The Focusing Effect of Self-Evaluation Threat in Coaction and Social Comparison

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This article contends that the presence of a coactor leads to a focusing effect whenever this presence represents a threat or a potential threat to self-evaluation. Experiment 1 showed that attentional focusing appears in the presence of an actual (in the case of upward comparison) or potential (in the case of mere coaction) threat to self-evaluation but not in its absence (in the case of downward comparison). Experiments 2 and 3 confirmed that the presence of a coactor affects focusing because the coactor represents a potential threat and showed that introducing a threat in downward comparison can produce a focusing effect. Experiment 4 showed that removing the threat in upward comparison decreases the focusing effect. Experiment 5 confirmed that the effects observed in upward comparison are due to attentional focusing and not to an increase in effort. Contributions to social facilitation, social comparison, and attention research are discussed.

Keywords: social comparison, self-evaluation threat, coaction, illusory conjunction, attentional focusing

> Attention implies withdrawal from some things in order to deal effectively with others.—William James, *The Principle of Psychology*

When William James wrote the above citation, he used the terms "in order to" presumably to refer to a conscious intentional attentional strategy (a kind of attention now referred to as *endogenous attention*; Briand, 1998). Individuals could, for instance, decide to give more attention to cues that are central to the task at hand while allocating less attention to cues that are related to the task but that are only peripheral. However, in other situations, individuals do not make a conscious choice to allocate less attention to peripheral cues but still are faced with situational factors that require them to deal with information not directly related to the task itself, which leads to a withdrawal of attention from peripheral cues in order to deal effectively with more central cues (Cohen, 1978). For the distraction-conflict theory, the presence of a coactor is such a situation (Baron, 1986; see also Geen, 1976; Muller, Atzeni, & Butera, 2004). Indeed, the presence of a coactor often induces the processing of information relative to her or his presence, information that is not directly relevant to the task. Hence, in order to deal with both the task and the additional information represented by the coactor's presence, an attentional focusing phenomenon occurs: More attention is allocated to cues that are central for the task at hand, while peripheral cues are neglected (Chajut & Algom, 2003; Cohen, 1978; Geen, 1976). An interesting consequence is that this focusing of attention that is caused by the coactor's presence will benefit performance when central cues are needed and peripheral cues are useless or disturb the information processing. On the contrary, when peripheral cues are useful in addition to central ones, performance will be impaired by the coactor's presence. This dynamic is known in social psychology as the social facilitation/inhibition (SFI) effect: The presence of a coactor sometimes facilitates and sometimes inhibits performance (Zajonc, 1965, 1980).

However, the above attentional view of the SFI effects is at odds with Zajonc's still dominant drive theory (Zajonc, 1965, 1980), a behaviorist explanation that postulates that the presence of others enhances a person's level of drive. This drive level, in turn, accentuates the hierarchy of the behavioral repertory and, by doing so, reinforces the dominant response. This theory explains the

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circumstances in which coaction can enhance or impair performance by demonstrating that for certain tasks (simple or well-known tasks), dominant responses are the correct ones and that for others (complex tasks), they are not. Zajonc's theory has been very influential and is at the origin of several explanations of SFI effects, based on the notion of dominant responses (e.g., Baron, 1986, Model A; Cottrell, 1972). The first question addressed in the present article is then what are the effects of a coactor's presence? Increase of attentional focusing or increase of the dominant response?

The second important question is why a coactor's presence would consume attentional resources. According to Baron and colleagues (Baron, Moore, & Sanders, 1978; Sanders, Baron, & Moore, 1978), coactors are often sources of social comparison information as people tend to evaluate their own performance. In this article, we extend this idea and suggest that it is not the coactor's presence that is critical, but the threat to self-evaluation he or she could represent. The reasoning behind this extension is that concern about not reaching standards or goals, what we call here *self-evaluation threat*, is known to consume attentional resources in the form of ruminative thoughts (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999). Hence, the contribution of the present article is to propose the general hypothesis that self-evaluation threat induces attentional focusing. We support this hypothesis with five experiments, showing that coaction leads to attentional focusing whenever it represents an actual or potential self-evaluation threat.[1]

The Focusing Effect of a Coactor's Presence

One might suppose that there is nothing left to say about coaction effects given the attention this question has received in social psychology since Triplett's (1898) seminal study over a century ago, attention that has produced influential syntheses (e.g., Bond & Titus, 1983; Geen & Gange, 1977; Guerin, 1993). Moreover, Zajonc's theory has been so influential that often it is still taken for granted that a coactor's presence increases dominant responses. Nevertheless, recent publications addressing some of the theoretical points relevant to the more general field of SFI effects reveal that the debate is still alive and well (e.g., Huguet, Galvaing, Monteil, & Dumas, 1999; Lambert et al., 2003; Muller et al., 2004; Platania & Moran, 2001). More precisely, some of these articles have provided interesting insights into the issue by relying on tasks that are well-known in cognitive psychology and that could be used to demonstrate that coaction leads to attentional focusing (Huguet et al., 1999; Muller et al., 2004).

When Baron (1986) suggested that the presence of a coactor should facilitate performance if attentional focusing favors the correct response, he proposed that a critical test of the theory would be to use a task in which the dominant response is incorrect, but only central cues are needed to solve the task. If coaction enhances performance, then the dominant response cannot be invoked as the explanatory factor, while attentional focusing (considering only central cues) can. Baron suggested that the Stroop task would be particularly appropriate for this purpose (Stroop, 1935; see also MacLeod, 1991, for a review). Several years later, Huguet et al. (1999) showed, in line with this idea and Baron's theory, that the presence of a slightly superior coactor, as well as the mere presence of an observer, led to a better performance (i.e., a lower Stroop interference) via a higher attentional focus on color, compared with a control condition in which participants performed alone. Attention usually devoted to peripheral cues, namely, the meaning of the word, would be consumed by the information processing relative to the coactor's presence, leading to a more efficient processing of central cues, namely, the color. However, Huguet et al. (1999) explained these results in terms of a strategic (conscious) inhibition of word reading, which is not essential to an attentional explanation.

A Perceptual Task Revealing Attentional Focus

To provide a critical test of the attentional hypothesis, Muller et al. (2004) used a perceptual task that does not rely on verbal processes,

> showing that the positive impact of mere coaction, as well as of upward social comparison, can be found *even* when the task does not rely upon a learned process (as in the Stroop task, cf. MacLeod, 1991) and, most importantly, *even* when a systematic strategy cannot improve performance. (p. 660)[2]

This task is a target detection task that was used by Treisman and her colleagues to develop her features integration theory and to illustrate what has been called the "illusory conjunction effect" (Treisman, 1998; Treisman & Paterson, 1984; Treisman & Schmidt, 1982). According to this theory, in the first stage of visual perception, the perceptual system extracts—automatically (without any attention required) and simultaneously (every characteristic is processed at the same time)—the visual primitives, that is, the simplest perceptual features of the object. The second stage—in which attentional processing is needed—is the association phase: Visual primitives are bound if they are parts of the same object. Thus, *illusory conjunction* refers to the tendency to think that a target object is present when in fact only its primitive characteristics are displayed. For example, a leaning *$* target presented among distractors (e.g., vertical and horizontal bars) will be considered as present when only its visual primitives—that is, the leaning *S* and the leaning bar— are actually presented (very briefly) but are combined in an illusory manner (Treisman & Paterson, 1984). Here, the leaning bar and the leaning *S* are the central cues for determining the target's presence, while the distractors are peripheral cues. Treisman (1988) specified that the target's characteristics "are accurately located and conjoined only when attention is narrowed to exclude the features of other objects also present in the display" (p. 213). Thus, if coaction induces higher attentional focusing (Baron, 1986), then only central cues—and not peripheral—should receive attention, making illusory conjunction less likely to occur. This is what Muller et al. (2004, Experiment 1) found: Illusory conjunctions were less frequent when participants were in the presence of a coactor than when they

[1] It should be noted that, consistent with distraction-conflict theory, other situational factors, such as noise, can induce attentional focusing (see Chajut & Algom, 2003; and O'Malley & Poplawsky, 1971, for the effect of noise on the Stroop interference).

[2] In this article, we use the term *mere coaction* as Muller et al. (2004) did: A situation in which the coactor is present but where no information is provided about the relative status of participants and the coactor.

were alone. Why, however, would a coactor consume attention and thus induce attentional focusing?

The Focusing Effect of Self-Evaluation Threat

Baron and his colleagues (Baron et al., 1978; Sanders et al., 1978) argued that dealing with the presence of a coactor consumes attentional resources, notably because he or she is a source of social comparison information. Or, in Sanders et al.'s (1978) words, "desire for social comparison is a major reason why participants are distracted by coactors" (p. 293). They tested this idea by showing that the presence of a coactor had a beneficial impact on performance only when he or she was working on the same task and not when he or she was working on a different one (Sanders et al., 1978, Experiment 2). In the present article, we argue that an integration of distraction-conflict theory (Baron, 1986) and social comparison theory (Festinger, 1954) can be particularly fruitful to understanding coaction effects. From the social comparison literature, we know that a coactor's performance is a standard against which we often evaluate our own performance (e.g., Bandura, 1986; Seta, Seta, & Donaldson, 1991). Thus, a threat to self-evaluation should appear when the drive upward (Festinger, 1954) is not satisfied, that is, when the coactor is superior (i.e., in upward comparison) or could potentially be superior (i.e., when we have no information about his or her performance). In regard to the latter case (i.e., a mere coaction), one could object that the absence of information on the coactor's performance could be seen as an opportunity for stating one's own superiority. Indeed, research on social comparison has shown that people often declare themselves better than the average person (e.g., Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995). However, Alicke et al.'s (1995) results also showed that, when the comparison target is a specific person, people do not assert their superiority. In fact, when asked to evaluate the difference between themselves and a specific comparison other, people even declare themselves inferior to the other person.

