The Overpowering Effect of Social Comparison Information: On the Misalignment Between Mastery-Based Goals and Self-Evaluation Criteria

Nico W. Van Yperen[1] and N. Pontus Leander[1]

Abstract

If people's goals and evaluative standards were aligned, then individuals with mastery-based goals should, theoretically, primarily rely on temporal comparison information (i.e., on how they performed relative to before). In contrast, individuals with performance-based goals should rely on social comparison information (i.e., on how they performed relative to others). However, across three studies, we explored a misalignment phenomenon we call "the overpowering effect of social comparison information" (TOESCI). We found that, irrespective of individuals' specific achievement goal (performance-based vs. mastery-based), there is a consistent, dominant reliance on social comparisons over temporal comparisons in their performance self-evaluations. These findings suggest that one's goals and evaluation criteria do not always align—that explicitly endorsing mastery-based goals does not necessarily lead one to rely on temporal comparison information over social comparison information. Only after receiving an explicit reminder to consider their mastery-based goal did participants align their goal and performance self-evaluation criteria.

To what extent do people's explicit goals and standards actually predict how they evaluate their own performance on a task? Tradition and lay perspectives might suggest that people's evaluative standards are fundamentally driven by deliberate choice and conscious control, but contemporary research suggests that some aspects of goal pursuit can operate without one's conscious intent and awareness (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Shah, 2005). One such aspect may include the comparison standards (i.e., self and/or others) that people rely on when evaluating their performance on goal-related tasks. We propose that relying on social comparison information—or *inter*personal standards—is bound to be an overpowering tendency for a number of theoretical reasons and we will present data to suggest how and when this may indeed be the case.

Achievement Goals and Evaluative Standards

Evidence suggests that there are two fundamental comparison standards one could use when evaluating one's performance on a task: (a) one's personal history of past performances and/or (b) the performances of other people (Zell & Alicke, 2009). In the achievement goal literature (Elliot, 2005; Van Yperen & Orehek, 2013), a focus on (a) *intra*personal standards (i.e., the self) is linked to mastery-based goals (e.g., "My goal is to do better than I did before on this task"), whereas a focus on (b) *inter*personal standards (i.e., others) is conceptually linked to performance-based goals (e.g., "My goal is to do better than others on this task"). If people's goals and evaluative standards were aligned, then individuals with mastery-based goals (either approach or avoidance) should, theoretically, primarily rely on temporal comparison information, or *intra*personal standards ("How did I do relative to how I did before?"; Albert, 1977). In contrast, individuals with performance goals (either approach or avoidance) should primarily rely on social comparison information, or *inter*personal standards ("How did I do relative to others?"; Festinger, 1954).

In the present research, we specifically test the idea that a misalignment may exist between individuals' explicitly preferred mastery-based goals and the evaluation criteria they actually rely on when globally assessing how they feel about

[1]University of Groningen, The Netherlands

Corresponding Author:
Nico W. Van Yperen, University of Groningen 2/1, Grote Kruisstraat, 9712 TS Groningen, The Netherlands.
Email: N.van.Yperen@rug.nl

their task performances. To illustrate, imagine a student who explicitly endorses a mastery-based achievement goal. Let us assume that after performing badly on her first exam, she studies harder and performs better on the second exam. If her mastery goal and evaluation criteria were aligned, her personal improvement should lead her to evaluate her second performance positively. However, let us now assume that when she got her second test back, she noticed that she still performed worse than the class average. It is conceivable to us that the social comparison information (i.e., her performance relative to the class average) would overpower and undermine her positive self-evaluation. Indeed, although she improved and she explicitly endorses a mastery-based goal, the temporal comparison information may end up having comparatively little impact on her resulting performance self-evaluation. If we were right, then this would suggest a misalignment between her mastery-based goal and the type of comparison information she is relying on.

The Overpowering Effect of Social Comparison Information (TOESCI)

We propose that social comparisons tend to be the dominant contributor to one's performance self-evaluations—overpowering temporal comparisons even when one's goals should favor temporal comparisons. This phenomenon, which we call "the overpowering effect of social comparison information," occurs when social comparison reliably explains, by far, most of the observed variance in one's performance self-evaluation, irrespective of one's explicit achievement goal (i.e., performance-based vs. mastery-based).

