



# Individual differences in the social facilitation effect: A review and meta-analysis

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## Abstract

The present study reviews the social facilitation literature and identifies two overarching responses to social presence: negative-apprehensive and positive-self-assured. These responses correspond to two general orientations toward the social environment described in current personality literature: a negative orientation, comprised of neuroticism and low self-esteem; and a positive orientation, comprised of extraversion and high self-esteem. A meta-analysis reveals that social presence is associated with performance impairment for negatively oriented individuals, and with performance improvement for positively oriented individuals. Additional analysis reveals that personality is a more substantial moderator of the effect of social presence than is task complexity. The results of this study open a new avenue in the research on social facilitation, encouraging a closer inspection of the meaning that various individuals attribute to social presence.

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## 1. Introduction

At one time or another, we have all found ourselves in situations in which we have been the focus of others' attention. Occasionally, those others were individuals unfamiliar to us. Sometimes we were observed performing a task, whether it was giving a talk, taking a test, or playing ball. Nearly everyone can recall such an experience, yet the experience is unique

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to the individual who recalls it. How we react to being the focus of social attention seems to be closely related to the meaning that we assign to the situation. In turn, this meaning is largely the result of our prior experience as well as of our genetic heritage, or, in short, our personality. This premise lies at the foundation of the present review, which looks at the way personality moderates the response to social presence.

Despite being one of the early questions asked in the field of social psychology, research on the social facilitation effect (i.e., the effect of social presence) has not dealt much with the question of personality moderation. The present review shows that considering personality could considerably improve our understanding of this effect. The review begins by describing the major research directions and explanations of social facilitation. A broad look at this literature shows that the response to social presence follows one of two general orientations: positive-self-assured and negative-apprehensive. The review then explores the role of personality in social facilitation. Personality is suggested as an enduring basis for a relatively positive or negative orientation toward social presence. The results of an original meta-analysis support this claim by showing that positively oriented individuals experience performance improvement in social presence, whereas negatively oriented individuals experience performance impairment. The moderating effects of personality are discussed vis-à-vis the traditional focus in the social facilitation literature on task complexity as a moderating variable. The review concludes with suggestions for future research.

### 1.1. *Social Facilitation*

Triplet's (1898) observation of cyclists riding faster when in competition compared to when alone stimulated the creation of a new research interest in social psychology, which focuses on the effects of social presence on behavior. The term *social facilitation* was coined by Allport (1924) to describe "an increase in response merely from the sight or sound of others making the same movement" (p. 262). Although early studies of social facilitation focused on a co-action paradigm, later studies introduced a passive observer paradigm (e.g., Dashiell, 1935) in which an individual is passively observed by one or few individuals. Current approaches to social facilitation refer to both paradigms. Specifically, social facilitation is said to occur when there is an increase or decrease in behavior by an animal<sup>1</sup> in the presence of another animal that does not otherwise interact with the first animal (Guerin, 1993).<sup>2</sup>

Zajonc's (1965) seminal review was a major milestone in the research on social facilitation, paving the way for future research by proposing an interaction-based paradigm. According to Zajonc, social presence improves performance of simple or well-learned tasks, and impairs performance of complex or ill-learned tasks. Utilizing the Hull-spence drive model (Spence, 1956), Zajonc's Drive theory asserted that while in the mere presence of others, an organism automatically and unconditionally experiences generalized drive (arousal), which interacts with its habit strength to yield a greater tendency toward issuing a habitual (dominant) response. On simple tasks, this response is usually the correct one, leading to performance improvement, but on complex tasks, it is usually the incorrect one, leading to performance impairment.

<sup>1</sup> While the definition generally refers to animal behavior, the focus of the present review is on human behavior.

<sup>2</sup> Modern definitions of social facilitation exclude situations like the one described by Triplet, in which competition, cueing, or any other form of interaction exists between the actor and the observer/co-actor.

Zajonc's contribution was twofold: first, by introducing task complexity<sup>3</sup> as a moderating variable, he managed to account for previously seemingly inconsistent results and to establish what later became a consensual paradigm in social facilitation research. Subsequent theories regarded simple performance improvement and complex performance impairment as the social facilitation effect that needs to be explained. The second aspect of Zajonc's contribution was his proposed explanation, which, as described above, was based on an automatic arousal increase. Later theories, however, have considered other explanations differing mainly in their suggestions for mediating mechanisms and the role they ascribe for arousal. A short consideration of this theoretical dispute follows (for more detailed reviews see Aiello & Douthitt, 2001; Geen, 1989, 1995; Geen & Gange, 1977; Guerin, 1993).

### *1.2. Leading explanations of social facilitation*

Four major mediating mechanisms of the social facilitation effect have thus far been proposed: uncertainty, evaluation apprehension, self-awareness, and distraction.

#### *1.2.1. Uncertainty*

Two theories suggest that the social facilitation effect evolves from a sense of uncertainty that the organism experiences in social settings. The first to suggest the uncertainty mechanism was Zajonc (1980) in a modification of his Drive theory. This idea was further developed by Guerin and Innes (1982; Guerin, 1983, 1993) in their Monitoring theory. Both the Drive theory and the Monitoring theory claim that organisms are predisposed to monitor and be prepared to react to the ever-changing demands induced by social presence. Social situations pose various threats to the organism, necessitating it to maintain a high level of alertness in order to quickly react in case of attack. This high level of readiness causes the aforementioned increase in arousal, which in turn is claimed to be responsible for the social facilitation effect. Based on this approach, one can expect stronger effects when the performing organism feels threatened, unable to monitor the observer, or is unfamiliar with the observer.

#### *1.2.2. Evaluation apprehension*

In response to Zajonc's original Drive theory, Cottrell (1968, 1972) asserted in his Evaluation Apprehension theory that the drive in social situations is a learned one, originating from one's past experience with social encounters. An individual's past experiences produce a set of (either positive or negative) unconscious expectations regarding future encounters, forming the basis of the drive. According to Cottrell, a social facilitation effect will be evident only if the performing organism expects to be evaluated by others (similar ideas were presented by Bond, 1982 and Berger et al., 1981, emphasizing self-presentation concerns and various behavioral changes stemming from a tendency to conform in social presence). In support of this theory, several studies showed that social facilitation occurs only when the observers were able to evaluate the actor's performance (e.g., Cottrell, Wack, Sekerak, & Rittle, 1968; Henchy & Glass, 1968; Paulus & Murdoch, 1971). Some

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<sup>3</sup> The original focus on habit strength (an organism's attribute) quickly translated in the literature into the more controlled external variable of task complexity.

researchers (e.g., Weiss & Miller, 1971) have suggested that the social facilitation effect occurs only under the expectation of receiving negative feedback, yet evidence has shown otherwise, demonstrating that positive feedback expectations produce social facilitation effects as well (e.g., Blascovich, Mendes, Hunter, & Salomon, 1999; Good, 1973).

