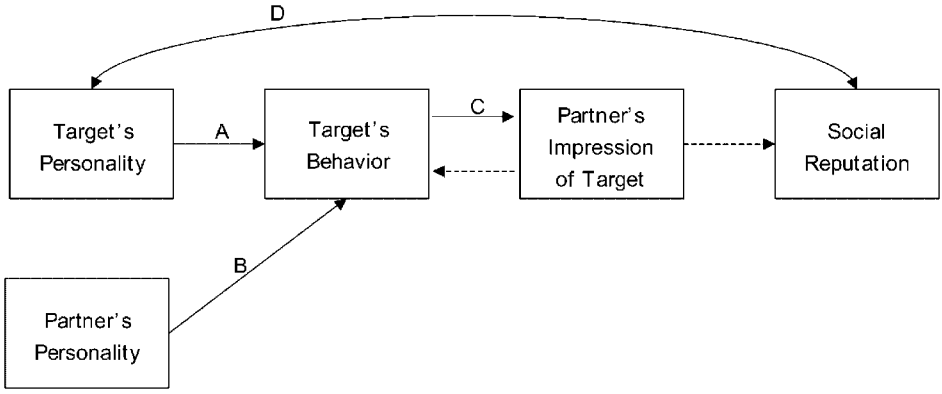

Figure 2. The evocative or dynamic person–situation interaction as examined in this study. The paths labelled A–D are those illustrated by the present data.

and measured the participants' social reputations by asking two close acquaintances from their 'natural' college environment to describe each participant. Path analysis will be offered as a method for examining the dynamic person–situation interaction as a model of personality and interpersonal behaviour.

The structure of the data gathered by the Riverside Accuracy Project (Funder, 1995) allows several—though not quite all—of the steps in the dynamic person–situation interaction to be directly assessed. Consider the conceptual model portrayed in Figure 2.

This model describes much the same process as Figure 1, but is adapted to reflect the data and analyses included in the present study. First, an individual's personality affects his or her behaviour (path A in the model). His or her behaviour is also influenced by the personality of his or her interaction partner (path B). This behaviour affects the subsequent impression of the individual that is formed by his or her partner (path C). We assume this impression affects the way the partner behaves back toward the individual. This latter path is drawn with a dashed line, and not labelled, because in the present data the impression of the partner was measured *after* the interaction concluded and so this path cannot be directly estimated.

Eventually, the cumulative effect of the individual's behaviour and the way it is perceived by others creates a social reputation, the way he or she is viewed by the acquaintances with which he or she interacts on a daily basis. This reputation is an important part of the target's social environment, and over time can be expected to feed back with effects on his or her characteristic patterns of behaviour, or personality. The path from an interaction partner's immediate impression to the individual's general, long-term reputation is drawn with a dashed line and not labelled, because it cannot be demonstrated directly by the present data. A long-term, longitudinal study that assessed the gradual growth of individuals' reputations over time would be required. (Such a study would of course be extraordinarily difficult to conduct.) However, we can assess the relation between our participants' personalities and the way they are viewed by acquaintances in their larger, natural social environment (path D, which is probably bi-directional).

Accuracy in personality judgment can be derived from the correlation among self-reports of personality and partner reports of personality and/or peer reports of personality (Funder, 1999; Ickes, 1997; Kenny, 1994). While the accuracy of these judgments is not central to the present study, this issue is not tangential. Theoretically, if an individual

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behaves in a manner that is consistent with his or her personality, and if those behavioural cues are detected, and subsequently utilized correctly by the perceiver when making judgments, then those judgments should possess some degree of accuracy (Funder, 1995). However, should a target's behaviour be somehow altered by the interaction partner's personality, then it is unclear whether accurate personality judgments would follow. This issue will be addressed in the present study.

Furthermore, the issue of accuracy is important as it has implications in applied contexts as well. In daily life there are times when individuals are required to make decisions about others based on limited information obtained through the course of a single interpersonal interaction. Issues concerning accuracy in person perception strike at the heart of the veracity of such decision-making contexts. Successfully deciding whom to pursue for romance (Swan & Gill, 1997), deciding whom to hire as a police officer (Landy, 1976), or attempting to discover the integrity of an individual's account of an event (Ekman, 2001; Ross, Read, & Toglia, 1994) depends on the perceiver's ability to disentangle the effects of the individual's personality on behaviour from the situational presses that also influence behaviour. This present study does not contain the data required to explicate the cognitive processes that underlie these judgments (this is not the purpose of the present study). However, including a measure of the accuracy does provide evidence concerning the degree to which individuals can and do make accurate judgments based on limited information.

In this study we will focus on the personality trait of extraversion, one of the most robust and visible basic factors of personality (Costa & McCrae, 1992; Eysenck, 1987; Funder & Colvin, 1988). We will examine how this trait, in our target participants and their partners, is related to how the participants behave, and how they are seen by others by the end of just five minutes of interaction. We will test the hypothesis that ratings of extraversion are moderated by the participants' behaviour in our social interaction. Finally we will examine how our participants are viewed by close acquaintances in the larger social environment.