In summary, if self-evaluation threat consumes attention (and thus induces attentional focusing), then this should be true as long as people are not reassured about their self-evaluation. Hence, a more specific hypothesis is that enhancement of attentional focusing should take place in mere coaction and in upward social comparison (USC) but not in downward social comparison (DSC). Indeed, in DSC, no focusing of attention should be found because participants are not threatened in their self-evaluation since they have been reassured about their superiority. The two experiments presented in Muller et al. (2004) support this hypothesis. First, they found a lower rate of conjunctive errors under USC than under DSC (see Huguet et al., 1999, for conceptually similar results). Second, by comparing a mere coaction condition, USC (with a coactor present) and DSC (also with a coactor present), they showed that this effect was due to DSC effectively reducing attentional focusing (as indicated by a higher conjunctive error rate) as compared with the mere coaction condition. However, USC only maintained the coaction effect because no difference was found between these conditions. The present article is intended to provide the self-evaluation threat account that was lacking in the Muller et al. (2004) article as well as to support the general hypothesis that self-evaluation threat induces attentional focus.

In order to understand why self-evaluation threat would consume attention and thus induce attentional focusing, self-evaluation threat must be defined more precisely. The concept of threat has recently become very popular in social psychology. One way to conceive threat in the self-evaluation domain is to say that a person would feel threatened whenever self-evaluation leads him or her to the conscious or unconscious conclusion that his or her performance does not fit with his or her standards (e.g., Tesser, 2000; see also Salovey, 1991). Actually, both Steele's (1988) self-affirmation theory and Tesser's (1988) self-evaluation maintenance model propose that the need to reduce any discrepancy between actual evaluation and standards would be a fundamental one. In other words, positive evaluation may be a fundamental need for human beings (Steele, 1988; Tesser, 1988; see also Beach & Tesser, 2000; Tesser, 2000, 2001). This implies that, as far as performance is concerned, threat is an expression of a lack of fit between performance and standards that people have set for themselves (Tesser, 1988), whether consciously or not (Martin & Tesser, 1996). We use the term *self-evaluation threat* to refer to situations in which performance level is not high enough to reach relevant standards used to evaluate performance.

What is the effect of this threat? If we rely on Martin and Tesser's (1996) model, we may suppose that this threat will lead to ruminative thoughts (see Koole et al., 1999, for an experimental test of this statement). Hence, for these authors, people under self-evaluation threat will experience ruminative thoughts concerning the existing discrepancy between their performance and their standards. In our conceptualization, this rumination is a situational constraint that would consume attention normally devoted to peripheral cues. Thus, it should create attentional focusing. It is also worth noting that, given the importance of standards, simply abandoning them may be very difficult (Steele, 1988; Tesser, 1988). Accordingly, the most efficient way to stop these ruminative thoughts would be to obtain reassurance about one's performance (Martin & Tesser, 1996).

These considerations lead us to extend distraction-conflict theory (Baron, 1986) by arguing that the critical factor is not social comparison in itself but the self-evaluation threat that this comparison represents. This would explain why the coaction effect is not found in DSC (Huguet et al., 1999; Muller et al., 2004; Rijsman, 1974; Seta, 1982). In this article, we argue and show that the presence of a coactor leads to an enhancement of attentional focusing as long as there is a threat, or a potential threat, to self-evaluation.

Overview and Hypotheses

The general hypothesis of this article is that self-evaluation threat leads to attentional focusing. Because our theoretical framework is rooted in the SFI field, we test our general hypothesis in the context of the coaction effect. We show that coaction leads to attentional focusing whenever a coactor's presence represents a threat to self-evaluation. In the case of the paradigm used in the first four studies, attentional focusing will correspond to a reduction in conjunctive errors (cf. Muller et al., 2004). In the case of the paradigm used for the last experiment, attentional focusing will correspond to a reduction in a cueing effect (which is presented later).

Self-evaluation threat is expected to be high—and to produce more attentional focusing than control conditions—whenever a standard is activated and performance is, or may be, below this standard. This will be true when performance is unsatisfying at the interpersonal level (lower than the coactor's, regardless of his or her physical presence), or at the normative level (lower than some other relevant standards). In particular, the mere presence of a coactor is a self-evaluation threat situation, as one's own performance may potentially be lower than the coactor's. Conversely, self-evaluation threat is expected to be low—and to produce the same (lack of) attentional focusing as control conditions—as soon as individuals are clearly reassured about their performance, that is, when performance is satisfying compared with available standards of evaluation.

In Experiment 1, we tested the general assumption that self-evaluation threat, or the possibility of a threat, entails attentional focusing, which should produce a lower conjunctive error rate in the task we used. We manipulated the physical presence of the coactor (the coactor was either in the same cubicle or in another one) and social comparison (USC, DSC, or without social comparison; WSC). If, as we reasoned, self-evaluation threat is a critical factor, then being inferior to a coactor (regardless of his or her physical presence) should constitute such a self-evaluation threat and should thus induce attentional focusing. As a consequence, a lower conjunctive error rate was expected in both USC conditions. In addition, because mere coaction represents a potential self-evaluation threat, this lower level of conjunctive error rate should also appear even in the mere coaction (WSC/coactor-present) condition. Both DSC conditions should produce the same level of conjunctive errors as the control condition (WSC/coactor absent).

In Experiments 2, 3, and 4, we aimed to confirm and generalize the interpretation in terms of self-evaluation threat by demonstrating that self-evaluation threat can account for (a) the increased attentional focusing in mere coaction, (b) the lowered attentional focusing in DSC, and (c) the increased attentional focusing in USC, each of which was found in Experiment 1. In particular, in Experiment 2, we tried to provide a conceptual replication of these self-evaluation threat effects by inducing a threat in reference to a normative standard that is not directly linked to interpersonal comparison, namely, the midpoint of an evaluation scale. The second aim of this experiment was to reinforce the idea that the mere coaction effect is related to a potentially unfavorable interpersonal comparison. In Experiment 3, results of Experiments 1 and 2 were articulated to demonstrate that it is possible to induce a self-evaluation threat, and, in turn, attentional focusing, even in interpersonal DSC. Symmetrically, Experiment 4 aimed at demonstrating that it is possible to decrease self-evaluation threat, and thus attentional focusing, associated with interpersonal USC. The results of all four studies converge to illustrate that the focusing effect of coaction occurs when the coactor's presence represents a self-evaluation threat. In these four experiments, however, the attentional focusing was potentially confounded with performance. Therefore, in Experiment 5, we used a task that dissociates performance and attentional focusing, with the aim of showing that self-evaluation threat leads to attentional focusing and not to higher performance per se.

Experiment 1

The aim of this first experiment was to test the hypothesis that self-evaluation threat, or potential self-evaluation threat, entails attentional focusing, as indexed by a lower rate of conjunctive errors. In this experiment, we manipulated the physical presence of the coactor (the coactor was either in the same cubicle or in another one) and the direction of comparison (USC, DSC, or WSC). A lower conjunctive error rate was expected in mere coaction (WSC/coactor present)—because of a potential self-evaluation threat—and in both USC conditions (with and without the physical presence of a coactor)—because of the explicit self-evaluation threat. Both DSC conditions should provide reassuring information about self-evaluation and thus produce the same level of conjunctive errors as in the control condition (WSC/coactor absent). No differences should be found among conditions in terms of the rate of nonconjunctive errors (claiming that the target is not present when in fact it is) because the literature has shown that errors on these items is the result of the extraction of erroneous features rather than of erroneous bindings (e.g., Treisman & Paterson, 1984). Given that Treisman's (1998) theory suggests that attention is only needed for correct bindings, no effect was expected on these items.

Method

Participants

Sixty-eight undergraduate students received extra course credit for participation in what was presented as a visual perception study. Five participants were dropped from the analysis: 3 because they were suspicious about the feedback and 2 because they could not remember their score or that of their coactor at the end of the experiment. The mean participant age was 20 years ($M = 20.11$, $SD = 2.99$). The majority of the participants were women ($n = 52$).[3] All the participants had normal or corrected vision.

Experimental Design

This experiment took part in two experimental phases. There were two between-participants variables. The first one concerned both Phase 1 and Phase 2 and was introduced right after the instructions at the beginning of the experiment (coaction: coactor absent, coactor present): Half the participants were left alone in the cubicle and half were in the physical presence of a coactor during the entire experiment. The second variable was introduced via bogus feedback during the break and right before the beginning of Phase 2. This variable concerned the direction of social comparison (USC, DSC, and WSC). Participants were randomly assigned to one of the six experimental conditions of this design.[4]

Materials

The stimuli used in this experiment were similar to those used by Treisman and Paterson (1984). One hundred sixty items were created, of which 80 were conjunctive items, and 80 were nonconjunctive items. Items consisted of pictures, 9×9 cm in size, and were displayed one at a time in the center of the computer screen. Half of the items consisted of pictures with five vertical bars, five straight angles and five *S*s. We refer to these items as *conjunctive items*, given that errors on these will be to see the

[3] All the analyses presented in the present article have been rerun without male participants. Although less powerful, the results remained the same.

[4] It is worth noting that the three coactor-present conditions correspond to the three conditions reported in Muller et al.'s (2004) Experiment 2.

target (i.e., the symbol *$*) when only its characteristics are present (i.e., the *S* and the vertical bar). The other half of the items were the same, but one of the *S*s was replaced by a *$* (the target; for more details about materials, see Muller et al., 2004). We refer to these items as *nonconjunctive items*, given that, here, errors will be not to see the target when it is actually present. This perceptual task was run on a PC computer with a Mitsubishi diamondtron 17-in. (43-cm) screen. The order of presentation of the items was randomized by the software. Each item was displayed for 70 ms after a fixation point of 1,000 ms. The duration of 70 ms was chosen to promote illusory conjunctions. This duration has proved to be too short to allow attentional processing of the entire pattern of elements (cf. Treisman & Paterson, 1984). After each item, a 1,700-ms poststimulus mask was presented (a compound of random letters), which served to eliminate retinal persistence.