### *1.2.3. Self-awareness*

Two theories argue that social presence makes one self-aware. Duval and Wicklund's (1972; Wicklund and Duval, 1971) Objective Self-Awareness theory proposes that while in social presence, one inspects oneself from an objective observer's perspective. In so doing, the difference between the current self and an ideal self becomes salient and produces an aversive state, which motivates behavior. When the task is simple, the added energy improves performance; in contrast, when the task is complex, the excessive effort leads to impaired performance.

Similar ideas were introduced by Carver and Scheier (1981a, 1981b) in their Control theory. This theory compares human nature to a control system, in which a process of matching to standards governs behavior. Social presence catalyzes a process of testing one's behavior against a (private or public) standard, which in turn stimulates a negative feedback loop to close the gap. This affect-free mechanism contributes to enhanced performance of simple tasks with clear and achievable standards; however, the difficult and sometimes contradicting standards of complex tasks create cognitive withdrawal that negatively affects performance.

### *1.2.4. Distraction*

The Distraction-Conflict theory (Baron, 1986; Baron, Moor, & Sanders, 1978; Groff, Baron, & Moore, 1983; Sanders & Baron, 1975) proposes that social presence distracts and creates an attentional conflict for the individual engaged in a task. Social presence summons the actor's attention for various reasons, such as social comparison or monitoring for threats, and this distraction conflicts with the actor's wish to accomplish the task. The unavoidable result is an attentional conflict that creates either increased drive or cognitive overload (depending on the version of the theory; see Baron, 1986); both supposedly facilitate performance of easy tasks (due to their low demands), but impair the performance of complex tasks.

## *1.3. An integrative approach*

All of the above theories have supporting evidence, yet all have marked weaknesses. Attempts to pinpoint a single exclusively accurate theory have proven unsuccessful (Guerin, 1993). In my opinion, such attempts are misguided because the existing theories are not mutually exclusive. The picture that emerges from the aforementioned theories is of an organism that, once aware that it is being observed, reacts in a way that is either compatible with its phylogenetic heritage (i.e., increased alertness to enhance survival), its ontogenetic experience (i.e., learned drive), its current evaluation of its abilities (resulting from a process of self-reflection), or its momentary sense of disturbance (i.e., reaction to being distracted). Considering the different bases for these reactions, the possibility of the co-occurrence of one or more of them seems a plausible alternative (see also Geen, 1989; Guerin, 1993; Paulus, 1983 & Sanders, 1981, for other integrative ideas). A multi-level reaction to social presence seems reasonable when taking into consideration the ambiguity entailed

in having a non-interacting stranger observe you. In such a situation, myriad interpretations and reactions are likely, and the theories emphasize what might reflect varying levels of control, awareness, and intentionality in the individual's reaction to it.

For our purpose, however, more important is what cuts across these levels, and these are two overarching orientations toward social presence. The first is a *negative orientation*, which is reflected in explanations that emphasize threat, apprehension, or distraction. This orientation predominates in social facilitation theorizing (Borden, 1980). Other explanations emphasize a *positive orientation*, expressed by high levels of self-assurance and enthusiasm. Such a reaction can result from the potential of being prized by others after successfully accomplishing a task, from the boost of motivation in pursuing an ideal self that emerges while being observed, or from any other positive connotation that one has with regard to social situations.

With the bulk of social facilitation theories emphasizing anxiety-related reactions to social presence, it is no surprise that little research attention has been paid to the exploration of other reactions. In the instances when this issue was addressed, it was in the context of manipulating the relations between the actor and the observers (e.g., Cox, 1966, 1968; Geen, 1977; Henchy & Glass, 1968; Seta & Seta, 1995), or by manipulating the actor's prior success with the task (e.g., Blascovich et al., 1999; Robinson-Staveley & Cooper, 1990; Sanna, 1992). These manipulations attempted to induce either anxiety or self-assurance in the actor, creating temporary states of either negative or positive activation. However, the effect of such manipulations is not always straightforward. For example, prior success with a task seems a good source for self-assurance when asked to re-perform the task before an audience. However, under some conditions (e.g., when the audience is aware of the actor's prior success) such manipulation may act as a double-edged sword, actually increasing anxiety and eventually debilitating performance (Seta & Seta, 1995). Therefore, although there is a theoretical basis for a distinction between positive and negative activation in situations of social presence, experimental manipulations do not necessarily capture it, and when they do, they necessitate the manipulation of additional factors (e.g., familiarity with observers, prior experience with the task) that may compromise the researcher's ability to manipulate in isolation the effect of the mere presence of others.

One way to overcome this limitation is by looking at personality traits. To the extent that there are positive and negative orientations toward social presence, one can reasonably expect that the relevant traits will moderate the reaction to social presence with no need for additional (potentially confounding) manipulations. To further explore this idea, the following sections focus on the role of personality in the social facilitation effect.

#### 1.4. Personality

Recognition of the importance of individual differences in moderating the effect of social presence dates back to Triplett's pioneering work. Triplett (1898) attributed the variance in his findings to differences in control among his subjects. Several years later, Allport (1924) also reported on individual differences in susceptibility to the influence of social presence, this time with regard to mental functions (thought and association). According to Allport (1920/1967), some individuals are inclined to be distracted and to experience performance impairment in group sessions. Later on, Hollingsworth (1935) concluded that audience effects are extremely variable across performers, and Dashiell (1935) marked individual differences as a source of complication in the understanding

of this effect. Finally, writing from a theoretical perspective, Spence (1956) mentioned individual differences as a source of variance in drive and response.