METHOD

Participants

The data in the present study come from the Riverside Accuracy Project (Funder, 1995), which has gathered a wide variety of data from a sample of 182 target participants (91 F and 91 M), all undergraduates at the University of California, Riverside. Previous analyses of portions of this large data set have examined a variety of issues concerning accuracy in personality judgment (see e.g. Blackman & Funder, 1997; Funder, Kolar, & Blackman, 1995), emotional experience in daily life (see e.g. Eaton & Funder, 2001; Spain, Eaton, & Funder, 2000), and other issues central to personality theory (see e.g. Creed & Funder, 1998) to name a few. The topic and analyses of the present study are new.

The initial sample of target participants was recruited through fliers and classroom solicitation; all participants were volunteers paid $5.00 per hour for their participation. Complete participation entailed seven experimental sessions; the number of participants in each session varies because of occasionally incomplete participation or missing data. All of the analyses presented herein include only those subjects with complete data across all the variables utilized for this study, a sample size of 76 females and 76 males.

Each participant was asked to provide names and phone numbers of two acquaintances on campus that knew him or her well and would be willing to participate. These largely same-sex acquaintances were contacted by telephone, brought to the laboratory and paid

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$5.00 to provide personality descriptions of the target participants, along with other information not utilized in the present set of analyses.

Procedure

Previously unacquainted pairs of participants, one male and one female, were scheduled by telephone to arrive for their initial experimental session. After both participants had arrived, it was confirmed that they had never met before. They were then led into the laboratory and seated on a couch in front of a video camera that was not concealed. The participants were encouraged to 'talk about whatever you'd like'; the experimenter activated the camera and departed, to return five minutes later.

Next, the participants completed several questionnaires. On one of these, they recorded their immediate impressions of their partner. At a separate session, scheduled within the next few weeks, the participants completed a variety of self-report measures of personality.

Personality and impression measures

Over the course of several sessions of the Riverside Accuracy Project, a large number of different self-report measures were administered to our participants. Those germane to the present analyses are described below.

California Q-Sort

The target participant provided personality self-descriptions using, among other instruments, the California Q-Sort (CQ; Block, 1978), as adapted by Bem and Funder (1978). The CQ is a set of 100 cards, each of which has printed on it a description of a characteristic of personality. For example, one item reads 'is basically anxious', another is 'is productive, gets things done', and so on. Raters place these cards into a nine-step, symmetric, approximately normal, forced-choice distribution ranging from 'not at all characteristic' (category 1) to 'highly characteristic' (category 9) of the person being described. The result is 100 scores that extensively reflect the rater's judgment of the target's personality. An extraversion composite was computed by summing extraversion Q-Sort items, as identified by McCrae, Costa, and Busch (1986).

As described above, each participant was asked to nominate two individuals on campus to provide a description of his or her personality, also using the California Q-Sort. Of those peers that agreed to participate, 80% nominated by female participants were themselves female; 77% nominated by male participants were themselves male. On average, the peers had known the participants they described for 20.8 months. Most of these peers described themselves as either 'close friends/non-romantic' (67%) or 'casual friends' (23%) of the target participants, as measured by the Relationship Closeness Inventory (Berscheid, Snyder, & Omoto, 1989). Descriptions used in the present analyses were averaged across the two informants for the 76% of the subjects for whom both appeared. In the remaining cases the single description available was used. In the aggregate, these Q-Sorts by peers reflect the way our participants are viewed by some of the important people in their social environment.

Q-Rating Inventory

The previously unacquainted, opposite-sex partners also provided their immediate impressions of each other's personality at the end of their initial five-minute interaction, using a form on which each Q-Sort item, slightly abbreviated, was rated using a five-point Likert-type scale. These ratings reflect how each participant was viewed by a previously

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complete stranger, after just five minutes of interaction. As was the case with the Q-Sort, a Q-Rating extraversion composite was computed by summing extraversion Q-Sort items, as identified by McCrae et al. (1986).

Behavioural coding

Target participants' behaviour in the initial experimental session described previously was recorded on videotape.

Videotaped behaviours were coded using the 64-item Riverside Behavioural Q-Sort (RBQ), a revision of the 62-item Q-Sort used in previous research in this project (Funder et al., 2000). The RBQ was modelled after the California Q-Sort (Block, 1978) and was designed to provide behavioural cognates for many of the personality traits measured by the California Q-Sort. This instrument allows us to code information about behaviour on our videotapes at a psychologically meaningful level of analysis. It is aimed at a mid-range of generality between molecular level frequency counts of specific micro-level acts (e.g. eyebrow lifts) and more molar, impressionistic levels of description (e.g. is successful). (For discussions of levels of analysis in behavioural coding, see Funder & Colvin, 1991; Funder, Furr, & Colvin, 2000.) For example, the RBQ includes behaviours such as 'acts irritated' or 'expresses warmth'. Trained coders sort the 64 items into a nine-step, forced-choice, approximately normal distribution ranging from not at all descriptive of the participant's behaviour (category 1) to highly descriptive (category 9). In this way, each behavioural item receives a rating from 1 to 9 from each coder.