At the end of the experiment, participants filled out a questionnaire. Among a number of descriptive questions, two concerned the social comparison manipulation check: Participants were asked to recall their alleged performance in the first phase as well as that of the coactor.

Procedure

When participants registered for this experiment, they were told that two people could participate at a time, each one in a cubicle. In fact, only 1 real participant took part in the experiment because the coactor was always a confederate. When participants arrived for the experiment, basic task instructions were given to both the participant and the confederate at the same time. This was not true for the control condition (WSC/coactor absent), in which the participant only met with the experimenter. The experimenter explained to participants that their task was to decide whether the symbol *$* was present (by pressing on the *P* key) or absent (*A* key) among a certain number of distractors. Participants were told to make their response during the poststimulus mask. The instructions clearly specified that participants should try to make as few errors as possible, rather than to go as quickly as possible.

Subsequently, participants in the coactor-present condition were told that, for last-minute reasons, the second cubicle was no longer available, so they would have to share a cubicle with the confederate. Those in the coactor-absent condition received no such information and were each installed in a different cubicle. In the coactor-present condition, the experiment took place in a single cubicle equipped with two computers, one across from the other. Given that participants were face-to-face with the confederate, it was impossible for them to see the coactor's responses and screen. In all conditions, the experimenter left the room during the experiment and returned only for the break, which occurred between Phases 1 and 2 (see below).

Participants initially performed four training trials and then completed the first experimental phase. During this phase, 32 items (half conjunctive and half nonconjunctive items) were randomly presented to participants. After these 32 items, a message appeared on the screen and told participants that this phase was over and that they should call the experimenter.

Then, a short break took place. This break was uneventful for participants in the two WSC conditions, that is, the WSC/coactor absent (control condition) and the WSC/coactor present (mere-coaction condition). Therefore, in these two conditions, there was no explicit social comparison. However, for both USC and DSC conditions, the experimental induction of direction in social comparison was introduced during this break. In these four conditions (two USC and two DSC), the experimenter told participants that there would be a short break in order to process the results of the first phase. The results had allegedly been processed by a central computer, and the scores (both the participants' and the confederate's) appeared directly on the participants' computer screen. In the USC conditions, participants were allegedly inferior to the coactor (scoring 65% of good responses, compared with 80% of good responses for the coactor), whereas in the DSC conditions, they were allegedly superior to the coactor (scoring 65% of good responses, compared with 50% of good responses for the coactor).

After this bogus feedback, participants were required to perform the second experimental phase. During this phase, 160 items (80 conjunctive and 80 nonconjunctive items) were presented in random order. When this phase was over, participants filled out the manipulation check questionnaire, were thoroughly debriefed, thanked, and dismissed.

Results

Control of the Illusory Conjunction Effect

In order to confirm the presence of the illusory conjunction effect and therefore demonstrate that the present task has the properties described in the attention literature presented above, we must find a higher error rate for conjunctive items than for nonconjunctive items. We thus conducted a *t* test on error rates in the first phase for the control group (i.e., WSC/coactor absent), with the type of item (conjunctive items and nonconjunctive items) as a within-participants factor. As in Muller et al.'s (2004) experiment, and as expected on the basis of the conjunctive illusions literature, the rate of nonconjunctive errors ($M = 10.69\%$, $SD = 11.09\%$) was lower than the rate of conjunctive errors ($M = 58.75\%$, $SD = 19.76\%$), $t(11) = 5.97$, $p < .001$, one tailed, proportional reduction in error (PRE) = .76.[5] These analyses have been carried out also in Experiments 2–4, and the same effect was consistently found (all $ps < .002$).

Manipulation Check

As noted earlier, participants were asked at the end of the experiment to write down their own score from the first phase as well as that of the coactor (i.e., the information given during the break). The aim of this questionnaire was to confirm that participants correctly understood the score they had been given. As reported in the *Participants* section, 2 participants were excluded from the analyses because they failed to complete this information.

[5] We opt here for presenting the PRE (Judd & McClelland, 1989) as an effect size index, instead of the more often used eta squared. This does not change the way it is calculated and interpreted, given that this change is only dictated by mathematical formalization rules. Indeed, in mathematical formalization, Greek letters are often supposed to be used to refer to population values. Eta squared should thus be the true effect size in the population, which is, by definition, a value that cannot be known in experimental settings.

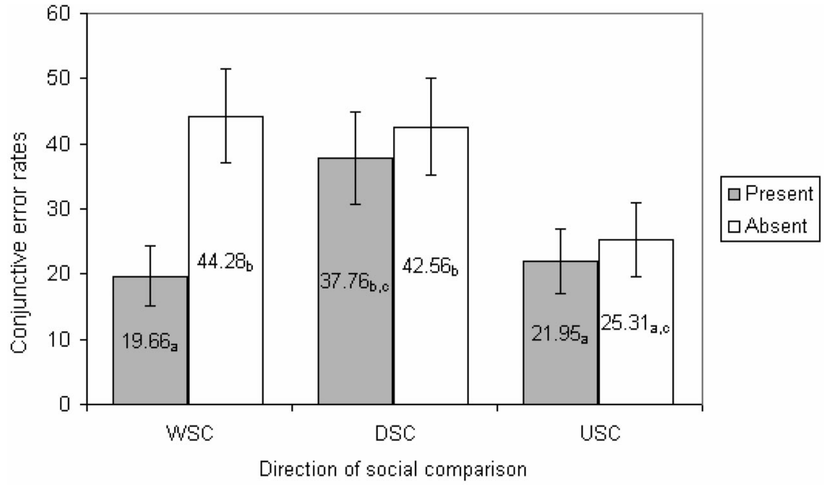

Figure 1. Conjunctive error rates as a function of presence of the coactor and social comparison in Experiment 1. Error bars represent standard errors of the mean. Means that do not share the same subscript are significantly different at $p < .05$, one tailed t test. WSC = without social comparison; DSC = downward social comparison; USC = upward social comparison.

Error Rate

Phase 1. At this stage of the experiment, presence of the coactor was the only independent (between-participants) variable that had been introduced. This analysis showed that participants who were in the presence of the coactor made fewer conjunctive errors ($M = 47.91\%$, $SD = 21.08\%$) than did those in the coactor-absent condition ($M = 56.56\%$, $SD = 18.08\%$), $t(61) = 1.75$, $p = .043$, one tailed, $PRE = .047$. It should be noticed that the same analysis on the rate of nonconjunctive error rate was not significant, $t(61) < 1$.

Phase 2. We have argued that the self-evaluation threat hypothesis predicts a two-level pattern of performance. On the one hand, for participants in the two DSC conditions and the control condition (WSC/coactor absent), there is no salient self-evaluation threat. For these three conditions, we therefore predicted a higher rate of conjunctive errors. On the other hand, for participants in the two USC conditions and the mere-coaction condition (WSC/coactor present), there is a self-evaluation threat (or at least the risk of one). Among these three conditions, we therefore predicted a lower conjunctive error rate. Given the specificity of this prediction, we treated experimental conditions as a one-way factor in order to test this theoretical model directly with a planned comparison. First, the analysis of variance (ANOVA) conducted on the rate of conjunctive errors revealed a significant condition effect, $F(5, 57) = 3.017$, $p = .017$, $PRE = .21$. Second, in order to test our model, we decomposed this omnibus effect into two orthogonal tests: one planned comparison testing the model and a set of orthogonal contrasts testing the remaining variance (i.e., this set of orthogonal contrasts should not be significant if the model fits the data; Judd & McClelland, 1989; Keppel, 1991). The planned comparison test was then a single-degree-of-freedom contrast coded as "–1 1 1 1 –1 –1," respectively associated with the WSC/coactor-present, WSC/coactor-absent, DSC/coactor-present, DSC/coactor-absent, USC/coactor-present, and USC/coactor-absent conditions. The second orthogonal test was the set of contrasts testing the residual variance. In other words: Do the conditions within each predicted level differ from each other? This analysis revealed that the former test—the model—was significant, $F(1, 57) = 13.28$, $p < .001$, $PRE = .189$, whereas the latter—the residual—was not, $F(4, 57) < 1$, $p = .92$, $PRE = .016$.[6] Furthermore, as can be seen in Figure 1, the means were in the expected direction, with the two DSC and the WSC/coactor-absent conditions showing a higher level of conjunctive errors (which did not differ from each other), and the two USC and the WSC/coactor-present conditions showing a lower level (again, not different from each other).

Given the attentional nature of our predictions, no differences were expected on the rate of nonconjunctive errors. The ANOVA conducted on the nonconjunctive error rates was not significant, $F(5, 57) = 1.33$, $p = .26$, $PRE = .10$.

Reaction Time

One might suppose that participants in the conditions with lower error rates were not more attentionally focused but that they simply took more time to respond carefully. However, this possibility is not borne out in the data. The ANOVA conducted on reaction times for the conjunctive items of Phase 2 was not significant, $F(5, 57) < 1$, $p = .74$, $PRE = .046$.

Discussion

First, these results appear to be in line with an attentional view of SFI. Indeed, in the first phase, conjunctive error rate was higher than 50% (i.e., 56.56%) in the absent condition—the relevant

[6] In order to be less conservative when no effects were expected, all residual tests presented in this article were also tested with only one degree of freedom (Keppel, 1991). These analyses led to exactly the same conclusions.

condition in the assessment of the baseline error rate—and therefore a dominant-response view would have predicted a higher error rate in the presence of the coactor (Zajonc, 1980). However, and in line with a prediction in terms of attentional focusing, the presence of the coactor led to a lower (and not a higher) rate of conjunctive errors in Phase 1. As can be seen in Figure 1, Phase 2 confirmed as well the focusing effect of coaction by showing that, in the conditions in which no social comparison was induced, the mere-coaction condition (WSC/present coactor) entailed a significantly lower conjunctive error rate than the control condition (WSC/coactor absent). It is true that during Phase 2, in the coactor-absent condition, the conjunctive error rate was lower than 50% (i.e., 44.28%), and the dominant-response view would have been correct in predicting a lower error rate in presence of the coactor. However, only the attentional view successfully predicted the results in both phases.