However, following Zajonc (1965) most of the social facilitation theories ignored individual differences, and emphasized task complexity as the central moderating variable. This emphasis had some less-than-constructive consequences. The task-based interaction is, by its nature, nearly irrefutable: there are no objective criteria for determining the difficulty of a task, so virtually any outcome is theoretically accounted for. In addition, many sorts of tasks that require varying and even opposing skills (e.g., error detection vs. creativity) could be classified as equally complex. That is, without a theoretical basis for task classification, we are left with a very general and vague categorization of simple versus complex tasks. In addition, the emphasis on task characteristics shifted the theoretical debate to the last link in the causal chain—task performance. All theories aimed at explaining this behavioral effect while actually disagreeing on the mediating process(s) involved (e.g., uncertainty, distraction, etc.). Because most theories provided successful *posteriori* explanations for the bulk of results, they became undifferentiated and nearly impossible to refute (Aiello & Douthitt, 2001; Guerin, 1993).

The utility of the simple/complex dichotomy is also challenged by the results of a meta-analysis (Bond & Titus, 1983). Two of its most substantial conclusions were: (1) social presence accounts, on average, for only a small amount of variance (between 0.3 and 3%) in both simple and complex task performance; and (2) various studies typically yield inconsistent and sometimes contradictory results. On some effects (e.g., complex task performance quantity), over 40% of the results opposed the overall mean. This pattern of results points to the existence of moderating variables beyond the contribution of task complexity, once again indicating that there is more to social facilitation than the facilitation of simple performance and the impairment of complex performance.

An additional, broader reason for the neglect of individual differences in the social facilitation effect resides with the difference between situationism and dispositionism (Baumeister, 1999; Jones, 1998). These two disciplines of psychology have a long history of rivalry and mutual disregard (Cronbach, 1957), and from a historical standpoint, it is interesting to note that the growing body of research in social facilitation (starting in 1965) was concurrent with the beginning of the fierce “person–situation” debate in psychology (Mischel, 1968). At least in the early years of the debate, personality was attacked for its conceptual existence and empirical contribution. Yet even as the debate waned, and both sides were proved partially correct, the methodological insights gained along the way help in clarifying why personality would still find it difficult to be proven useful under the current social facilitation paradigm: experiments are “strong situations” (Snyder & Ickes, 1985), and the conventional social facilitation experiment is an “impact study” (Aronson, Wilson, & Brewer, 1998), usually relying on a between-subjects experimental design and not on repeated measures or longitudinal designs (for example, in Bond & Titus’s, 1983 meta-analysis, four out of every five studies was based on a between-subjects design). Narrow response options, brief experiment duration, detailed behavioral instructions—all typical of social facilitation experimentation—contribute to constraining the effect of personality traits and to enhancing effects associated with experimental manipulation (Buss, 1989).

From the above discussion, it appears that a blend of historical, methodological, and theoretical causes contributed to the relatively scant attention paid to personality in the study of the social facilitation effect. It is estimated that only 5–7% (approximately 30 studies) of the social facilitation studies thus far conducted have measured individual dif-

ferences. Only two reviews have addressed this issue, the more recent published over 25 years ago (Geen, 1980; Paivio, 1965), and both offered only a qualitative analysis of the then-available literature. The present review, therefore, offers the first quantitative analysis on individual differences in the social facilitation effect.

### *1.5. Self-esteem, trait anxiety, extraversion, and the two orientation systems*

Three traits dominate the existing literature on individual differences in the social facilitation effect: self-esteem, trait anxiety, and extraversion. Recent studies show that these traits are strongly associated with the two general orientations described above, the positive and the negative.

A considerable quantity of research reports on the relationship between the “Big Two” dimensions of personality—extraversion and neuroticism (in which anxiety is the most critical component; e.g., Eysenck & Eysenck, 1985)—and positive and negative affective states, accordingly (Abe & Izard, 1999; Carver, Sutton, & Scheier, 2000; Chang, 1997; Costa & McCrea, 1980; Rusting, 1998; Rusting & Larsen, 1997; Tellegen, 1985; Watson, Weise, Vaidya, & Tellegen, 1999; Wilson & Gullone, 1999). Compared to introverts, extraverts are predisposed to experience higher levels of positive affect in general (i.e., across conditions; e.g., Lucas & Baird, 2004), and in response to emotional inductions (e.g., Rusting & Larsen, 1997). Extraversion has little effect, however, on the emotional response along the negative affect scale (Rusting & Larsen, 1997).

Neuroticism, on the other hand, is strongly related to negative affect in general (Costa & McCrea, 1980), and in response to emotional inductions (e.g., Rusting & Larsen, 1997). Neuroticism has little effect, however, on positive activation (Rusting & Larsen, 1997). In addition, when faced with ambiguous events, extraversion and neuroticism promote trait-congruent interpretations. That is, extraversion promotes a positive interpretation, whereas neuroticism promotes a negative interpretation (e.g., Gomez, Gomez, & Cooper, 2002; Rusting, 1999; Zelenski & Larsen, 2002), the one not exclusive of the other (Uziel, 2006).

Extraversion and neuroticism are considered independent of each other (e.g., Eysenck & Eysenck, 1985), yet both are related to self-esteem (e.g., Judge, Erez, Bono, & Thoresen, 2002; Swickert, Hittner, Kitos, & Cox-Fuenzalida, 2004). Robins, Tracy, Trzesniewski, Potter, and Gosling (2001) reported on a correlation of 0.38 between extraversion and self-esteem, and a correlation of  $-0.50$  between neuroticism and self-esteem in an online survey with more than 320,000 respondents. Their results are consistent with nine other studies that reported an average correlation of 0.40 between extraversion and self-esteem, and  $-0.61$  between neuroticism and self-esteem (cf. Robins et al., 2001).

As might be expected from the aforementioned correlations, in terms of associations with other variables, the self-esteem relationships resemble in part those of extraversion and in part those of neuroticism. For example, self-esteem appears to be associated with both positive and negative affect (Cheng & Furnham, 2003; Pelham & Swarm, 1989; Watson & Clark, 1984), and was found to mediate the effects of both extraversion and neuroticism on happiness and depression (Cheng & Furnham, 2003).

In addition, high self-esteem individuals, like extraverted individuals, seem to be especially responsive to positive stimuli (Wood, Heimpel, & Michela, 2003). In contrast, low self-esteem individuals, like neurotic individuals, focus on the negative aspects of situations (Smith & Petty, 1995; Wood et al., 2003). In light of the differential reactions by

low and high self-esteem individuals, researchers have suggested that a bi-dimensional model, differentiating between positive and negative self-esteem, would better fit the existing data (e.g., Cheng & Furnham, 2003; Owens, 1993).