Undergraduate and graduate student research assistants rated the behaviour of our participants from the videotapes. These 'coders' received approximately three hours of training on the Q-Sort method and our coding procedures. During the training we emphasized *behavioural observation*; the coders were instructed not to make inferences from what they observed, but rather were told to simply code the behaviour they saw. Additionally, the coders-in-training practiced coding one of our participants on videotape ('test participant'). This practice coding was assessed for accuracy by correlating the ratings provided by the coder-in-training to the average ratings of four other trained coders of the test participant's behaviour. Feedback was given to the coder-in-training and additional practice was provided when necessary. A package of training materials and instructions were left with the coders for their future reference.

Our graduate student laboratory coordinator randomly assigned coders to view and Q-Sort behaviours for one participant in a single interaction. Coders were not permitted to code the behaviour of anyone they were acquainted with, and if a coder had viewed the behaviour of one participant previously, he/she was not permitted to code that participant's partner. Ultimately each videotaped interaction was coded by four independent coders, each of whom had viewed an interaction only once.

As a preliminary quality control check, each coder's ratings were compared with every other set of ratings for the session, and were entered into the overall composite only if they correlated at least 0.30 with two other coders and at least 0.25 with a third coder. (A coding that failed to achieve this threshold was repeated or replaced.[2]) Then, the ratings for each participant were averaged across the four coders. This procedure ensured a minimum

[2]Incomplete or incorrectly completed Q-Sorts, as well as codings that did not meet the reliability threshold, were replaced with another randomly assigned independent coder's ratings. The occurrence of coder replacement was very infrequent and was not systematic between individual coders. Our training procedures and random assignment of coders to participants, for more than 728 independent sets of ratings, completed over a two-year period of time, ensures the likelihood that replacement of ratings due to common human error introduced no measurable bias into these behavioural ratings.

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alpha reliability of 0.60 for each composite behavioural coding; the actual alpha reliability of the composite profile for session 1 (used in the present study) was alpha = 0.81. More germane than the profile reliability, for the present analyses, is the reliability of the coding of each item. The alpha reliability estimates of ratings of the 64 items calculated across the four coders within the behavioural session ranged from 0.08 to 0.80, with an average of 0.53 (for a more detailed discussion, refer to Funder et al., 2000).

A principal components analysis, using an orthogonal promax rotation, of the 64 behavioural items reveals a three factor solution that accounted for a considerable proportion of the behavioural variance (43%), and more factors added little (Eaton, unpublished doctoral dissertation). These three factors were named 'involvement', 'positive interpersonal affectivity', and 'confidence'. The alpha reliabilities of the three behavioural scales were, respectively, 0.90, 0.86, and 0.73.

The involvement factor includes positively weighted items such as 'shows high enthusiasm and energy level' and 'is talkative', and negatively weighted items such as 'is reserved and unexpressive' and 'seems detached from the interaction'. The positive affectivity factor includes positively weighted items such as 'expresses warmth' and 'seems to like partner', and negatively weighted items such as 'talks at rather than with partner' and 'speaks sarcastically'. The confidence factor includes items indicative of academic achievement and self-efficacy. Theoretically, only the involvement and positive interpersonal affectivity behaviours are central to extraversion (Sneed, McCrae, & Funder, 1998; Watson & Clark, 1997), therefore we will use only these two factors in the present study.

RESULTS

Data analyses were conducted in two phases. In the first phase, bivariate correlations were calculated to reflect the content of the relations among extraversion and behaviour, and among behaviour and extraversion ratings. In the second phase, path analysis was used to summarize, integrate, and illustrate the relationships uncovered in the first phase.

Correlational analyses

Stage A. Target's personality → target's behaviour

The first stage in the process depicted in Figure 2 is simply the direct association among the target participants' personality and his or her own behaviour. In this analysis, the Q-Sort Extraversion scores of the participants were correlated with each of 64 items of behaviour. These correlations reflect the ways in which this personality trait can be seen to manifest itself in behaviour within a five-minute period of time.