As far as the hypothesis on self-evaluation threat is concerned, these results appear to be in line with the prediction of two levels of performance. A level of performance comparable to that of the control group was predicted when self-evaluation was not threatened. Indeed, both DSC conditions—those in which the positivity of self-evaluation is satisfied—were found to be at the level of the control condition. The second predicted level of performance is a level with a lower conjunctive error rate than the control condition. This level is reached in every condition in which there is a threat or a possible threat to self-evaluation. Indeed, this level is reached on the one hand for conditions in which there is a threat because the performance of the participant is inferior to the target of comparison (in both USC conditions). More important, this was true regardless of the physical presence of the coactor, which argues for the fact that self-evaluation threat is a critical determinant of attentional focusing in this paradigm. Crucially, this heightened level of performance is also reached in the mere-coaction condition, in which no explicit threat exists (i.e., participants are not inferior) but in which a potential threat still looms because the coactor could turn out to be superior. In other words, the mere possibility of a self-evaluation threat, rendered salient by the presence of the coactor, produced an attentional focus. Although this is not the core of our argument in the present article, future research could study other factors, including priming, that might affect the salience of potential USC as a means to reinforce the idea that the representation of a potentially unfavorable comparison is threatening and induces attentional focusing.

Experiment 2

In Experiment 1, threat was induced on the basis of an interpersonal comparison standard of performance. Indeed, knowing the coactor's performance introduces a standard to be reached (cf. Seta et al., 1991), and participants in the USC realized that their performance was below that standard. This comparison is threatening for self-evaluation because the performance is not sufficient in relative terms. Our interpretation in terms of self-evaluation threat could be confirmed and extended if a threat induced on the basis of another standard would also lead to attentional focusing and thereby to a reduction in the conjunctive error rate. For instance, comparison to a normative standard (Bandura, 1986) should also induce self-evaluation threat. Accordingly, Experiment 2 was designed to manipulate the feedback in order to induce a perception of good or bad performance, not on the basis of an interpersonal comparison, but on the basis of a normative standard well-known by students: the midpoint of a scale. Indeed, the students who participated in these experiments have been socialized in a system in which grades under the midpoint of the grading scale correspond to a "fail," whereas grades over the midpoint correspond to a "pass": From the beginning of primary school, French students are evaluated on a 0–20 scale, and they learn that all grades below 10 imply a failure (getting worse when approaching 0) and that all the grades equal or above 10 imply some success (getting better when approaching 20).

Using a 0%–100% scale, we then expected a lower conjunctive error rate when participants' performance was (allegedly) below the midpoint of the scale (namely, 35%), as compared with an alleged performance over the midpoint of the scale (namely, 65%). Furthermore, the presence of the coactor was again manipulated (coactor absent, coactor present). If it is true that the mere presence of a coactor (i.e., without any information on his or her performance) is threatening because it makes salient another standard of evaluation and thus raises the potential for an unfavorable comparison, then there should be a (potential) threat even when the participant's alleged performance is above the midpoint. In summary, only the condition in which the coactor is absent and participant's performance is above the scale midpoint is free of self-evaluation threat: Neither normative nor interpersonal standards will cast doubt on the individual's performance. Thus, this condition should be the only one with a higher conjunctive error rate.

Method

Participants and Design

Sixty psychology undergraduate students received extra course credit for participation in what we presented as an ergonomics study. Five participants were dropped from the analysis: 2 because they were suspicious about the feedback and 3 because they could not remember their score at the end of the experiment. Participants were randomly assigned to one of the four experimental conditions of a design, including two between-participants independent variables. The first one was introduced at the beginning of Phase 1 and concerned the presence of the coactor (coactor absent, coactor present). The second one was introduced during the break between the two phases and concerned the performance feedback (high performance, low performance). The average participant age was 21 years old ($M = 21.02$, $SD = 4.65$). The majority of the participants were women ($n = 49$). All the participants had normal or corrected vision.

Materials and Procedure

The materials for this experiment were exactly the same as in the previous one. The procedure was basically the same; participants arrived either alone or two at a time and thus were either alone in the cubicle or in the presence of a coactor. To be sure that participants did not exchange their scores during the experiment, the coactor was always a confederate. After the first experimental phase, and in order to manipulate self-evaluation threat on the normative standard, half the participants were provided bogus feedback stating that they had responded correctly 35% of the time, whereas the other half were told that they had responded correctly 65% of the time. This information appeared on the participant's screen during the break, after the results for Phase 1 had supposedly been computed. It is worth noting that in the coactor-present condition, participants had no access to the coactor's score.

Results

Manipulation Check

As in Experiment 1, participants had to recall their score in the postexperimental questionnaire. In this experiment, as reported in the *Participants* section, 3 participants who did not correctly recall their scores were excluded from the analysis.

Error Rate

Phase 1. Given that presence of the coactor was the only independent variable that was introduced in Phase 1 (participants were either alone in the cubicle or in the presence of a coactor), a replication of Experiment 1 should obtain a mere-coaction effect on conjunctive error rates. A t test, with the presence of the coactor (coactor absent, coactor present) as a between-participants variable, revealed that the results replicated those of Experiment 1: The error rate was lower in the presence of the coactor (M = 46.18%, SD = 17.42%) than when participants were alone in the cubicle (M = 61.37%, SD = 27.44%), $t(53) = 2.44$, $p = .009$, one tailed, $PRE = .10$. Again, no effect appeared when the same analysis was performed on the nonconjunctive error rate, $t(53) < 1$.

Phase 2. The hypothesis in terms of self-evaluation threat predicted a two-level pattern of conjunctive error rates, with, on the one hand, a higher error rate for the high-performance/coactor-absent condition and, on the other hand, a lower error rate for the remaining conditions, all of which represented a threat or a potential threat to self-evaluation. The ANOVA conducted on the rate of conjunctive errors revealed a significant effect, $F(3, 51) = 6.58$, $p < .001$, $PRE = .28$. In order to test our model, this omnibus test was again broken down into two orthogonal tests. First, the planned comparison for the model was the single-degree-of-freedom contrast coded as "3 –1 –1 –1," respectively associated with the high-performance/coactor-absent, low-performance/coactor-absent, high-performance/coactor-present, and low-performance/coactor-present conditions. The second test was the test of the residual (i.e., Do the three conditions in which we predicted low error rates differ from each other?). This analysis revealed that the former test—the model—was significant, $F(1, 51) = 19.14$, $p < .001$, $PRE = .27$, whereas the latter—the residual—was not, $F(2, 51) < 1$, $p = .73$, $PRE = .012$. Furthermore, as can be seen in Figure 2, the means were in the expected direction, with the high-performance/coactor-absent condition yielding a higher level of conjunctive errors than the other three conditions, which did not differ from one another.

Given the attentional nature of the proposed effects, no difference was expected on the rate of nonconjunctive errors. The ANOVA performed on the nonconjunctive error rate was not significant, $F(3, 51) < 1$, $p = .74$, $PRE = .02$.

Reaction Time

Again, it might be suggested that participants in the conditions with a lower conjunctive error rate simply took more time to respond accurately. However, as in Experiment 1, the data did not support this explanation. The ANOVA conducted on the reaction times for Phase 2 conjunctive items was not significant, $F(3, 51) = 1.27$, $p = .29$, $PRE = .069$.

Discussion

Results of the first phase confirmed that mere coaction led to a lower conjunctive error rate in this task requiring attentional focusing. One could infer from the rate of conjunctive errors in the alone condition (more than 61%) that the dominant response was not correct. Nevertheless, the effect of mere coaction resulted in a significant decrease (and not increase) in the conjunctive error rate. These results seem once again more consistent with an attentional approach to the coaction effect, notably with the distraction-conflict theory (Baron, 1986; Muller et al., 2004).

The major aim of this second experiment, however, was to test whether the induction of self-evaluation threat via another, less relational, standard of evaluation could lower the conjunctive error rate. As expected, and as can be seen in Figure 2, the results of this second experiment confirmed our hypothesis: When the coactor was not present, the participants' rate of conjunctive errors was lower in the low-performance condition than in the high-performance one. As soon as the coactor was present, being reassured about the performance on the basis of this standard was not sufficient. As mentioned above, if the mere-coaction effect is due to uncertainty concerning a possible USC, then reassurance about one's performance relative to a normative standard does not rule out this uncertainty. Therefore, the coactor's presence should still result in attentional focusing and thus in a lowered conjunctive error rate. And indeed it does: Being reassured (or not) about a normative standard had no influence on conjunctive error rate when a coactor was present. As in Experiment 1, when a coactor is present, potential threat associated with the possibly higher performance of the coactor seems to lead to a lower conjunctive error rate. This is an important result because it supports our general hypothesis that as long as there is an element that suggests the possibility of an unfavorable self-evaluation, attentional focus occurs.

The results of this experiment constitute another brick in the wall of the self-evaluation threat interpretation. Moreover, they suggest an additional hypothesis: If a threat can be induced on the basis of a normative standard of comparison, then it must be possible to use this normative standard to induce self-evaluation threat in DSC, resulting in attentional focusing and the consequent reduction in conjunctive errors.