At least part of the association of self-esteem with extraversion and neuroticism has been attributed to social relations and perceived social acceptance (Leary & MacDonald, 2003). According to the Sociometer theory of Leary and his colleagues (e.g., Leary, 1999; Leary & Baumeister, 2000; Leary & MacDonald, 2003; Leary, Tambor, Terdal, & Downs, 1995), self-esteem operates as a gauge of one's interpersonal appeal and success. Extraverts tend to be dominant, optimistic, and assertive in their social interactions—behaviors that lead to social approval and to a sense of being socially accepted. This sense is in turn reflected in high levels of self-esteem. In contrast, neuroticism is associated with anxiety, depression, and bashfulness, which are not socially desired, and which lead to social rejection and to a reduced sense of social inclusion, which in turn is reflected in low self-esteem.

According to the Sociometer theory, trait self-esteem serves as a gauge especially “in the absence of explicit cues connoting inclusion or exclusion” (Leary et al., 1995, p. 527), that is, in conditions that prevent individuals from ascertaining how they are perceived and evaluated. In such conditions, “people with very low trait self-esteem may perceive others as rejecting most of the time, whereas those with higher self-esteem generally feel they are being accepted” (Leary et al., 1995, p. 527). These perceptions guide individuals' overall approach (apprehensive vs. self-assured) and behavior in social conditions.

Taken together, the above discussion points to two basic tendencies that have affective and social roots. The first represents a tendency toward self-assurance and enthusiasm in general and toward the social environment, and is reflected in the traits of extraversion and high self-esteem. The other represents a tendency toward anxiety and apprehension in general and toward the social environment, and is reflected in the traits of neuroticism and low self-esteem.

The idea of two general predispositions related to social presence was suggested by Paivio (1965) in his research on children's reaction to audience. Paivio differentiated between a predisposition to anxiety before observers (“self-consciousness”) and an attention-seeking tendency (“exhibitionism”), representing largely orthogonal avoidance and approach tendencies toward social performance (Levin, Baldwin, Gallwey, & Paivio, 1960). According to Paivio, such tendencies result from child-rearing practices and the development of conditioned (negative or positive) responses to audience by the child. In a series of experiments (summarized in Paivio, 1965), Paivio and his collaborators demonstrated the interaction between audience presence and personality by showing generally positive effects of exhibitionism and negative effects of self-consciousness on verbal behavior in the presence of audience.

Paivio's work did not focus on social facilitation as it is currently defined (for example, Paivio's experiments did not compare performance alone to performance under social presence). Still, in many respects, his work is a conceptual antecedence of the present study in proposing a dual personality-based approach to social presence. One noticeable difference in this regard between the present work and that of Paivio is that the latter's research treated the approach tendency as a *need* or motivation that may or may not be fulfilled (depending on other factors, particularly the level of avoidance tendency), whereas in the present study, positive orientation is conceptualized as a characteristic *quality* of the individual.

## 1.6. Hypotheses

Social presence is both an ambiguous situation and a significant one. It is ambiguous because one does not know for certain the consequences of such presence—both positive and negative consequences are possible. It is significant because as social creatures, each outcome, either positive or negative, has a potentially substantial effect on our future.

Personality predisposes us to adopt differing approaches to these situations. High self-esteem and extraverted individuals are predisposed to positive orientation, whereas low self-esteem and neurotic individuals are predisposed to negative orientation. The existing social facilitation literature has demonstrated that it is the individual's approach—expressed in the level of comfort that she/he experiences in social presence (Geen, 1977); in the assessment of the impression that she/he makes (Bond, 1982); in his/her level of self-assurance (Robinson-Staveley & Cooper, 1990; Sanna, 1992; Sanna & Shotland, 1990); and in his/her sense of challenge and excitement (as opposed to threat and apprehension; Blascovich et al., 1999; Levin et al., 1960)—that determines the positive or negative effect that social presence will have on him/her (and in turn the perceived difficulty of the task being performed).

The present study proposes that positive and negative orientations promote an opposite cascade of affective (challenge, enthusiasm vs. anxiety, depression), motivational (approach vs. withdraw), and cognitive (active generation of ideas vs. rumination and distraction) processes (cf. Carver et al., 2000; Fiedler, 2001; Higgins, 1998; Isen, 1987; Mueller, 1992). These processes in turn cause positive orientation to be associated more often with performance improvement, and negative orientation to be associated more often with performance impairment in conditions of social presence compared to solitary performance.

The above studies suggest that social orientation will have a greater effect on performance than will the effect associated with the “objective” classification of the task as simple or complex (e.g., Bond, 1982; Geen, 1977). Still, positive orientation may be associated with an even greater improvement on simple tasks, because the more likely felt success during the performance of these tasks may further enhance this orientation. In contrast, negative orientation may be associated with an even poorer performance on complex tasks, because the more likely experienced difficulties during the performance of these tasks may further (and quicker) enhance this orientation (see Mueller, 1992, for additional theoretical mechanisms that predict performance impairment among negatively oriented individuals especially on complex tasks). To explore these propositions, the interaction between orientation and task complexity will also be included in the analysis.

The next section quantitatively explores the existing literature in order to check the above hypotheses. Efforts were made to trace all published studies in order to present a comprehensive overview of the field.

## 2. Method

### 2.1. Literature search and inclusion criteria

Data for the meta-analysis were retrieved using three sources: (1) online databases (IBAINform 1971–2005; PsycInfo, 1887–2005; Sociological Abstracts, 1963–2005; Web of Science, 1984–2005) using the following search terms: *audience*, *co-action*, *group effect*,

observer, public performance, social facilitation, and social presence crossed with anxiety, extraversion, individual differences, neuroticism, personality, and self-esteem; (2) reference lists of reviews of the social facilitation literature (e.g., Bond & Titus, 1983; Guerin, 1993); and (3) reference lists of all the articles collected.

To be included in the meta-analysis, a study had to report a measure of performance of a single task under two social settings: alone *and* social presence (social presence was broadly defined in order to include all manipulations typical to social facilitation experiments, including passive observers, co-action, mirror, and video camera). In addition, the study had to measure personality.