These results appear in Table 1. It can be seen that the targets' extraversion was meaningfully associated with their observed behaviour.[3] The behaviours correlated with extraversion include such items as 'Speaks fluently and expresses ideas well' and 'Exhibits social skills'. Negative correlates—which could alternatively be thought of as positive

[3]The use of arbitrary levels of statistical significance in this (or any) manner is fraught with complications (Harris, 1997), but here the 0.05 level provides a convenient benchmark for whether one has obtained more 'significant' correlations than would be expected from chance alone. When 64 correlations are calculated (one for each RBQ item), one would expect 3.2 of them to be significant at the 0.05 level, if chance alone were driving the data. We intentionally refer to this cut-off as a *benchmark*, and not as some absolute criterion, particularly in light of the non-independence of Q-Sort items. All of the correlations, those significant and non-significant, for Tables 1–3 can be found on our internet site: www.psych.ucr.edu/faculty/RAP/rap.html

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Table 1. Correlations among targets' behaviour and targets' extraversion

Q-Sort item	*r*
Positive correlates	
Speaks fluently and expresses ideas well.	0.27**
Exhibits social skills.	0.27**
Is talkative (as observed in this situation).	0.24**
Appears relaxed and comfortable.	0.23**
Seems to enjoy the interaction.	0.21*
Volunteers a large amount of information about self.	0.20*
Shows high enthusiasm and a high energy level.	0.18*
Is expressive in face, voice, or gestures.	0.17*
Interviews his or her partner(s).	0.16*
Negative correlates	
Exhibits an awkward interpersonal style.	−0.37**
Is reserved and unexpressive.	−0.31**
Shows physical signs of tension or anxiety.	−0.31**
Keeps partner(s) at a distance, avoids development of any sort of interpersonal relationship.	−0.29**
Expresses criticism.	−0.22**
Seems detached from the interaction.	−0.21*
Behaves in a fearful or timid manner.	−0.19*
Expresses insecurity.	−0.17*
Expresses guilt.	−0.17*

$N = 152$.
Item content is abbreviated.
$^{*}p < 0.05$; $^{**}p < 0.01$.

correlates of introversion—include 'Exhibits an awkward interpersonal style' and 'Is reserved and unexpressive'.

Path B. Partner's personality → target's behaviour

The next step in data analysis was to examine the correlations between each target participant's behaviour and the personality of his or her *partner*. This analysis begins our examination of the person–situation interaction, because these correlates contrast the way people react to others who are relatively high and low in extraversion, and therefore also reflect the social environment that people high and low in extraversion create around themselves.

As can be seen in Table 2 the targets' behaviour was less predictable from their partners' personality than from their own (in terms of the number of significant correlates).[4] Nonetheless, several behaviours of the targets can be predicted from their partner's personality. Table 2 reveals that, in a mere five minutes, extraverts began to create a favourable social environment for themselves. Individuals tended to show liking and interest when paired with relatively extraverted partners; while they tended to show disinterest, disliking, and condescending behaviour when paired with more introverted partners.

Path C. Target's behaviour → partner's impression

The next set of results examines how participants' behaviour affected the impressions their partners subsequently formed of them. This path is reflected in the correlation among the 64 behaviours displayed by the target and the partners' subsequent rating of the targets'

[4]Technically this is not an 'effect' because the data are correlational; however, the only plausible direction of effect between personality reports and separately measured behaviour would seem to be personality to behaviour.

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Table 2. Correlations among targets' behaviour and partners' extraversion

Behavioural Q-Sort item	*r*
Positive correlates	
Expresses agreement frequently.	0.23**
Seems to like partner.	0.20*
Seems interested in what partner has to say.	0.19*
Engages in constant eye contact with partner.	0.18*
Behaves in a fearful or timid manner.	0.17*
Negative correlates	
Dominates the interaction.	−0.24**
Exhibits condescending behaviour.	−0.21*
Talks at rather than with partner.	−0.17*

$N = 152$.
Item content is abbreviated.
*$p < 0.05$; **$p < 0.01$.

extraversion (derived from the partner-report Q-Ratings). The significant correlations are presented in Table 3. Among the positive behavioural correlations, 'Shows high enthusiasm and a high energy level' and 'Is talkative' were significant, along with negative behavioural correlates that include 'Exhibits an awkward interpersonal style' and 'Shows physical signs of tension or anxiety'.

Accuracy. Target's extraversion → partner's impression
Theoretically, this path reflects accuracy in personality judgment. The correlation between the targets' extraversion and the partners' extraversion ratings was $r = 0.28$ ($p < 0.0006$).

Table 3. Correlations among targets' behaviour and partners' extraversion ratings

Behavioural Q-Sort item	*r*
Positive correlates	
Shows high enthusiasm and a high energy level.	0.29**
Is talkative (as observed in this situation).	0.23**
Initiates humour.	0.20*
Is expressive in face, voice, or gestures.	0.19*
Dominates the interaction.	0.19*
Exhibits social skills.	0.19*
Appears relaxed and comfortable.	0.18*
Acts playful.	0.18*
Seems to enjoy the interaction.	0.16*
Negative correlates	
Exhibits an awkward interpersonal style.	−0.34**
Shows physical signs of tension or anxiety.	−0.28**
Is reserved and unexpressive.	−0.28**
Behaves in a fearful or timid manner.	−0.26**
Keeps partner at a distance, avoids development of any sort of interpersonal relationship.	−0.26**
Expresses insecurity.	−0.26**
Says negative things about self.	−0.19*
Seems detached from the interaction.	−0.17*

$N = 152$.
Item content is abbreviated.
*$p < 0.05$; **$p < 0.01$.