Experiment 3

In our third experiment, the interpersonal standard of comparison and the normative standard were explicitly articulated in order to test the idea that as soon as self-evaluation is threatened on at least one of these standards, attentional focus-

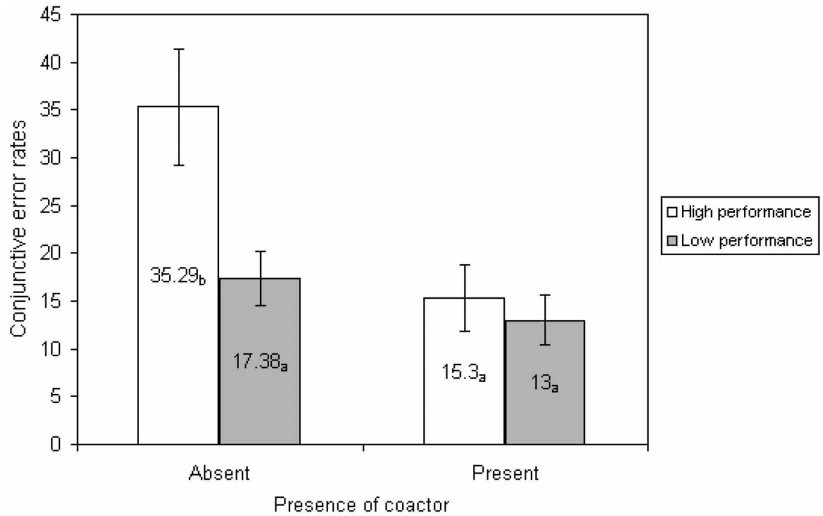

Figure 2. Rate of conjunctive errors as a function of the presence of the coactor and bogus feedback in Experiment 2. Error bars represent standard errors of the mean. Means that do not share the same subscript are significantly different at $p < .05$, one tailed t test.

ing will be enhanced, and the conjunctive error rate will be reduced. In this experiment, social comparison (USC, DSC) will be articulated with the alleged level of performance (high performance, low performance). The contribution of this experiment is to demonstrate that being superior to the coactor (DSC) is not necessarily a guarantee against self-evaluation threat. Showing that a self-evaluation threat induction can increase attentional focusing even in DSC would add to the strength of our argument that self-evaluation threat induces attentional focusing.

On the basis of the self-evaluation threat hypothesis, it can be expected that if feedback is threatening on at least one of the two standards, then the conjunctive error rate will decrease. It follows that a two-level pattern of performance should be found, with only one condition in which the conjunctive error rate is higher, because self-evaluation is not threatened by either type of comparison: the DSC/high-performance condition. Conversely, the conjunctive error rate should be reduced when self-evaluation is threatened on either or both of these standards. First, conjunctive errors should be lower when self-evaluation is challenged by the interpersonal comparison standard (that is, in both USC conditions). Second and more interestingly, a lower conjunctive error rate is also predicted in the DSC/low-performance condition because of the threat on the basis of the normative standard. This condition is important in the sense that, if the rate of conjunctive error is lowered (as expected), it would demonstrate that it is possible to find a focusing effect even when the interpersonal comparison is favorable.

Method

Participants and Design

Sixty-two psychology undergraduate students received extra course credit for participation in what we presented as an ergonomics study. Eight participants were dropped from the analysis: 5 because they were suspicious about the feedback and 3 because they could not remember their score or the coactor's score at the end of the experiment. Participants were randomly assigned to one of the four experimental conditions of a design with two independent variables: the social comparison, with two between-participants conditions (USC, DSC); and the performance feedback, with two between-participants conditions (high performance, low performance). The average participant age was 20 years old ($M = 20.33$, $SD = 3.35$). The majority of the participants were women ($n = 51$). All the participants had normal or corrected vision.

Materials and Procedure

The materials in this experiment were exactly the same as in Experiments 1 and 2. The procedure was almost the same as in Experiment 2, but this time, participants were always alone in the cubicle. As in both previous studies, feedback was manipulated during the break. As shown in Table 1, feedback patterns (participant/coactor) were 65/50, 65/80, 35/20, and 35/50, respectively, for the high-performance/DSC, high-performance/USC, low-per-

Table 1
Summary of Feedback Patterns Given to Participants, Depending on Alleged Performance and Direction of Social Comparison in Experiment 3

Condition	Bad performance	Good performance
USC	Self: 35% Coactor: 50%	Self: 65% Coactor: 80%
DSC	Self: 35% Coactor: 20%	Self: 65% Coactor: 50%

Note. USC = upward social comparison; DSC = downward social comparison.

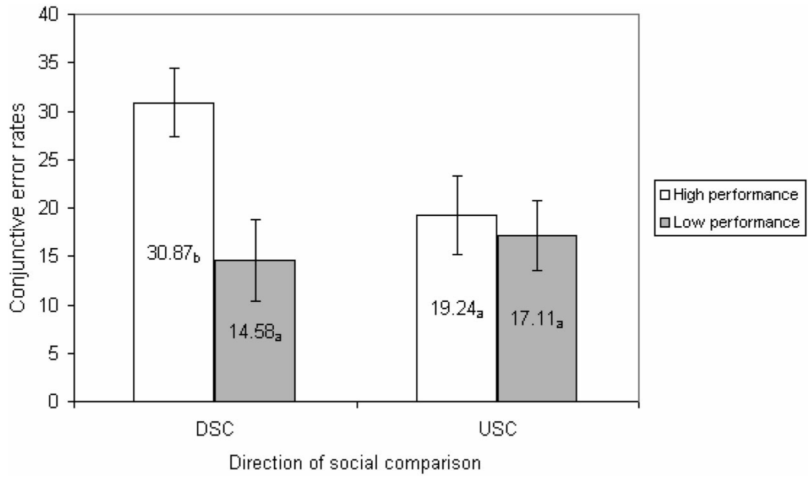

Figure 3. Rate of conjunctive errors as a function of bogus feedback and social comparison in Experiment 3. Error bars represent standard errors of the mean. Means that do not share the same subscript are significantly different at $p < .05$, one tailed t test. DSC = downward social comparison; USC = upward social comparison.

formance/DSC, and low-performance/USC conditions. The experimenter gave participants information about the scores during the break by using the following strategy: First, he gave them the coactor's score, and then he said, "Oh no, sorry, this is the other participant's score. Your score is . . . "

Results

Manipulation Check

As in Experiments 1 and 2, participants had to recall Phase 1 scores in a postexperimental questionnaire. In this experiment, as reported in the *Participants* section, 3 participants who had not correctly recalled these two scores were excluded from the analyses.

Error Rate[7]

We predicted a two-level pattern of conjunctive error rates, with, on the one hand, a higher error rate for the high-performance/DSC condition, which posed no evaluative threat and, on the other hand, a lower error rate for the remaining conditions, each of which entailed some form of threat. The ANOVA conducted on the rate of conjunctive errors revealed a significant effect, $F(3, 50) = 3.55$, $p = .021$, $PRE = .175$. In order to test our model, this omnibus test was again broken down into two orthogonal tests. First, the planned comparison for the model was the single-degree-of-freedom contrast, coded as "3 –1 –1 –1", respectively associated with the high-performance/DSC, low-performance/DSC, high-performance/USC, and low-performance/USC conditions. The second test was the test of the residual (i.e., Do the three conditions in which conjunctive errors are predicted to be low differ from each other?). This analysis revealed that the former test—the model—was significant, $F(1, 50) = 10.10$, $p = .002$, $PRE = .168$, whereas the latter—the residual—was not, $F(2, 50) < 1$, $p = .70$, $PRE = .014$. Furthermore, as can be seen in Figure 3, the means were in the expected direction, with the high-performance/DSC producing a higher rate of conjunctive errors than the other three conditions (which did not differ from each other).

As before, given the attentional nature of the proposed dynamics, no difference was expected on the rate of nonconjunctive errors. The ANOVA performed on the nonconjunctive error rate was not significant, $F(3, 50) = 1.22$, $p = .31$, $PRE = .068$.

Reaction Time

Again, the ANOVA conducted on the reaction time for conjunctive items in Phase 2 was not significant, $F(3, 50) < 1$, $p = .79$, $PRE = .020$, and therefore offers no alternative explanation for the pattern of results.

Discussion

Like Experiment 2, this study showed that as soon as self-evaluation regarding performance is threatened, the rate of conjunctive errors is lowered. Indeed, as illustrated in Figure 3, these results showed that as long as one of the two evaluation standards introduces a threat, the illusory conjunction rate is decreased. These results also replicated the difference found in Experiment 1 between USC and DSC when the coactor was not physically present. Moreover, and even more interestingly, this experiment illustrates that even participants in DSC can be led to reduce their conjunctive error rate if a self-evaluation threat on the basis of a normative standard of comparison is introduced: Participants in the "35/20" condition were superior to their target of comparison, but the fact that their (alleged) performance was low relative to the normative standard, in itself, led to a lower rate of conjunctive errors. This effect is crucial because it demonstrates that being superior to the coactor is not sufficient for participants to be

[7] In Experiments 3 and 4, the only purpose of the first phase was to reproduce the same experimental setting, as in Experiments 1 and 2, and to create an excuse to provide feedback; no manipulation was introduced at this point, and therefore no analysis is presented for Phase 1. However, we did run analyses that showed no biased random assignment to the different conditions.

satisfied with their performance, and, by virtue of that demonstration, it reinforces the self-evaluation threat hypothesis. It is also worth noting that these results do not involve a ranking of these standards in order of their importance. Indeed, the results of both Experiments 2 and 3 suggest that introducing a self-evaluation threat on either one of these two standards is sufficient to lower the rate of errors on conjunctive items.

Finally, if Experiment 3 introduced self-evaluation threat in DSC, then a symmetric test of the present self-evaluation threat hypothesis would be to remove the threat from USC in order to see whether this could lower attentional focusing. This idea is developed in the next experiment.

Experiment 4

The aim of this experiment was to test the possibility of removing the impact of interpersonal USC by attenuating—instead of inducing—the self-evaluation threat inherent to this kind of comparison. The reasoning here was based on work that has demonstrated that individuals infer their position in the larger group from interpersonal comparison (e.g., Gilbert, Giesler, & Morris, 1995; Kulik & Gump, 1997). In other words, if, for instance, Josh's performance is worse than Greg's, then it must be bad in general. Hence, self-evaluation threat could be manipulated under interpersonal USC by manipulating this inference. Therefore, the basic idea was to introduce the same threat used in Experiment 3 by telling participants that their performance was both low and inferior to that of the coactor. They were thus provided feedback stating that they had responded correctly only 35% of the time, whereas the coactor had responded correctly 50% of the time (the worst situation given that neither of the previously studied standards are reached). However, one half the participants was told that 35% is actually a good score, compared with how people usually perform on this task. The other half was told nothing other than their performance and that of the coactor. If USC threatens participants in their self-evaluation because of an inference about the ranking of their performance, relative to a larger population, then this threat should be removed when participants are reassured about their standing within that population. We predicted that giving participants such an assurance should lead them to commit more conjunctive errors than participants in the regular USC condition.