After reviewing several hundred studies, 26 were found to fit the above inclusion criteria. Fourteen (with 28 effect sizes) are included in the meta-analysis, of which six (10 effect sizes) focused on trait anxiety; six (14 effect sizes) on self-esteem<sup>4</sup>; and three (four effect sizes) on extraversion. The remaining twelve had insufficient specification of data for a quantitative analysis.<sup>5</sup>

## 2.2. Data preparation and determination of effect sizes

Most of the studies included in the meta-analyses utilized a between-subjects experimental design, with both alone and observer conditions. Within each condition, two groups of participants were considered: one high and one low on a particular personality trait. The combination of the social presence variable and the trait variable resulted in a two-by-two design. The reported means and *SDs* of each of the four groups served as the basis for the analysis. Unless otherwise stated, the reported effect sizes are point-biserial correlation coefficients that were calculated by converting *t* or *F* values based on transformation formulae specified in Hunter and Schmidt (1990, pp. 268, 272)<sup>6</sup>.

For each group (e.g., extraverts in Grant & Dajee, 2003, or high-anxiety individuals in Berkey & Hoppe, 1972), the correlation coefficient represents the association between *social presence* (as a dummy variable with alone = 0; observer = 1) and *performance*. A positive correlation means that performance in the presence of observers was *better* than

<sup>4</sup> One study (Shrauger, 1972) measured both trait anxiety and self-esteem.

<sup>5</sup> The following studies were not included in the meta-analysis due to insufficient data specification: Abrams and Manstead (1981), Bargh and Cohen (1978), Cox (1966, 1968), Fouts (1969), Ganzer (1968), Geen (1976, 1977), Hall and Bunker (1979), Hutchinson and Cotten (1973), Kieffer (1977), and Martens (1969).

<sup>6</sup> Hunter and Schmidt (1990) specify a variety of artifacts that may be corrected for in order to obtain ideal values of the correlation coefficients as if taken from an error-free world. However, among the artifacts mentioned by Hunter and Schmidt (1990), some have little or no relevance to the present study, while others could not be corrected for due to lack of relevant data. In detail, there is no reliable way to estimate the *error of measurement* in the dependent or independent variables; the same is true with regard to *deviations from perfect construct validity* and variance due to *extraneous factors*. *Dichotomization* of continuous (dependent or independent) variables was not corrected for because the correlation coefficients reported in this study represent the association between an experimental manipulation (social presence, which is not an artificially dichotomized continuous variable) and performance (which was not dichotomized). *Range variation* in the independent variable, *attrition*, and *transcriptional errors* were not detected in the data, and therefore were not corrected for. The weighing of the effect sizes based on the inverse of the sampling error variance was utilized to control for the effect of *sampling error* on the mean, and the regression procedure (see Section 3) explores whether the distribution of the effects is homogeneous, that is, beyond what would be expected from sampling error only. Taken as a whole, the results reported in this study are, therefore, directly derived from the studies that comprise the meta-analysis, and most likely are underestimations of the ideal correlations in an error-free world.

solitary performance, whereas a negative correlation means that performance in the presence of observers was *worse* than solitary performance.

Where data were missing or partially reported, I tried to complete the calculation based on the data at hand. For a precedent example, Terry and Kearnes (1993) reported means without specifying *SDs*. An estimate of the error variance was calculated based on the results of a reported *F*-test. The calculated variance then served for secondary analyses of the means.

In order to test the hypotheses, the effect sizes were sorted to represent the two predictors: orientation (positive or negative) and task complexity (simple or complex). The 11 effect sizes taken from studies on high self-esteem and extraversion formed the positive orientation group, and the 17 effect sizes taken from studies on low self-esteem and high trait anxiety formed the negative orientation group. In addition, based on the description of the task in the original study (cf. Bond & Titus, 1983), each of the above effect sizes was associated with either simple (11 effect sizes) or complex (17 effect sizes) performance.

### 3. Results

The characteristics and effect sizes of all of the studies in the meta-analysis are presented in Table 1. The table includes separate columns for positive orientation and negative orientation, as well as summary descriptive statistics. The distribution of the effects across orientations and task complexity is presented in Fig. 1. As seen in Table 1, the 11 effect sizes that represent the positive orientation include four effect sizes in which the focal trait was extraversion and seven effect sizes in which the focal trait was self-esteem. Of the 11 effect sizes, six are based on data from simple tasks and five on data from complex tasks. Five effect sizes are based on studies using observers as a social presence manipulation. Other manipulations were co-acting participants (two effect sizes), a mirror (two effect sizes), and a video camera (two effect sizes). Eight effect sizes are based on the results of studies using non-optimal control conditions in which the participants were not truly alone.

The 17 effect sizes that represent the negativity orientation include seven in which the focal trait was self-esteem and 10 in which the focal trait was trait anxiety. Of the 17 effect sizes, five are based on data from simple tasks and twelve on data from complex tasks. Ten effect sizes are based studies using observers as a social presence manipulation. Other manipulations were co-acting participants (three effect sizes), a mirror (two effect sizes) and a video camera (two effect sizes). Fourteen effect sizes are based on the results of studies using non-optimal control conditions in which the participants were not truly alone.

In order to test the hypotheses, a weighted multiple regression approach was used (Hedges & Olkin, 1985). Two variables served as predictors: orientation (negative, positive) and task complexity (simple, complex). These were entered in Step 1, and their interaction was introduced in Step 2. The results of the analysis are presented in Table 2. Following Lipsey and Wilson (2001, p. 123), the standard errors of the regression coefficients ( $SE_B$ ) were adjusted in order to represent their non-biased values. As seen in Table 2, participants' orientation toward social presence substantially moderated the effect of social presence on performance ( $\beta = .61, p < .01$ ). In contrast, task complexity and the orientation-by-complexity interaction did not contribute to the prediction of performance.

These results basically mean that regardless of the “objective” task performed, the individual's own characteristic orientation toward the situation had a strong effect

Table 1  
 Characteristics and effect sizes of the studies included in the meta-analysis