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While this result indicates a significant degree of accuracy after five minutes of interaction, an important question remains: what behaviours were associated with these judgments?

Since the target behaviours displayed in Table 1 appear to be a reasonable representation of extraversion, we can assess the degree to which the behaviours actually associated with extraversion were associated with partners' judgments of this trait. A vector correlation can represent this relation, by correlating the vector of extraversion related target behaviours (represented in path A; Table 1 correlates) with the vector of behaviours used in the ratings (represented in path C; Table 3 correlates). Considering all 64 behaviours, the vector correlation is $r = 0.81$, $p < 7 \times 10^{-16}$. These vector correlations seem to indicate that individuals tend to correctly utilize available behaviours when judging extraversion (see also Funder & Sneed, 1993).

Limitations of the correlational approach

The correlational approach just taken yields a great deal of detailed information regarding the relations among personality, behaviours, and impressions. As important as this detail is, there are several limitations to the correlational approach just enumerated. Statistical considerations, such as Type I error rate,[5] attenuation due to less than perfect reliability of the extraversion composites, and unaccounted for intercorrelations among behaviours are methodological difficulties encountered when trying to assimilate and derive meaning from tables of correlations.

In addition to such perennial and well known such statistical and pragmatic limitations, the simple bivariate approach is also theoretically limited. It does not allow examination of personality, behaviours, and ratings as an *interpersonal system*. Yet, the theory of reciprocal determinism asserts that the combinations of personality traits, behaviours, and impressions form a dynamic system that can simultaneously be causal and be the effect of other behaviours. Correlations alone cannot allow us to comprehensively view this dynamic system nor directly test the model depicted in Figure 2. Therefore, the next step in our analysis was to employ structural equation modelling to simultaneously view the relations displayed in Tables 1–3, add in a path for the assessment of projection, test the model for its comprehensiveness (model fit), and test the degree to which accuracy is fully represented by the theoretical model.

Dynamic person–situation model

The model of the dynamic person–situation interaction tested by the SEM analysis was a simple elaboration of the theoretical model presented in Figure 2 (path C is specified to include the behaviours we measured). This model includes several interrelated components surrounding the targets' and partners' extraversion, the targets' behaviours, and how each of these affects the partners' ratings of the targets' extraversion. This model is tested as a path analysis using the CALIS procedure in SAS. (Latent variable analyses were not conducted because the number of participants in our sample—although unusually large for a study that includes direct behavioural observations—is inadequate to support the added paths.)

The analyses were conducted in two stages. First, a path analysis examined the effect of targets' and partners' extraversion on the two behavioural factors theoretically linked with extraversion (involvement and positive affectivity). Included in this model are paths that

[5]Again, while these data are observational, the only plausible direction of causation is from partners' personality to the targets' behaviour.

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Table 4. Correlation matrix used in path analysis

Variable	Targets' extraversion	Partners' extraversion	Targets' involvement	Targets' positive affectivity	Partners' rating of targets' extraversion
Targets' extraversion	1.0				
Partners' extraversion	−0.025	1.0			
Targets' involvement	0.323	−0.093	1.0		
Targets' positive affectivity	0.193	0.214	0.231	1.0	
Partners' rating of targets' extraversion	0.277	−0.101	0.335	0.003	1.0

link subsequent impressions of the target's extraversion from the target's behaviour and from target and partner self-ratings of extraversion. Second, a single degree of freedom chi-square test, adding the direct path from the targets' extraversion to the partners' ratings of the targets' extraversion, was conducted to determine whether our model sufficiently explains the partners' ratings from the targets' behaviour in this situation (Bollen, 1989).

The correlation matrix for this analysis appears in Table 4 and the results of the path analysis are shown in Figure 3. These results show that the targets' extraversion covaries with both involvement and positive interpersonal affectivity. The partners' extraversion is associated with the targets' positive interpersonal affectivity; in other words, relatively more extraverted partners appear to be eliciting positive interpersonal affectivity from our target participants. Only the targets' involvement covaries with the partners' ratings of the targets' extraversion. This model was a marginally good fit; $\chi^2(1) = 6.22$, $p < 0.0126$; RMSEA = 0.1860, 90% confidence limit ranging from 0.07 to 0.33; and CFI = 0.9028. A fair amount of the variance in the ratings is explained by the two behavioural factors, $R^2 = 0.12$, $p < 0.0003$.