If this turns out to be true, then it would mean that the goals people explicitly endorse are no guarantee of the type of feedback information they end up relying on when evaluating how well or poorly they did in a situation. As in the example above, students, workers, or athletes can explicitly claim to have an *intra*personal standard (i.e., one's previous performance at the task), but their performance self-evaluation may still be primarily predicted by how they did on the task relative to others (i.e., an *inter*personal standard). Important to note is that this *does not* imply that relying on social comparison is at odds with relying on temporal comparison in shaping self-evaluations. Rather, it is a question about the reliability and size of the effect of each type of comparison. In the present work, we simply suggest that people can engage in both comparison processes, but social comparison is likely to be the main driver of individuals' self-evaluations, even among those individuals who explicitly endorse a mastery-based goal.

Our TOESCI model assumes that simply having or endorsing a mastery-based goal does not guarantee that one will rely on temporal comparison information over social comparison information. That is, people may readily disregard temporal comparisons and overwhelmingly follow social comparison information. For example, in a study in which participants were asked to evaluate either their own or another's task performance on the basis of manipulated temporal and social comparison information, the effect size was much larger for the social comparison than for the temporal comparison (η_p^2 = .15 vs. η_p^2 = .02; see Zell & Alicke, 2009).[1] Particularly when evaluating the task performance of another person, individuals preferred to evaluate actors based on their status relative to others; they paid virtually no attention to temporal comparison information. This suggests that social comparison information is weighted more heavily in people's minds than temporal comparison information.

Why Is It Important to Understand TOESCI?

TOESCI could be problematic because most people actually prefer mastery-based goals over performance-based goals, perceive them as more important, and show better outcomes when pursuing them (e.g., Elliot, 2005; Van Yperen, 2006). For example, in a sample of 2,158 workers, Van Yperen and Orehek (2013) found that most workers (71.1%) indicated a mastery-based goal as their dominant achievement goal. In experimental settings, approximately half of the participants prefer a mastery-based goal (e.g., Van Yperen, 2003; Van Yperen & Renkema, 2008). Furthermore, relative to performance-based goals (and performance-avoidance goals in particular; Senko, Hulleman, & Harackiewicz, 2011), endorsing mastery-based goals is associated with more interest (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002); more willingness to share valuable information (Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2007); less anxiety, worry, and negative affect (Elliot & McGregor, 2001; Pintrich, 2000); less dissatisfaction (Van Yperen & Janssen, 2002); less neurotic behaviors (Hendricks & Payne, 2007); and a lower likelihood to cheat (Van Yperen, Hamstra, & Van der Klauw, 2011). Hence, mastery-based goals—and the temporal comparisons associated with them—are generally perceived as the ideal form of competence-based regulation (e.g., Midgley, Kaplan, & Middleton, 2001; Pintrich, 2000).

At a broader level, it is also useful to know when and how people's explicit goals and preferences do not align with their responses to performance feedback. Classic cybernetic models of goal pursuit (e.g., Carver & Scheier, 1998) suggest that goals and evaluation criteria interact to create feedback loops meant to facilitate effective self-regulation toward a goal. If people's goals and evaluation criteria were aligned, these models might predict that when evaluating goal-directed performance, individuals with mastery-based goals rely on temporal comparison information whereas individuals with performance-based goals rely on social comparison information. Yet, if social comparison overpowers temporal comparison among mastery goal individuals—the focus of

this research—then one's performance self-evaluations could misinform the feedback loop system. The existence of such a misalignment would illustrate how hard it actually is to accurately evaluate progress at mastery-based goals.

Why May TOESCI Occur?