Study	Personality inventory	Task (difficulty)	Effect size ( $r_{pb}$ )		Comments
			Negative orientation (Trait anxiety and LSE)	Positive orientation (Extraversion and HSE)	
<i>Extraversion</i>					
Colquhoun and Corcoran (1964)—Morning	Heron PI	Letter cancellation (simple)		.16 <sup>ab</sup> (29)	NA; Co.
Colquhoun and Corcoran (1964)—Noon	Heron PI	Letter cancellation (simple)		-.18 <sup>ab</sup> (38)	NA; Co.
Grant and Dajee (2003)	EPI	Multiplication (simple)		.25 <sup>b</sup> (60)	PO.
Graydon and Murphy (1995)	EPI	Ping-pong game (simple)		.75 <sup>c</sup> (20)	NA; Active Observers.
<i>Self-esteem</i>					
Brockner (1979a)	Based on Cutick (1962)	Concept formation (complex)	-.39 <sup>de</sup> (19)	.34 <sup>de</sup> (17)	NA; Mr.
Brockner (1979b)	Based on Cutick (1962)	Concept formation (complex)	-.19 <sup>df</sup> (41)	.15 <sup>df</sup> (49)	NA; Mr.
Brockner and Hulton (1978)	Based on Cutick (1962)	Concept formation (complex)	-.53 <sup>d</sup> (27)	-.03 <sup>d</sup> (28)	NA; PO.
Geisler and Leith (1997)	Rosenberg SES	Soccer penalty shots (simple)	.00 <sup>e</sup> (20)	.00 <sup>e</sup> (20)	NA; PO.
Shrauger (1972)	Based on Cutick (1962)	Concept formation (complex)	.00 <sup>e</sup> (32)	.00 <sup>e</sup> (32)	NA; PO.
Terry and Kearnes (1993)	Rosenberg SES	Letter copying (simple)	-.47 <sup>h</sup> (20)	.24 <sup>h</sup> (20)	VC.
Terry and Kearnes (1993)	Rosenberg SES	Letter copying (complex)	.11 <sup>h</sup> (20)	.56 <sup>h</sup> (20)	VC.
<i>Trait anxiety</i>					
Berkey and Hoppe (1972)	Taylor manifest anxiety scale	Paired associates (simple)	.04 <sup>d</sup> (20)		NA; PO.
Berkey and Hoppe (1972)	Taylor manifest anxiety scale	Paired associates (complex)	-.32 <sup>d</sup> (20)		NA; PO.
Geen (1985)	Test anxiety scale	Anagrams (complex)	-.39 <sup>hi</sup> (20)		Experimenter as observer.
Pederson (1970)	Test anxiety scale	Paired associates (complex)	.00 <sup>e</sup> (16)		NA; Co.
Pederson (1970)	Test anxiety scale	Vowel cancellation (simple)	-.35 <sup>h</sup> (16)		NA; Co.
Pederson (1970)	Test anxiety scale	Multiplication (simple)	.00 <sup>e</sup> (16)		NA; Co.

Quarter and Marcus (1971)	Achievement anxiety scale	Digit span (complex)	–.21 (34)		NA; PO.
Shrauger (1972)	Taylor manifest anxiety scale	Concept formation (complex)	.00 <sup>g</sup> (16)		NA; PO.
Wankel (1977)—two observers	State-trait anxiety inventory	Pursuit rotor (complex)	.02 <sup>j</sup> (20)		NA; PO.
Wankel (1977)—six observers	State-trait anxiety inventory	Pursuit rotor (complex)	–.10 <sup>i</sup> (20)		NA; PO.
Summative weighted point-biserial correlations					
		Simple tasks	–.154 ( $K = 5$ )	.171 ( $K = 6$ )	
		Complex tasks	–.178 ( $K = 12$ )	.156 ( $K = 5$ )	
		All tasks	–.172 ( $K = 17$ )	.165 ( $K = 11$ )	

Note. LSE, low self-esteem; HSE, high self-esteem;  $r_{pb}$ , point-biserial correlation between social presence (alone = 0, Observer = 1) and performance;  $n$  appears in parenthesis next to each correlation; NA, No true alone condition; PO, passive observers; Co, co-action; Mr, mirror; VC, video camera.

<sup>a</sup> Transformed  $t$  or  $F$  values.

<sup>b</sup>  $SD$  estimate derived from reported  $t$ -test.

<sup>c</sup> Within-subject design.

<sup>d</sup> Based on reported means and  $SD$ s.

<sup>e</sup> Data taken from Study 2 in Brockner (1979a).

<sup>f</sup> Collapsed across success/failure priming.

<sup>g</sup> Study only reported that all main-effects and interactions were non-significant. Treated as  $r_{pb} = 0.00$ .

<sup>h</sup>  $SD$ s were not reported in the article. Variance estimates were calculated from reported  $F$  values.

<sup>i</sup> Based on data reported in Table 2 in Geen (1985), comparing the alone group to the observed group.

<sup>j</sup> Mean values were inferred from Fig. 1 in Wankel (1977). Variance estimates were calculated from reported  $F$  values.

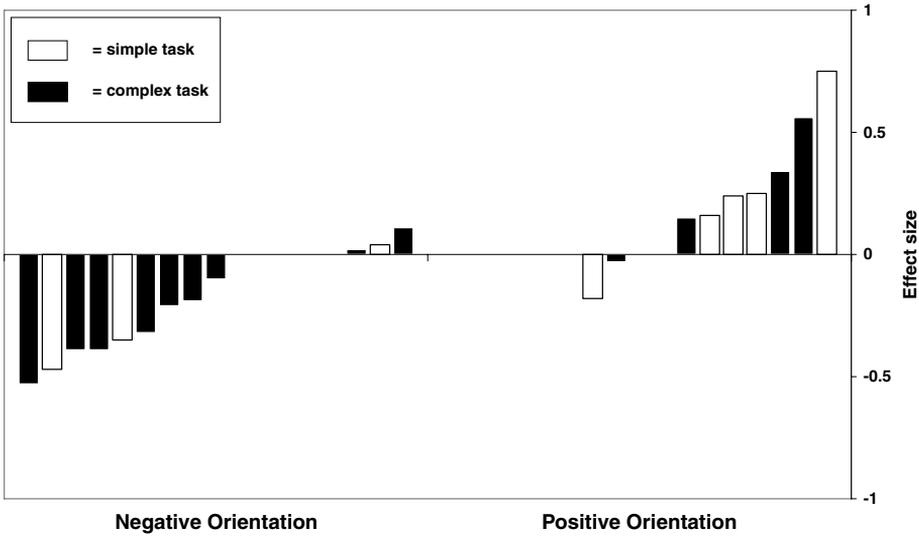


Fig. 1. Distribution of effect sizes across orientations and task complexity. The effect sizes are point-biserial correlations, representing the effect of social presence on performance.