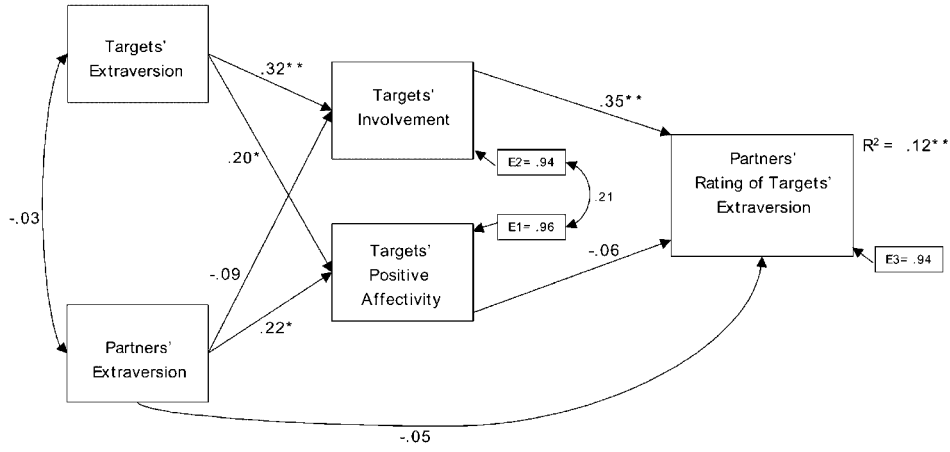

Figure 3. Standardized parameters for the structural model predicting behaviour and post-interaction ratings of extraversion, from the targets' extraversion, the partners' extraversion, and involvement and positivity behaviours. Bi-directional arrows show the correlation between the two partners' extraversion (which should be near zero, as the targets and partners were randomly assigned). $N = 152$ individuals; 76 dyads, with complete data. $*p < 0.05$; $**p < 0.01$.

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Explaining accuracy in judgment

In this present study, our opposite-sex dyads had only just met and interacted for a total of five minutes. As we have already seen, some accuracy in judgment was achieved. The question remains as to whether or not the model adequately depicts the sources of this accuracy in judgment. To test this hypothesis, a single degree of freedom chi-square test was used to compare models. First, we removed the three non-significant paths and recalculated the model's fit,[6] $\chi^2(4) = 8.9267$, $p < 0.0630$. Next, we added the direct path leading from the targets' extraversion to the partners' ratings of the targets' extraversion, and again recalculated the model's fit,[7] $\chi^2(3) = 3.4167$, $p < 0.3317$. If there is no significant improvement in the fit from the first model to the second, which has the accuracy path included, then it can be concluded that our model does adequately account for the ratings (in other words, there is very little outside the model that contributes to the judgments). This test indicates that our model may not sufficiently account for the accuracy of these judgments, as the model did fit significantly better with the accuracy path added, $\chi^2(1) = 5.51$, $p < 0.02$. The effect size for the added direct path, from the targets' extraversion to the partners' ratings of extraversion, was $r = 0.19$, $p < 0.02$ ($R^2 = 0.036$). In concert, these analyses indicate that, while the targets' behaviours we measured account for some of the variance in the partners' ratings, some of the accuracy in personality judgment derives from sources other than the behaviours we measured.

Acquaintance perceptions of extraversion

Finally, to get a glimpse of how our target participants are perceived by those who know them well, we correlated the peer-report Q-Sort items with the participants' self-reported extraversion scale score (scaled from the participants' self-report Q-Sort items). The results of these analyses are presented in Table 5. These results provide some evidence for the contention that extraverts create a positive social environment for themselves. Extraverts were rated by their peers as being relatively talkative, sensuous, and socially poised; and introversion, the opposite pole of extraversion, covaried with peer reports of being emotionally bland, feeling a lack of personal meaning in life, and feeling cheated and victimized by life. A vector correlation of the partner-based Q-Sort extraversion correlates and the corresponding peer-based Q-Sort correlates of extraversion reveal them to be highly similar, $r = 0.57$ ($p < 7.6 \times 10^{-10}$). Some accuracy in these personality judgments was also seen in the correlation among peer-reports of extraversion and our targets' extraversion, $r = 0.44$ ($p < 9.5 \times 10^{-8}$).

DISCUSSION

The present data show that a lot can happen in five minutes. Two strangers of the opposite sex were brought together and, in that period of time, it was already possible to see the dynamic person–situation interaction begin. First, the correlational analyses showed that the personalities of our participants were sensibly associated with their behaviour in our laboratory. To a lesser degree, we also noted the partners' extraversion affecting the targets' behaviour, a result consistent with Kenny et al. (2001), who reported similar findings for predicting a partner's *behaviour* from a target's *behaviour*. From this we can

[6]RMSEA = 0.0903, 90% confidence limit ranging from 0.00 to 0.17; and CFI = 0.9083.
[7]RMSEA = 0.0303, 90% confidence limit ranging from 0.00 to 0.1439; and CFI = 0.9922.