We assume that there are several possible reasons why social comparison is an overpowering tendency for people. First, individuals may tend to place enormous stock in social comparison information because it is normative and easy to justify one's reliance on it. Indeed, visible and public performance evaluations are typically based on social comparison rather than temporal comparison (Klein, 1997; Wheeler & Miyake, 1992; White, Langer, Yariv, & Welch, 2006). Although temporal comparison information is also readily accessible in people's minds, subjectively important, and psychologically significant (e.g., Hanko, Crusius, & Mussweiler, 2010), in our society, excellence and success are often defined in terms of an individual's achievement relative to others—as exemplified by prizes, titles, bonuses, and honors (e.g., Harackiewicz, Barron, & Elliot, 1998; Klein, 1997). It could, therefore, be unusual, non-normative, or hard for one to justify making a positive self-evaluation if one improved on a task but still ended up performing worse than others.

A second, subtler reason TOESCI could occur is that one's reliance on social comparison may be habitual and/or regularly reinforced by one's social environment—thus making it hard for people to consciously notice, or at least acknowledge, the full extent of its influence. Since Festinger (1954), psychologists have considered the possibility that people have an innate, perhaps phylogenetic drive to engage in social comparison. Contemporary research suggests that this tendency might also be unconscious—occurring spontaneously in response to subliminal cues (Mussweiler, Rüter, & Epstude, 2004). Hence, people may not be consciously aware of all the underlying (i.e., unconscious) processes affecting their behavior, yet they still make sense out of their behavior based on whatever information is consciously accessible to them (e.g., Bar-Anan, Wilson, & Hassin, 2010; Nisbett & Wilson, 1977). This could mean that a person could have an explicit mastery-based goal, unconsciously rely on social comparisons when making a performance self-evaluation, and then subsequently—and curiously—still endorse a mastery-based goal (a premise we test in the present work).

The potentially automatic or implicit influence of social comparison information may explain why it is hard for people to discount or ignore it. For example, even when the social comparison information is presented as nondiagnostic, people are nevertheless more likely to rely on it when they are cognitively "busy" with other things (i.e., having to remember an eight-digit number; Gilbert, Giesler, and Morris, 1995). This suggests that it takes more cognitive resources to discount social comparison information than to rely on them. People also do not always realize or acknowledge the extent of their reliance on social comparisons. Although they may not believe that they had used nondiagnostic social comparison information, they often still show subtle affective responses to it (Gilbert et al., 1995). In general, it may be hard for people to discount or ignore feedback that happens to be goal-related: Research in neuroscience suggests that, even when the feedback is explicitly stated as nondiagnostic for their own goal outcomes, people still show a change in ERPs (event-related potentials) in response to the information (Holroyd, Hajcak, & Larsen, 2006). In other words, people may be prone to relying on social comparison information because their reactions to it are automatic and they may not know how or whether to correct for it.

The Present Research

In three studies, we sought to test whether people's overall performance self-evaluation is more reliably predicted by social comparison information relative to temporal comparison information, regardless of individuals' explicit achievement goal (mastery-based or performance-based). Thus, Hypothesis 1 is that social comparison is the main driver of individuals' self-evaluations across goal types.

The anticipated overpowering effect of social comparison information would imply that mastery goal individuals' explicit goal (and/or preference) does not align with the type of feedback information they primarily use in their performance self-evaluations. However, this does not to say that mastery goal individuals completely ignore temporal comparison information; we still expect mastery goal individuals to engage in temporal comparison, but we aim to show that they do so only in addition to the social comparison they are already making. In other words, the vast majority of the variance in their performance self-evaluations will be explained by the social comparison information rather than the temporal comparison information. Hence, Hypothesis 2 states that temporal comparison only adds to the social comparison individuals make, particularly among mastery goal individuals.

In addition to illustrating TOESCI, we also explored whether an intervention could help individuals overcome the effect. As discussed above, TOESCI could be problematic because mastery-based goals and temporal comparison are highly prevalent, subjectively important, and consistently considered ideal for competence-based regulation, intrinsic motivation, collaboration, and performance attainment (e.g., Elliot, 2005; Midgley et al., 2001; Pintrich, 2000; Van Yperen & Orehek, 2013). It could also be problematic because it suggests a caveat to classic cybernetic models of goal pursuit (e.g., Carver & Scheier, 1998), which assume that goals and evaluation criteria interact to create feedback loops. Therefore, in Study 2, we examined whether a mastery-based goal intervention can attenuate TOESCI. Specifically, we

sought to test the hypothesis (Hypothesis 3) that it takes an explicit reminder about one's mastery-based goal to produce a goal-congruent self-evaluation. Such a reminder might increase the relative strength or accessibility of the mastery-based goal while also providing the public justification needed to primarily rely on temporal comparison information.