Method

Participants and Design

Twenty-four psychology undergraduate students received extra course credit for participation in what we presented simply as a social psychology experiment. Two participants were dropped from the analysis because they could not remember their score or the coactor's at the end of the experiment. Participants were randomly assigned to one of the two conditions (default, reassured). The average participant age was 19 years ($M = 19.27$, $SD = 1.69$). The majority of the participants were women ($n = 17$). All the participants had normal or corrected vision.

Materials

The materials of this experiment were the same as in the previous experiments. The only difference was that the postexperimental questionnaire asked participants how they estimated their performance compared with all other participants on this type of task. Responses were collected on a 7-point scale ranging from 1 (*very much below the average*) to 7 (*very much above the average*).

Procedure

The procedure was approximately the same as for Experiment 3. The experiment was clearly presented as a study on the impact of social comparison feedback on performance. By doing so, participants were not surprised to be given their performance (i.e., 35%), that of the coactor (i.e., 50%), and, for half of them (i.e., in the reassured condition), to be told "Hmm, 35% correct responses . . . in comparison to how people usually perform in this task, that's really good!" The performance feedback was displayed during the break on the computer screen just before the above experimental induction.

Results

Manipulation Check

As in our other experiments, participants had to recall their and the coactor's scores in the postexperimental questionnaire. In this experiment, 2 participants were excluded from the analysis given that they did not recall these two scores correctly. Participants were also asked to evaluate their performance in comparison to the population. As expected, participants in the reassured condition evaluated their performance more positively ($M = 3.72$, $SD = 0.78$) than participants in the default condition ($M = 2.72$, $SD = 0.47$), $t(20) = 3.62$, $p < .002$, $PRE = .40$. Moreover, a t test against the midpoint (namely, 4 = average) revealed that participants in the default condition saw their performance as below average, $t(20) = 6.53$, $p < .001$, which was not the case for participants in the reassured condition, $t(20) = 1.40$, $p = .18$.

Error Rate

As expected, during the second phase, a higher conjunctive error rate was found in the reassured condition ($M = 56\%$, $SD = 25.94\%$) than in the default condition ($M = 26\%$, $SD = 22.39\%$), $t(20) = 2.81$, $p = .005$, one tailed, $PRE = .28$. As previously, the t test conducted on the nonconjunctive error rate did not show a significant difference, $t(20) < 1$, $p = .69$, $PRE = .008$.

Reaction Time

Again, the difference on the reaction times for Phase 2 conjunctive items was not significant, $t(20) = 1.44$, $p = .16$, $PRE = .093$.

Discussion

This experiment studied the possibility of removing the self-evaluation threat inherent to interpersonal USC. Threat was minimized for half the participants by suggesting that their performance, though lower than the coactor's, was actually quite good compared with that of the general population. Results confirmed that removing self-evaluation threat by providing a more relevant target of comparison—the population as a whole—led participants to commit a higher rate of conjunctive errors, even in USC. In other words, it is possible to reduce self-evaluation threat—that is, to reassure participants—even when performance is unsatisfactory on both the interpersonal and the normative standards. This is an important result because, in a way that is symmetric to Experiment 3, the present experiment shows that what is crucial for inducing attentional focus is not the type of interpersonal social comparison that people make but rather the self-evaluation threat that is associated with that social comparison.

An ad interim conclusion on the basis of the results obtained with the above four experiments is that every time participants' self-evaluation was threatened, we observed an attentional focus indicated by a lower conjunctive error rate than conditions implying no self-evaluation threat. However, in the task consistently used in the four experiments, self-evaluation threat always induced—as predicted—a lower conjunctive error rate, which in this task corresponds to a better performance and therefore to a social facilitation effect. The uniformity of this result may give way to a serious objection: The lower conjunctive error rate may not be a specific effect of attentional focus but a generic social facilitation effect due to an increase in effort. Indeed, one might argue that not only in the USC conditions but also in the mere-coaction conditions or when participants are told that they performed below the midpoint, we increased the participants' level of self-focused attention, thereby producing greater effort in order to match the standard (cf. Carver & Scheier, 1981) and, in turn, better performance (social facilitation). Two elements favor our attentional focus explanation over the alternative self-focus one. First, increased performance appeared only on conjunctive items, and not on nonconjunctive ones, suggesting a specific attentional-focus-restriction-to-central-cues process rather than a generic self-focus-increased-effort process, which should predict a facilitation effect also on the nonconjunctive items because the display time does not allow participants to consciously recognize the two kinds of items. Second, no experimental effects were observed on reaction times, in any of the four experiments, suggesting that participants did not "try harder" to find out the good answer in the critical conditions. However, the above two elements provide only circumstantial evidence and render the alternative explanation less plausible but not impossible. In order to rule it out, we designed Experiment 5, which reproduced two critical conditions of Experiment 1 (USC and DSC), but it involved a perceptual task in which the effort and attentional views would make clearly different predictions.

Experiment 5

The aim of this last experiment was to reproduce two critical conditions of Experiment 1 (USC and DSC) using a task that allows us to test whether self-evaluation threat increases attentional focusing and not performance per se. This task was conceptually similar to the one used by Geen (1976), which had participants perform a memory task. In addition to central cues (i.e., the material to be learned), they were provided with peripheral cues that could help (relevant cues, in Geen's terms) or harm (irrelevant cues) their performance. Thus, it was a task in which allocation of attention to peripheral cues would induce differential performance as a function of their relevance. Interestingly for our contention, Geen found, particularly for anxious participants, that the presence of the experimenter (a threatening evaluative presence) led participants to use less peripheral cues (to focus their attention only on central cues) than did participants in an alone-control condition. In other words, the experimenter's presence resulted in attentional focusing as indicated by the disappearance of the cueing effect (higher performance with relevant than with nonrelevant cues).

Experiment 5 adopted the same logic and presented the participants with a perceptual task often used in attentional studies (in order to enable a clearer attentional interpretation), which contains both helpful or harmful peripheral cues (from now on, we rather call them valid versus invalid peripheral cues to be consistent with the vast majority of the literature on attention; e.g., Posner, Snyder, & Davidson, 1980). Within this visual detection task, one has to locate a target, the letter *O*, among three *Q*s as quickly as possible. Such a situation is known to require the participant to scan each letter that is presented until the target is found, a kind of search that is referred to as a *serial search* (Treisman, 1988, 1998, see also Briand, 1998). In addition, a cue is provided before these measure displays are presented. Hence, a simple black dot in an otherwise blank screen is shown in what is called "orienting" displays: For some trials, this dot, the cue, indicates in advance the target's location (cf. Figure 4). Because the participant's attention is attracted by this cue, the serial search starts (and actually finishes) on the target's location. As a consequence, the reaction time is faster. This kind of cue is referred to as a *valid cue*. In contrast, for some trials, the cue is not located where the target will appear but in the location of one of the *Q*s. In this case, attention is attracted toward the "wrong" location, and reaction time becomes slower. This kind of cue will therefore be referred to as an invalid cue. Note that invalid cues should only lower reaction times slightly because without any cue, the serial search would only have one chance out of four to start in the right location against zero chances out of four when attention is attracted by the invalid cue.

The attentional literature has repeatedly shown that in a reaction time paradigm, as the one we use, participants are faster to detect targets preceded by valid cues than by invalid ones (Briand, 1998; Briand & Klein, 1987; Posner et al., 1980).[8] Thus, it appears that such orienting cues do attract attention. The replicability of this effect in our experimental setting will be tested in a pilot study. It is worth noting that this attentional orientation is said to be exogenous because it is a bottom-up process in which the mere presence of an object (a black dot in the present experiment), in an otherwise blank screen, attracts attention. It does not rely on any intention or strategic decision on the part of individuals (cf. Briand, 1998; Briand & Klein, 1987). This is important for our contention because it implies that participants cannot consciously decide not to use these cues.

What would be the influence of being inferior to the coactor (USC)? The simplest prediction is the one in terms of self-focus and increased effort to match standards: Reaction time should be faster under USC, regardless of the validity of the cue. In a 2 (social comparison: DSC, USC) × 2 (cue validity: valid, invalid) design, the effort view would then predict a social comparison main effect. However, a self-evaluation threat approach would predict more attentional focusing (attention to central cues and inhibition of peripheral cues) under USC than under DSC, and therefore an interaction effect. Why? Let us bear in mind that in the

[8] It should be noted that this would be true only for short to modest stimulus onset asynchrony (SOA). Indeed, longer SOA could induce an inhibition of return effect, with reaction time being faster after invalid than after valid cues (Posner & Cohen, 1984).

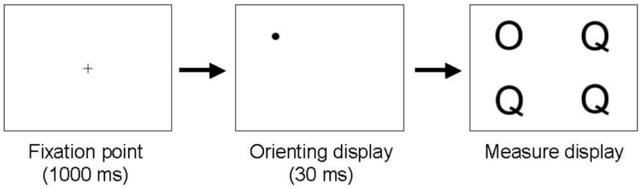

Figure 4. Items presentation schema in Experiment 5.

present task, the (measure) displays presenting the *O* and the *Q*s are the central cues; the orienting displays, those displaying the dot, are peripheral cues because they are not necessary to perform the task.[9] Thus, if self-evaluation threat leads to attentional focusing, peripheral cues should be more disregarded under USC than under DSC, and therefore the cueing effect (faster reaction times after valid than after invalid cues) should be smaller under USC than under DSC, that is, a Social Comparison × Cues Validity interaction effect.