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Table 5. Peer-rating correlates of targets' self-reported extraversion scale-score

California Q-Sort item	*r*
Positive correlates	
Is a talkative individual.	0.36**
Enjoys sensuous experiences (including touch, taste, smell, physical contact).	0.33**
Has social poise and presence; appears socially at ease.	0.33**
Tends to perceive many different contexts in sexual terms; eroticizes situations.	0.30**
Is skilled in social techniques of imaginative play, pretending and humour.	0.28**
Behaves in an assertive fashion.	0.26**
Is facially and/or gesturally expressive.	0.24**
Is cheerful.	0.24**
Is personally charming.	0.23**
Tends to proffer advice.	0.23**
Is turned to for advice and reassurance.	0.22**
Initiates humour.	0.21*
Tends to arouse liking and acceptance in people.	0.21*
Responds to humour.	0.21*
Has a rapid personal tempo; behaves and acts quickly.	0.19*
Emphasizes being with others; gregarious.	0.18*
Has high aspiration level for self.	0.17*
Negative correlates	
Is emotionally bland; has flattened affect.	−0.32**
Feels a lack of personal meaning in life.	−0.28**
Feels cheated and victimized by life; self-pitying.	−0.28**
Tends toward over-control of needs and impulses; delays gratification unnecessarily.	−0.26**
Is vulnerable to real or fancied threat, generally fearful.	−0.25**
Is self-defeating.	−0.22*
Genuinely submissive; accepts domination comfortably.	−0.21*
Is sensitive to anything that can be construed as a demand.	−0.20*
Keeps people at a distance; avoids close interpersonal relationships.	−0.19*
Reluctant to commit self to any definite course of action; tends to delay or avoid action.	−0.19*
Is critical, sceptical, not easily impressed.	−0.19*
Is subtly negativistic; tends to undermine and obstruct or sabotage.	−0.18*
Gives up and withdraws where possible in the face of frustration and adversity.	−0.17*

$N = 137$.
Item content is abbreviated.
$^{*}p < 0.05$; $^{**}p < 0.01$.

draw two interrelated conclusions. Social situations, construed as either the social context or as an interaction partner, can modify a target individual's behaviour in a meaningful way. Moreover, while a target individual's behaviour is *modified* by the social situation, he or she continues to maintain his or her general repertoire of behaviour regardless of the situational press, consistent with his or her personality characteristics. This pattern of results has direct implications for the controversy concerning the cross-situational consistency of behaviour widely discussed in the literature (Bem & Allen, 1974; Epstein, 1979; Funder, 1983; Funder & Colvin, 1991).

We observed that the behaviours the target displayed in this situation appear to have been utilized by the partner when judging his or her extraversion. The findings concerning the relative strength of target and partner effects would indicate that this is a correct strategy to use when asked to make judgments concerning someone's personality. Finally, extraversion had many, powerful correlations with the way the targets were described by close acquaintances who form an important part of their social environment. Extraverts, it

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appears, consistently live in a social environment largely populated by people who think well of them.

In this paper we offered structural equation modelling (SEM) as a statistical methodology for representing the person–situation interaction and, pragmatically, as a means for summarizing and clarifying phenomena already examined in the correlational analyses presented. We are not the first to use a SEM approach to the study of interpersonal interaction, nor are we the first to apply this technique to the problem of understanding the sources of accuracy in personality judgment (see Kenny, 1994). In this present study, we offer SEM analyses as a viable approach to furthering the understanding of the mechanisms that may underlie the dynamic person–situation interaction. Toward this end we incorporated in a single path model, equally represented, the traditional domains of both personality and social psychology, capturing the essence of Bandura's (1978) and Lewin's (1935) theories. Furthermore, we show how a path analysis was used to illustrate more completely the process that the correlational analysis could reveal only one piece at a time.

In our model (see Figure 3) we saw the processes described by earlier theorists such as Lewin and Bandura: individuals' extraversion causes them to behave in a positive manner that creates a positive reaction in others, all of which probably enhances their level of extraversion. (The reverse could be said, of course, for introverts.) Because extraverts tend to elicit positive interpersonal affectivity from others, it could be true that extraverted individuals are sought out by others as desirable friends and associates. This sort of selection could then create situational demands for the further display of extraverted behaviours on the part of these individuals (Emmons et al., 1986).

If this description of the person–situation process holds true over broad spans of time, it could have far reaching implications. It implies that the two 'active' forms of the person–situation interaction—the ones other theorists have called 'selection' and 'evocation', respectively—may both play a role in the maintenance of extraversion-related behaviour, such as positive affect in daily life (Eaton & Funder, 2001; Spain et al., 2000), by maintaining consistently positive social environments. The peer-report correlations presented in Table 5 appear to support this notion.