Study 1

Sample, Procedure, and Measures

The sample consisted of 156 undergraduates (17.3% male, M_{age} = 19.27) who were recruited to complete a mental concentration task in fulfillment of a degree requirement. They completed the experiment on the computer, in separate cubicles.

After a brief introduction, signing a consent form, and two practice items, the participants completed two versions of a "d2 Mental Concentration Task" (Brickenkamp, 1981), which was ostensibly linked to a meaningful outcome for undergraduates, namely, academic achievement. Specifically, the d2 task was presented as a valid and reliable task to measure individuals' concentration skills. It was explained that the ability to concentrate is an important factor during the preparation for an exam. The better one's ability to concentrate, the better students will remember the course material, and the better their results.

The d2 task involved the sequential presentation of random sequences (six) of 24 d's and 24 p's—with each letter accompanied by a number of apostrophes either above or below it, either zero (6), one (6), or two (12). For each of the two versions of the task (Versions 1 and 2), participants were alternately instructed to find d's either *with* two apostrophes (correct) or *without* two apostrophes (incorrect). An 8-s time limit was set for each line. During a 3-s wait between each line, participants were notified of what to find next (i.e., correct or incorrect d's). Note that we used the task's complexity, time pressure, and fuzzy printing of the d's and apostrophes to minimize participants' ability to track their own performance.

Participants' initial dominant achievement goal. After completing two practice items but before continuing with Versions 1 and 2, participants were asked to indicate their dominant achievement goal for the d2 task (Van Yperen, 2003). That is, the participants were recommended to adopt one out of the four goals representing Elliot and McGregor's (2001) 2 × 2 achievement goal framework. The four goals were as follows: (a) to do better than others on both versions of the task (*performance-approach*), (b) not to do worse than others on both versions of the task (*performance-avoidance*), (c) to do better on Version 2 relative to Version 1 (*mastery-approach*),

and (d) not to do worse on Version 2 relative to Version 1 (*mastery-avoidance*).

After indicating their dominant achievement goal for the d2 task, participants went on to complete Versions 1 and 2, after which performance feedback was manipulated. For their performance feedback, participants were randomly assigned to one of four experimental conditions in a 2 (Social comparison [favorable, unfavorable]) × 2 (Temporal comparison [favorable, unfavorable]) factorial design, or a separate control condition. Note that in the four experimental conditions, the participants received both social and temporal comparison information at the same time on a single computer screen. In the control condition, the participants did not receive any feedback.

In the *favorable social comparison* condition, participants read their ostensible average performance across Versions 1 and 2. Their rank of 27% was explained and explicitly evaluated as *good* (note: lower percentiles are better). In the *unfavorable social comparison* condition, participants read that their average performance across Versions 1 and 2 was 73%; this rank was explained and explicitly evaluated as *poor*. Note that the difference in percentile scores between the favorable and unfavorable condition was (73 − 27) = 46.

In addition to the above, participants also received temporal comparison information. Exactly the same difference in percentile score (46) was manipulated. In the *favorable temporal comparison* condition, participants ostensibly improved either from 50% to 4% (so performance averaged 27%) or from 96% to 50% (so performance averaged 73%). Participants read that this increase was explicitly evaluated as *good*. In the *Unfavorable temporal comparison* condition, the participants declined either from 4% to 50% (average = 27%), or from 50% to 96% (average = 73%). This decline was explicitly evaluated as *poor*.[2]

Performance self-evaluation. After receiving their performance feedback, participants were asked the following: "How do you think you did on the d2 task until now?" (rated 1 = *very poor* to 10 = *excellent*).