Table 2  
Results of the weighted multiple regression analysis

	<i>B</i>	<i>SE<sub>B</sub></i>	<i>β</i>	<i>R<sup>2</sup></i> change
Step 1				.387*
Orientation	.165	.042	.610*	
Complexity	-.010	.043	-.034	
Step 2				.000
Orientation	.165	.044	.608*	
Complexity	-.010	.044	-.035	
O * C	.002	.044	.007	

\* *p* < .01

on the way social presence affected performance. A positive orientation toward social presence carried a substantial performance benefit ( $w_{r_{pb}} = .17$ ) compared to a negative orientation ( $w_{r_{pb}} = -.17$ ). The interaction component added no significant contribution to the prediction, meaning that social presence did not have a differential effect on task performance as a joint function of orientation and complexity. In fact, under positive orientation, social presence was associated with improved performance of simple ( $w_{r_{pb}} = .17$ ) and complex ( $w_{r_{pb}} = .16$ ) tasks to the same extent [ $t(9) < 1, ns$ ]. An analogous pattern was found for the negative orientation, where social presence was found to have debilitating effects on simple ( $w_{r_{pb}} = -.15$ ) and complex ( $w_{r_{pb}} = -.18$ ) task performance [ $t(15) < 1, ns$ ].

The overall fit of the complete model can be assessed by looking at two indices that reflect the division of the variance into the portion associated with the regression model (weighted sum of squares due to the regression; denoted  $Q_R$ ), and the variance unaccount-

ed for by the model (weighted error sum of squares; denoted  $Q_E$ ). Both statistics have a chi-square distribution (Hedges & Olkin, 1985; Lipsey & Wilson, 2001).

Analysis of the data pertaining to the present regression model revealed that the regression model accounted for a significant portion of the variability [ $Q_R(3) = 17.76, p < .01$ ], an outcome that reflects the significant contribution of the orientation to the prediction. In addition, and more importantly, the analysis revealed that relatively little unaccounted for (i.e., error) variance is left once the variability associated with the model is removed [ $Q_E(24) = 28.08, p > .10$ ]. This outcome means that the model is homogeneous and has a good fit (non-significant  $Q_E$  indicates that the model has a good fit). Taken together, the analysis of the overall fit of the model revealed that the model explains the variability across effect sizes successfully and comprehensively.

A persistent problem in the social facilitation literature is the lack of a true alone control condition in many of the experiments (cf. Bond & Titus, 1983; Guerin, 1993). When the “alone” participants are not truly alone (usually because an experimenter oversees the experiment from a relatively concealed position), the experimental manipulation (i.e., attentive audience) potentially does not have its full effect. Therefore, in an auxiliary analysis, I have tried to evaluate whether having a true alone control condition affected the present results. The analysis revealed that to some extent, the absence of a true alone control condition did attenuate the effects of social presence. When there was a true alone control condition, the effects of social presence were somewhat more positive for the positive orientation group ( $k = 3; \overline{w_{r_{pb}}} = .31$ ), and somewhat more negative for the negative orientation group [ $k = 3; \overline{w_{r_{pb}}} = -.25$ ]; the difference between these effects is statistically significant:  $t(4) = 2.93, p < .05$ ] compared to the effects found for the entire literature (reported above). The small number of studies precludes drawing strong conclusions, yet the fact that the hypothesized effect is stronger for studies with a better methodology further underscores the conclusions reached by the present study.

#### 4. Discussion

Social facilitation deals with the most basic effect of our social environment on behavior: the effect of the mere presence of others near us. As one of the first research topics in the field of social psychology, the social facilitation effect has attracted the attention of many researchers over the years. This review explored one aspect of the social facilitation effect by asking how personality moderates it.

A close reading of the early social facilitation studies revealed that individual differences constituted an integral part of the social facilitation effect (e.g., Allport, 1924). However, for various reasons, these early findings were disregarded when a new and exciting paradigm was introduced in 1965 (Zajonc, 1965). With the acceptance of Zajonc’s “task as moderator” paradigm the field entered a stage of “ordinary business of science” (Eysenck, 1997), where theoretical deductions were tested and refinements, ameliorations, and theory replacement took place. Over the years, several theories have been proposed, each seeming to capture an important yet incomplete aspect of the social facilitation effect.

The present review offers an alternative integrative approach. It is based on the premise that social presence is an ambiguous yet significant event. Reactions to social presence are multi-dimensional, and are expressed in various physiological and psychological systems. An important characteristic of these reactions is that they are either predominantly positive or predominantly negative. That is, when observed, individuals experience increased

energy and enthusiasm, or alternatively, increased levels of apprehension and anxiety. Although both reactions share an arousal component, it is their valence (positive or negative) that represents their specific respective essences (Neiss, 1988). However, throughout the years, the social facilitation literature has placed most of its emphasis on general arousal and ensuing behavioral changes (i.e., increased tendency to react with a dominant response), focusing on unidimensional performance indicators (Kushnir, 1981). A meta-analysis of that literature revealed that under this paradigm, social presence has little effect on both simple and complex performance, leaving most of the variance unaccounted for (Bond & Titus, 1983).

The present review suggests that a better way to explore the valence-based differential reactions to social presence is by looking at individual differences. These differences represent stable orientations toward the social environment, and to the extent that differing approaches to social presence exist they should be apparent once personality is considered. Two major orientations toward social presence were proposed: a positive orientation, which reflects extraversion and high self-esteem; and a negative orientation, which reflects neuroticism and low self-esteem. A meta-analysis of the social facilitation studies that have measured individual differences showed that orientation toward social presence has a significant effect on performance. As hypothesized, positive orientation predisposed individuals to improve their performance under social presence, whereas negative orientation predisposed individuals to experience performance impairment under social presence. With these findings, a first step has been taken in substantiating the importance of considering the (positive or negative) meaning that social presence has for the acting individual, and in demonstrating the importance of individual differences in moderating this meaning.

The contribution of orientation to the prediction of performance was stronger than the contribution attributed to task complexity, a variable that has long been considered the most substantial moderator of this effect. Still, these findings do not mean that task complexity is not an important moderator of the social facilitation effect. The present study included a specific sample of the social facilitation literature (i.e., only studies with personality variables) and therefore has little to say on this broader question, which was addressed before by general reviews of this literature (e.g., Bond & Titus, 1983). The results of this study clearly show, however, that in the existing social facilitation literature that includes personality, the general orientation toward social presence, which stems from individual differences in personality, contributes more to predicting performance than does the level of complexity of the tasks involved.

The present study also provides an answer to the question of whether task complexity is a moderator of the interaction between social orientation and social presence in affecting performance. One could expect negative orientation to be associated with extremely poor performance of complex tasks, and positive orientation to be associated with a greater improvement on simple tasks. However, the data did not support this proposition, a finding that is open to both theoretical and methodological interpretations.