A corollary of the above hypothesis is that because valid cues should be more disregarded under USC than under DSC, reaction time after valid cues should be slower under USC than under DSC, as helpful information is ignored. This is an important corollary, as reaction time after valid cues is a highly diagnostic measure to disentangle increase in effort from increase in attentional focusing. Indeed, it is possible to oppose the two alternative views: Slower reaction times are predicted by the attentional focusing view (an inhibition effect), whereas faster reaction times are predicted by the effort view (a facilitation effect). As far as reaction time after invalid cues is concerned, it is a nondiagnostic measure because both views predict a faster reaction time under USC than under DSC—the effort view because of an increase in effort regardless of the type of cue and the attentional focusing view because the impairing peripheral information is ignored (although, as noted above, impairment of invalid cues only lowers the probability to start the serial search with the right location from 1 out of 4 to 0 out of 4).

Method

Participants and Design

Forty psychology undergraduates volunteered in an experiment presented as a study on visual perception. Participants were randomly assigned to one of the two conditions (social comparison: DSC, USC). The average age was 20 years old (M = 20.43, SD = 1.82). The majority of the participants were women (n = 31). All the participants had normal or corrected vision.

Materials and Procedure

As for Experiment 1, participants were welcomed at the same time as the confederate coactor. They were both seated in a cubicle, and the experimenter provided the same instructions as in the coactor-present conditions of Experiment 1. Participants were seated 1 m from a 17 in. (43-cm) Samsung 75 MHz monitor.

As depicted in Figure 4, the sequence was always as follows: a 1,000-ms fixation point, a 30-ms orienting display, and a measure display. These last displays stayed on the screen until participants responded. Measure displays had four black letters, which were always one *O* and three *Q*s. These letters were in Arial font and were presented on the same locations as the preceding orienting displays (i.e., top left, top right, bottom left, and bottom right). Each of the letters was presented at an angular distance of 6.78° from the fixation point. We created four of these items by having the *O* appearing once in each location. The participant's task was to indicate the location of the target "as QUICKLY and as carefully as possible" (as written on the screen). In order to answer, participants were instructed to use the numerical keyboard with 4, 6, 1, and 3, respectively, for the top left, top right, bottom left, and bottom right locations.

A fundamental aspect of the study was that each measure display ("O among Q") was preceded by an orienting display: A black dot presented in one of the four locations where the target, the *O*, could appear afterward. More important, location of the orienting cues could be either the one of the *O* target (i.e., a valid cue, 50% of the trials) or the one of a *Q* (i.e., an invalid cue, 50% of the trials). This distribution ensures that orienting cues were only peripheral cues (see Footnote 9). This manipulation constitutes the second, within-participants, independent variable.

Participants first underwent 15 practice trials. Then during the first experimental phase, they were exposed to 72 items (36 valid cues and 36 invalid cues). The order of presentation was randomized by the software (E-Prime; Psychology Software Tools, Inc., Pittsburgh, PA). Once the first phase was over, the computer provided participants with a measure of performance. This measure was said to be based on a too-complex calculation to be explained but was simplified to a score on a 100-point scale. Participants always received a score of 65 out of 100 while the coactor's performance was manipulated and was either 50 or 80, respectively, for the DSC and USC conditions. After this bogus feedback, participants moved to the second experimental phase, with again 72 items (36 invalid cues and 36 valid cues). After this last experimental phase, participants filled out an open-ended question for which they had to recall their alleged performance in the first phase. Moreover, they were to evaluate their own performance by placing a tick mark on a 10-cm long nongraded scale, with endpoints labeled *very bad performance* (0 cm) and *very good performance* (10 cm). Their answer was later coded into the distance in centimeters from the *very bad performance* anchor; a higher number thus means a better evaluation of performance. After doing this, they answered the same two questions (i.e., recall and evaluation) with reference to the coactor's performance. Finally, participants were thoroughly debriefed, thanked, and dismissed.

Dependent Variable

First, reaction times inferior to 300 ms and superior to 3,000 ms were replaced, respectively, with 300 ms and 3,000 ms (Bargh & Chartrand, 2000). Then, as a dependent variable, we used log-transformed reaction time for correctly answered (M = 99%) items

[9] We realize that there could be ground for disagreement on the peripherality of orienting displays, for instance, if valid cues indicated the correct location most of the time. If they did, then they could be said to be central to adequate performance. To prevent this ambiguity, the experiment was designed so that half of the trials were valid and half invalid.

(means and standard deviations are, however, presented in milliseconds).

Pilot Study

In order to ensure that the task we had designed did in fact produce the usual cueing effect (slower reaction time when provided an invalid than a valid orienting cue; e.g., Briand, 1998), we ran a pilot study with participants alone in the cubicle ($n = 11$). Results revealed that log-transformed reaction time for correctly answered items was slower for invalid ($M = 542$, $SD = 68$) than for valid cues ($M = 526$, $SD = 75.29$), $t(10) = 3.38$, $p < .007$, $PRE = .51$.

Results

Manipulation Check

We first checked that each participant recalled correctly his or her alleged performance. Everyone did. We also asked them to evaluate their performance and the coactor's on a very sensitive measurement scale. Results on this measure confirmed that participants under USC evaluated their performance ($M = 4.85$, $SD = 1.38$) less positively than the coactor's ($M = 7.49$, $SD = 1.05$), $t(38) = 8.38$, $p < .001$, $PRE = .65$, whereas participants under DSC evaluated their performance ($M = 5.73$, $SD = 1.01$) more positively than that of the coactor ($M = 4.59$, $SD = 0.96$), $t(38) = 3.62$, $p < .001$, $PRE = .26$.

Reaction Time

If, as we argued, self-evaluation threat induced by USC leads to attentional focusing, the cueing effect should be smaller under USC than under DSC (i.e., a Social Comparison × Cues Validity interaction). Conversely, if USC leads to self-focus and more effort, then faster reaction time should be found under USC regardless of cues validity (i.e., a social comparison main effect). To contrast these two predictions, we conducted a 2 (social comparison: DSC, USC) × 2 (cues validity: invalid, valid) ANOVA, with the first factor varying between participants and the second one within them.

This ANOVA only revealed the expected Social Comparison × Orienting Cue Validity interaction, $F(1, 38) = 4.46$, $p < .041$, $PRE = .10$ (all other ps $> .127$): The cueing effect was smaller under USC than under DSC. It is interesting to note that, as can be seen in Table 2, the social comparison main effect seemed to be in the opposite direction of what would be expected if USC simply induced an increase in effort to reach standards, although this effect was not significant ($p < .13$).

Discussion

The task used for this experiment was designed to make a clear distinction between increased attentional focusing and increased effort. An increase in effort was expected to induce a better performance (i.e., faster reaction times) regardless of cue validity, whereas an increase in attentional focusing was expected to reduce the cueing effect. This cueing effect was induced by manipulating (peripheral) cue validity and took the form of faster reaction times after valid cues than after invalid cues (see the *Pilot Study* section).

Our results illustrate that self-evaluation threat, under the form of USC, did not quicken reaction times (if anything, USC participants were slower) but led to a reduction—and actually to the disappearance—of the cueing effect. This indicates a reduction in the attention allocated to peripheral cues, or, in other words, an increase in attentional focusing. Furthermore, as can be seen in Table 2, results for the reaction time after the valid cues clearly favored the attentional focusing view given that USC participants used significantly less helpful (valid) information as compared with the DSC condition. Thus, it appears that attentional focusing can sometimes lead an individual to neglect helpful pieces of information, leading to an inhibition of performance (here, slower reaction times). Thus, it is confirmed that self-evaluation threat (in this experiment operationalized with a USC) does indeed produce an attentional focus on the central cues of the task at hand.

General Discussion

Our general contention is that self-evaluation threat increases attentional focusing. Studied in the context of coaction effects, it leads us to predict that the presence of a coactor increases attentional focusing whenever she or he represents a self-evaluation threat. This claim led us to deal with two questions relative to the coaction effect: first, the question concerning the type of effect (dominant response vs. attentional focusing) elicited by coaction (the "what" question) and, second, the conditions under which coaction has a focusing effect (the "why" question).

The Attentional Focusing Effect of Coaction

As far as the first question is concerned, we distinguished between an attentional view (Baron, 1986; Geen, 1989; Muller et al., 2004) and the dominant response view (Zajonc, 1965). The former view predicts more attentional focusing (only central but not peripheral cues are processed) in coaction than alone. In our first perceptual task, attentional focusing was indicated by lower conjunctive error rates. Therefore, according to the attentional view, rates of conjunctive error should be lower in a condition of coaction. The latter view predicts that coaction leads to better performance when the dominant response is correct (lower conjunctive error rates) and lower performance when it is incorrect (higher conjunctive error rates). The results obtained with this task appear to be in line with the attentional view because mere coaction always decreased conjunctive error rates (three times in the

Table 2
Mean Reaction Time as a Function of Social Comparison and Cues Validity in Experiment 5

	Condition			
	DSC		USC	
Cues validity	*M*	*SD*	*M*	*SD*
Valid	514_a	44.62	567_b	84.53
Invalid	534_c	46.30	$561_{b,c}$	93.28

Note. Means sharing the same subscript within a row or column do not differ significantly at $p < .05$ (one tailed). USC = upward social comparison; DSC = downward social comparison.

present article; see also Muller et al., 2004), regardless of the correctness of the dominant response. Indeed, in Phase 1 of both Experiments 1 and 2, the presence of a coactor decreased conjunctive errors even though the dominant response was incorrect in the alone condition, as indicated by conjunctive error rates that were higher than 50% (Zajonc, 1980). The robustness of this effect is noteworthy, since Bond and Titus' (1983) meta-analysis revealed that, in the broader area of SFI effects, it is quite difficult to find evidence of social facilitation on accuracy, and this measure was precisely a measure of accuracy. Moreover, it has frequently been noted that studies in the SFI domain often report interaction effects between the presence of other and task type, but very seldom simple effects of facilitation or inhibition (cf. Baron et al., 1978; Manstead & Semin, 1980; Sanders & Baron, 1975). Therefore, the specific kind of task we used in conjunction with the robustness of our effects concur to suggest that the presence of a coactor does increase attentional focusing.