Participants' subsequent dominant achievement goal. Participants were then asked to indicate their dominant achievement goal for a subsequent "Version 3" of the d2 task (which they did not end up taking). In measuring their subsequently dominant achievement goals, "both versions of the task" (see initial goals) were replaced by "Version 3" (performance-based goals), and the mastery-based goals referred to "Version 3 relative to Versions 1 and 2."

Manipulation checks. Participants were asked to recall (a) their score on Version 2 relative to Version 1 (response options: *good* or *poor*), and (b) their scores on both versions

relative to others (*good* or *poor*). Participants were then carefully debriefed and thanked.

Results

Manipulation checks. Almost all participants correctly recalled their score on Version 2 relative to Version 1 (97%) as well as their scores on both versions relative to those of others (99%). In the subsequent analyses, all participants were included. Analyses without the participants who failed either manipulation check did not change the results.

Participants' initial dominant achievement goal. As in previous experimental research (e.g., Van Yperen, 2003; Van Yperen & Renkema, 2008), approximately half of the participants (52.6%) preferred a mastery goal (mastery-approach = 24.4%, mastery-avoidance = 28.2%). The other half preferred a performance goal (performance-approach = 7.7%, performance-avoidance = 39.7%).

Performance self-evaluation. Hypothesis 1 states that social comparison is the main driver of individuals' self-evaluations across goal types, which we assessed by looking at the differences in effect sizes between the social versus temporal comparison manipulations on participants' subsequent performance self-evaluations. Specifically, we conducted a 2 (Social comparison [favorable, unfavorable]) × 2 (Temporal comparison [favorable, unfavorable]) × 2 (Goal [performance, mastery]) × 2 (Goal valence [approach, avoidance]) ANOVA. This analysis (without control condition) revealed two significant main effects—one for the social comparison manipulation and one for the temporal comparison manipulation—and two significant three-way interactions (*ps* < .05), which we address further below.

The first significant main effect indicated that social comparison information led individuals to evaluate their performances more positively when it was favorable (M_{fav} = 6.43, *SD* = 1.16) as opposed to unfavorable (M_{unfav} = 3.48, *SD* = 1.74), $F(1, 110) = 113.47$, $p < .001$, $\eta_p^2 = .51$. The second main effect was far less pronounced, but it demonstrated that temporal comparison information also led individuals to evaluate their performances more positively when it was favorable (M_{fav} = 5.48, *SD* = 2.09) as opposed to unfavorable (M_{unfav} = 4.43, *SD* = 1.97), $F(1, 110) = 8.71$, $p < .01$, $\eta_p^2 = .07$. Although both types of comparison information had their anticipated main effects, note how the effect size for the social comparison was much larger ($\eta_p^2 = .51$) than for the temporal comparison ($\eta_p^2 = .07$; see also Note 1); the vast difference in effect sizes indicates that TOESCI occurred. That is, social comparison was the main driver of individuals' self-evaluations across goal types.

The main effects reported above suggest that, on average, both mastery and performance goal individuals primarily relied on social comparisons. This suggests initial evidence for the idea that mastery goal individuals' explicit goal and
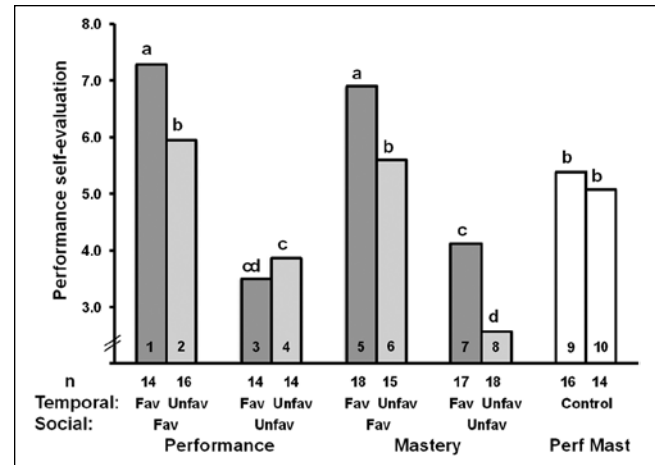