However, the present study can only address processes relevant to evocation. Selection was precisely what they were prevented from doing in this experiment; our participants could not choose their interaction partners. Furthermore, the effects of the partner's impression of the target on the partner's *subsequent* behaviour toward the target could not be assessed in the data available to this study. Once the impression was gathered, behaviour was not again observed in a similar, unstructured situation (it was observed in a structured task and a game, but the range of behaviours in those settings was much more restricted). This is a limitation of the present study and, in the future, research should be conducted that assesses impressions and behaviour at several times as a relationship between two people begins to develop.

Although accuracy in personality judgment was not a main focus of this present study, we noted that both partner-reported and peer-reported extraversion were significantly related with self-reported extraversion, indicating some degree of accuracy in personality judgment. Theoretically, accuracy in personality judgment should follow directly from behavioural observation, the detection and the utilization of behavioural cues to personality (Funder, 1995). A strength of the structural equation modelling method is that it affords the ability to examine the degree to which involvement and positive interpersonal affectivity behaviours account for the level of accuracy we observed. In this case, we saw that our model only marginally fitted the data and that 3.6% of the 'accuracy'

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variance was not accounted for by the behaviours we measured (12% was accounted for by the behaviours we measured). This indicates that there are some behaviours, or cues to extraversion, that our judges (the interaction partners) appeared to detect and utilize accurately, that we did not include among the behaviours we measured. There are two major sources of personality-relevant information we would recommend including in future research. First, we had no direct measure of physical appearance (e.g. style of dress, facial expressions, etc). Early in acquaintanceship physical appearance can provide strong cues to personality (Albright, Kenny, & Malloy, 1988). Secondly, we did not account for verbal self-disclosure. Although previous research appears to indicate that accounting for the quality of verbal information may not be very helpful in this regard (Park & Kraus, 1992), further research is warranted in this area.

The principal determinant of the degree to which individuals viewed their partner as extraverted was the targets' actual involvement behaviour. Positive interpersonal affectivity, although related to the target's extraversion, did not appear to influence the partner's judgments. We can only speculate on the possible causes of this discounting of a valid cue. It could be that individuals have some awareness, either consciously or unconsciously, that their own level of extraversion affects others' positivity behaviour. In that case, perhaps they have learned to discount these behaviours as valid markers of extraversion in others. An alternative explanation of this finding is that it is evidence for a fundamental attribution error (Ross, 1977), but in reverse; that is, when making judgments, these individuals mis-attributed positive interpersonal affectivity behaviour to the situation (our experimental 'getting to know you' context), rather than correctly attributing this behaviour to our targets' personality (extraversion). Future research could shed some light on the cognitive decision making processes that underlie this result.

Another possible source of error or bias in judgment, projection, was included in our model and was found to be negligible and not significant. It is surprising to see, with the limited amount of information five minutes of interaction provides, that individuals do not seem to make the mistake of attributing their own level of extraversion to their partner. This result, however, is consistent with previous research (Funder et al., 1995).

Along similar lines, an additional limitation of the present study is noteworthy. The single, five-minute interaction analysed in the present study may be too brief to fully capture the strength of the effects of personality on behaviour, of behaviour on social impressions, and of social impressions on behaviour. Indeed, it seems remarkable that five minutes was enough to see anything at all (see also Ambady, Hallahan, & Rosenthal, 1995). It is reasonable to surmise that in a longer interaction, the strengths of the paths could probably all increase in size. Accuracy in personality judgment would also be expected to increase over the course of longer acquaintanceship (Blackman & Funder, 1998; Funder & Colvin, 1988; Funder et al., 1995).

The present study demonstrates the feasibility of this kind of research on the dynamic person–situation interaction, as applied to a social interaction between two individuals at one point in time. The psychological processes that underlie our empirical observations are also a series of complex person–situation interactions. These interactions occur among biological, social, and cognitive systems at various levels in an individual, from micro-neurological systems to those systems present in the larger social context. Patterns of behaviour emerge from these multiple and complex sets of interactions as individuals adapt to their environments (both physical and social). Theories likely to elicit productive future research in this more global sense of the person–situation interaction include biosocial interactionist models based on an evolutionary perspective (Simpson & Kenrick,

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1997), and chaos theory, which is receiving increasing attention among psychologists (Masterpasqua & Perna, 1997). However, many more methodological advances must be made to fully exploit the potential of these theories (Magnusson & Torestad, 1993).

In this study, we offer one methodology to examine extraverted behaviour at the crossroads between social and personality psychology. With this methodological approach we combined the theoretical concerns of personality psychologists, viewing personality as manifest in behaviour, with the theoretical concerns of social psychologists, exploring the possible cues individuals utilize when making inferences from behaviour to personality traits. While the conclusions and speculations presented in this article may be interesting, the most important contribution of the present research may be—as so often happens—to point the way toward what needs to be done next.

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