The Focusing Effect of Self-Evaluation Threat

The second question is concerned with why a coactor's presence would consume attentional resources and thus induce attentional focusing. Previous work suggested that it is because a coactor is regarded as a source of social comparison information that is useful for self-evaluation (Baron, 1986; Muller et al., 2004; Sanders et al. 1978). We extended this view by suggesting that it is not the coactor's presence per se that is critical but the self-evaluation threat associated with this presence. The reasoning behind this claim is that a coactor's performance is a standard against which one can evaluate his or her performance, and concern about not reaching this standard is known to consume attentional resources under the form of ruminative thoughts (Koole et al., 1999). Note that this approach would explain why, in earlier work, a coactor's presence did not always lead to coaction effects. More precisely, coaction effects are not found when the coactor is working on a different task (Sanders et al., 1978) or when the coactor is inferior to participants (Huguet et al., 1999; Muller et al., 2004; Seta, 1982).

If the coaction effect on attentional focusing observed here and in previous work is due to self-evaluation threat, then four additional consequences should follow. First, USC should be threatening and should induce attentional focusing even when the coactor is not physically present. Second, self-evaluation threat and the associated attentional focusing should be induced also when performance is dissatisfying as compared with a normative standard (namely, the midpoint of an evaluative scale). Furthermore, being reassured in terms of this normative standard should not be always sufficient to remove self-evaluation threat because the presence of a coactor makes salient the risk of being inferior to him or her. Third, if self-evaluation threat is truly critical, then it should be possible to induce an attentional focusing effect in DSC by creating a self-evaluation threat on the basis of the normative standard. Fourth and symmetrically, if self-evaluation threat is critical, then the focusing effect found in USC could be removed by removing self-evaluation threat. Experiments 1, 2, 3, and 4, respectively, were designed to address these predictions.

Experiment 1 supported the first of these predictions by showing that a reduction in conjunctive errors was found not only in mere coaction and coaction with USC (see also Muller et al., 2004, Experiment 1) but also when the coactor was not physically present but was thought to be superior to the participants. Thus in our view, regardless of whether the coactor is present, the knowledge of another's superior performance is enough to set the standard of performance evaluation at the level of the other's performance and thus highlight the fact that one's own performance is insufficient compared with the standard. This self-evaluation threat, in turn, induces attentional focusing. Mere coaction with no knowledge of the coactor's results also represents a (potential) self-evaluation threat because the coactor could turn out to be superior. In contrast, the absence of self-evaluation threat in the two DSC conditions led participants to commit conjunctive errors at a level similar to the control condition, in which the individual worked alone.

Experiment 2 tested the second point presented above and showed that an increase in attentional focusing (i.e., a decrease in conjunctive errors) can be induced even by reference to a nonrelational standard. An alleged performance of 35% of good responses can be threatening because it highlights the fact that the performance level is not high enough to reach the normative standard used to evaluate performance, in this case the midpoint of the evaluation scale (the most widely used standard in our participants' education system). In addition, the self-evaluation threat account of the coaction effect implies that being reassured about that normative standard should not be sufficient once a coactor is present because his or her presence renders salient the possibility of not matching another available standard: his or her performance. We thus predicted that the only condition with a higher conjunctive error rate should be the condition with an alleged high performance, but without the presence of the coactor. In line with this reasoning, results showed that, without coaction, a (bogus) performance of 35% induced a lower conjunctive error rate than a (bogus) performance of 65%. Results also showed that when the coactor was present, the conjunctive error rate was lower even in the 65% condition. In other words, even when performance is positively evaluated on a normative standard, the potential superiority of the coactor, or, said differently, self-evaluation threat, induces attentional focusing.

Our reasoning so far was that DSC was reassuring because it does not threaten self-evaluation. However, as mentioned in the third point presented above, if it is true that self-evaluation threat is truly critical, then it should be possible to increase attentional focusing in DSC by introducing a self-evaluation threat on another available standard. It followed that if both standards are manipulated at the same time (i.e., interpersonal comparison and the comparison to the midpoint of the scale), as we did in Experiment 3, then only one condition should bring less attentional focusing, namely, the condition in which performance was satisfying on both standards: the DSC/high-performance condition. In the other three conditions, self-evaluation threat on one or the other (or both) standards should lead to attentional focusing. This was exactly what was found. It is interesting to note that the DSC conditions showed that, when self-evaluation threat is induced on a normative standard (35% on the evaluation scale), the conjunctive error rate decreased, as compared with the no-threat condition (DSC/65%), actually reaching the same level as the USC conditions. This result brings support to the interpretation put forward in Experiment 1, claiming that DSC reduces the coaction effect because a favorable comparison reduces the self-evaluation threat associated to coaction.

Finally, the aim of Experiment 4 was to demonstrate that attentional focusing could be decreased in USC by reassuring participants in terms of self-evaluation. In this experiment, all participants were potentially highly threatened: Not only did they receive low-performance feedback (35%), but they were also inferior to the coactor (USC). However, half of them were told that, in this task, 35% was a very good performance compared with the rest of the population. Being reassured in terms of self-evaluation by providing information at a higher level of comparison was supposed to decrease attentional focusing (and probably designate the coactor as a "genius"; cf. Alicke, LoSchiavo, Zerbst, & Zhang, 1997). In line with this reasoning, this procedure led to a conjunctive error rate significantly higher as compared with the default condition. To summarize, this series of four studies showed that the expected outcome (attentional focusing) is consistently induced by situations in which some aspect related to self-evaluation does not meet the standards (or what we referred to as self-evaluation threat), independently from the direction of social comparison.

It is worth noting that self-evaluation threat, although central to our contention, was never measured in the present research. Consistent with Sigall and Mills' (1998) advice, that "measures of manipulation checks and mediators are very useful [. . .], but if no plausible alternative explanations exist, data from such measures are not needed" (p. 218), we chose instead to dismiss experimentally the alternative accounts for our results (see also the *Increased Attentional Focusing or Increased Performance?* section). Moreover, there are important difficulties inherent to measuring threat in general and self-evaluative threat in particular. Indeed, one could think of designing self-report measures to this effect; however, because these measures are open to control and self-presentation concerns, they are often difficult to interpret (e.g., Muller & Butera, 2004). If future research is to address the issue of measurement of self-evaluation threat, then two (complementary) ways to deal with this problem may be in order. The first could be to design implicit measures assessing the accessibility of thoughts related to self-evaluative threat (see, for instance, Koole et al., 1999). The second one could be to rely on specific physiological measures known to be related to feeling of evaluative threat, for instance, the finger pulse volume (Allred & Smith, 1989; Smith, Houston, & Zurawski, 1984).

Increased Attentional Focusing or Increased Performance?

Although the series of experiments described above showed that the specific predictions stemming from the general self-evaluation threat hypothesis were supported, the specificity of the task used does not allow us to rule out an alternative explanation: The lower conjunction error rate could be due, not as predicted to attentional focusing, to an increase in effort because of the higher salience of standards in self-focusing situations. Experiment 5 thus tested the difference between USC and DSC conditions observed in Experiment 1 with a task that dissociates attentional focusing from performance. Results showed that the USC condition, as compared with the DSC condition, indeed induced a focusing effect revealed by the reduction (even the elimination) of a cueing effect normally caused by the processing of peripheral cues. Additionally, we found that the usefulness of valid peripheral cues was lower under USC than under DSC, making USC participants slower than DSC ones on these items. In other words, the above results supported the hypothesis that self-evaluation threat induces attentional focusing, which, in turn, facilitates performance in tasks in which ignoring the peripheral cues increases performance (as in the first four experiments) and inhibits performance in tasks in which ignoring the peripheral cues decreases performance (as for valid cues in Experiment 5).

An unquestionable contribution of Zajonc's (1965) theory has been to underline that one must be careful about the characteristics of the task at hand. These characteristics could explain why the presence of a coactor sometimes helps and sometimes hurts performance (Zajonc, 1965). Once the task at hand is considered closely, apparent contradictions could be resolved. To take only a few examples, one could think that the results of our first four experiments are in contradiction with results found in social influence research. Indeed, researchers have shown that when participants were confronted with a superior, more powerful source of influence (a majority; Butera, Mugny, Legrenzi, & Pérez, 1996), or when they had a threatening (i.e., competitive) relationship with the coactor (Butera & Mugny, 1995), confirmation bias in inductive reasoning was increased. One could interpret these results as an inhibition effect of self-evaluation threat, contrary to the facilitation effect found in Experiments 1–4. However, confirmation bias is known to be increased by the exclusive focus on one's own hypothesis (Butera & Buchs, 2005); thus, the above results are compatible with the present work in that they show that self-evaluation threat led to a form of attentional focusing.

One could also think that our results are in contradiction with the stereotype threat literature (e.g., Steele & Aronson, 1995). Within this field, threat is supposed to inhibit performance. But again, what are the tasks at hand? Usually, a fairly complicated task for which a lot of information has to be put together—in other words, tasks for which attentional focusing should impair and not help performance. With such tasks, we would predict that self-evaluation threat (for instance USC) should decrease performance. And indeed, in a stereotype threat study using a mathematics task, Marx, Stapel, and Muller (2005) found in the same experiment decreased performance under stereotype threat and under interpersonal USC. Given that reasoning or mathematics tasks are difficult to interpret in terms of attentional processing, these are just tentative extensions of the self-evaluation threat hypothesis at this point. However, in future research, it would certainly be interesting to show that other kinds of threat, like stereotype threat, increase attentional focusing.

Forty years after the publication of Zajonc's (1965) seminal article, we would reiterate that task characteristics must be studied carefully in order to understand the impact of social factors on people's information processing. We would add to Zajonc's advice that using well-known cognitive tasks could help with this matter and that this could contribute to cognitive psychology as well by showing that social factors can have a serious impact on effects that are often believed to be purely perceptual.

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