From a theoretical standpoint, positive orientation may have facilitated performance of simple and complex tasks to the same extent because of the additional challenge and greater motivation that positively oriented individuals felt once confronted with a complex task (e.g., Terry & Kearnes, 1993). Negative orientation may have had a similar debilitating effect on simple and complex performance because the actual nature of the task makes little difference once one sees the world through “negativity glasses” (e.g., Bond, 1982). In addition, ironically, fear of public humiliation may be particularly intense when one

performs a seemingly simple task. Extreme levels of apprehension may cause a range of negative effects including impaired performance (e.g., Lambert et al., 2003).

From a methodological standpoint, the relatively small number of studies involved may not have provided the necessary statistical power for the detection of these interactions (notwithstanding, the data was not indicative of even a meaningful trend in this direction). In addition, the subjective nature (in the social facilitation literature) of classification of tasks as simple or complex could have also contributed to the attenuation of these effects. Both of these potential problems could be overcome by future studies (if, for example, they will follow a better-specified criteria for task classification, such as by focusing on the skills required for successful performance).

Two further issues that deserve to be addressed by future studies are a detailed consideration of the mediation process and the exploration of additional personality traits. The question of social facilitation is as much a question of mediating processes and psychological reactions as it is a question of behavioral changes. By understanding how social presence affects us, we are in a better position to predict changes in behavior. Reviewing the social facilitation literature reveals that most studies do not include measures of psychological states, but rather assume their existence by demonstrating the expected behavioral changes. As mentioned in a prior section, in most cases this procedure is ineffective in differentiating alternative explanations (Guerin, 1993). Adding personality as a moderator brings us closer to understanding the mediating processes; however, focused studies that address this specific issue are still needed in order to reach conclusive answers.

A theory that can guide future research on this question is the Sociometer theory (e.g., Leary & Baumeister, 2000). Considering the central role that self-esteem plays in the present analysis, the results of this study could be interpreted in light of the theory's propositions regarding the nature of self-esteem and its effects on social behavior. All individuals have a need to belong and are motivated to act accordingly (Baumeister & Leary, 1995), yet the Sociometer theory posits that individuals with low and high self-esteem approach social situations with a different set of resources as a result of having different childhood experiences (Leary & Baumeister, 2000). Low self-esteem develops out of a history of relational devaluation and repeated rejection by caregivers and/or peers. Therefore, in approaching social situations low self-esteem individuals are highly concerned regarding other peoples' reactions to them, and as a result are distracted and perform poorly in public. In contrast, high self-esteem develops out of a history of social acceptance. Individuals with a high self-esteem feel valued and accepted, and thus approach social situations with confidence. Their self-assurance, coupled with the basic human motivation for social acceptance, forms the basis for enhanced effort and performance facilitation in social presence.

The Sociometer theory provides an additional layer of explanation for the difference in social performance between high and low self-esteem individuals. According to the theory, at least part of the social feedback that people receive in childhood reflects actual performance differences. That is, negative social regard—and therefore low self-esteem—may result, in part, from actual repeated failures, whereas positive social regard—and therefore high self-esteem—may result, in part, from actual repeated successful performances. This would mean that not only do high and low self-esteem individuals hold contrasting social orientations, but also that they possess objectively different skill levels. For low self-esteem individuals, this may double the burden of social performance by creating a “vicious

cycle” of social failure and negative social feedback, whereas for high self-esteem individuals this may be yet another source of their self-assurance in public performance.

Self-esteem included, the social facilitation literature has explored just a small number of traits (mainly self-esteem, trait anxiety, and extraversion). Although these traits represent both positive and negative orientations toward social presence, there is room for exploring other potential moderating personality traits. Some traits, such as locus of control, could provide additional converging evidence in support of the general orientations (see Judge et al., 2002, for evidence on the common basis for self-esteem, locus of control, and neuroticism; see Hall & Bunker, 1979, for the expected moderating effect of locus of control on the social facilitation effect).

Other traits may highlight the activation of more specific processes. One such trait is narcissism, which has been associated with improved performance, but only under certain social conditions (high potential for obtaining glory; Wallace & Baumeister, 2002). Another trait of interest is impression management, or self-presentation need. Individuals with a strong self-presentation need may be found to be especially sensitive to social presence, and this may serve as an amplifier of more basic orientations. For example, negative orientation might be associated with even poorer performance for individuals with a high self-presentation need compared to individuals with a low such need.

Although the available evidence seems to support individual differences moderating the social facilitation effect, the present review and the studies that make up the meta-analysis have some limitations that need to be addressed. The first is the overall small number of studies. With an estimate of 5–7% of the social facilitation studies measuring personality, and only 28 effect sizes in the present meta-analysis, the existing data still needs further checks and verifications before drawing strong conclusions. In addition, many of the studies are based on small sample sizes. From the perspective of a meta-analysis, this factor increases the sampling error and reduces the ability to detect moderating variables and to explore more complex models.

Another limitation is the absence of a true alone control condition in many of the studies (usually because of the presence of an experimenter that oversees the experiment). This is a persistent problem in the social facilitation literature (e.g., Guerin, 1993; Markus, 1978) that seems to be the rule rather than the exception. Only a minority of the social facilitation studies actually report a true alone control condition (100 out of 241 studies in Bond & Titus's, 1983, meta-analysis. Of the remaining 141 studies, in 96 studies there clearly was no true alone condition). Still, when subjected to empirical investigation, this factor was found to have no major effect on the conclusions (Bond & Titus, 1983). Notwithstanding, analysis of the studies in the present review has demonstrated that a better methodology (i.e., a true alone control condition) does have the potential to enhance the effects of social presence.

In addition, this analysis raises the possibility that some of the social facilitation effects rest not just with being in mere social presence (compared to a true alone condition) but also with some additional characteristics of this social presence (that are responsible for the effects found when there was not a true alone control condition), such as being subjected to evaluation (Cottrell, 1972), or being at the focus of social attention (see Ashton, Lee, & Paunonen, 2002, for evidence on the importance of social attention to extraverts). The analysis of these additional factors could be an interesting and important question to be addressed by future studies.

In conclusion, despite the above limitations, at this early stage of research the results should serve as a source of encouragement for the future. Additional studies, with an emphasis on the meaning assigned to social presence and on various aspects of affective, cognitive, and behavioral reactions, may further elucidate the complex processes that take place in social presence.

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