Figure 1. Performance self-evaluation as a function of individuals' initial, personally adopted achievement goals (performance-based vs. mastery-based) and comparison information (social vs. temporal and favorable vs. unfavorable; Study 1).

preference do not always align with the type of feedback information they use in their performance self-evaluations. However, mastery goal individuals were expected to still engage in temporal comparisons more than performance goal individuals—but only in a manner that added to the social comparison they were making anyway. And indeed, we found this in the three-way interaction between participants' dominant achievement goal (performance-based vs. mastery-based), social comparison (favorable vs. unfavorable), and temporal comparison (favorable vs. unfavorable), $F(1, 110) = 4.44$, $p < .05$, $\eta_p^2 = .04$. As shown in Figure 1, follow-up analyses (Least Significant Difference (LSD) tests), which included the control conditions, first indicated that across achievement goals, participants who received favorable social comparison but unfavorable temporal comparison information (see Bars 2 and 6) still made more positive self-evaluations than participants who received unfavorable social comparison but favorable temporal comparison information (Bars 3 and 7; M_{diff} = 1.48, *SE* = .51, p = .004). Next, the LSD tests indicated that the unfavorable temporal comparison information only attenuated the positive effect of favorable social comparison information (Bars 1 and 5 vs. Bars 2 and 6; M_{diff} = 1.29, *SE* = .37, p = .001). Third, the LSD tests indicated that, among mastery goal individuals only, the negative effect of unfavorable temporal comparison information merely exacerbated the negative effect of unfavorable social comparison information (Bar 7 vs. Bar 8; M_{diff} = 1.56, *SE* = .48, p = .002). These findings provide support for Hypothesis 2: Temporal comparison only adds to the social comparison individuals are making anyways, particularly among mastery goal individuals. This again supports our assertion that the social comparison information was the main driver of participants' self-evaluations.

Although not within the scope of the present research, the other (unexpected) significant three-way interaction, $F(1, 110) = 4.46$, $p < .05$, $\eta_p^2 = .04$, indicated that individuals holding performance-*approach* goals ($M_{PAp} = 2.20$, $SD = 1.64$) were especially negatively affected by unfavorable social comparison information ($M_{other3} = 3.59$, $SD = 1.72$). Apparently, unfavorable social comparison feedback is most devastating for performance goal individuals pursuing the highest standard (i.e., to do better than others; cf. Senko et al., 2011). Note that this effect was independent of our main findings and tangential to our research question, so it will not be discussed further.

Participants' subsequent dominant achievement goal. We then examined whether mastery-oriented participants continued to explicitly endorse a mastery goal despite TOESCI observed above. This was meant to provide additional support for our premise that only one's explicit mastery-based goal is misaligned with the evaluation criteria one primarily uses (i.e., the misalignment is only for mastery goal individuals and not performance goal individuals). Indeed, after completing their performance self-evaluations, the percentage of participants who endorsed a mastery-based goal actually *increased* from 52.6% (before Version 1) to 73.1% (before Version 3), $\chi^2(1) = 26.17$, $p < .001$. Specifically, before Version 3, 41.0% preferred a mastery-approach goal and 32.1% preferred a mastery-avoidance goal. Only a minority of 26.9% preferred a performance goal before Version 3 (performance-approach = 6.4%, performance-avoidance = 20.5%). Among those who initially adopted a performance goal, exactly 50% shifted toward to a subsequent mastery-based goal. Furthermore, despite participants' dominant reliance on social comparison information, *almost all* (93.9%) mastery goal individuals stuck to their mastery-based goal. In other words, participants either adopted or restated a mastery-based goal despite predominantly relying on social comparison information in their performance self-evaluations. This discrepancy suggests a possible lack of conscious awareness or acknowledgment about the social comparison processes underlying their evaluations. At the very least, it suggests that their explicit goal would remain (or become) misaligned with the evaluation criteria they just used. In sum, these results highlight how simply having or endorsing a mastery-based goal is no guarantee of the type of feedback information one ends up relying on when evaluating how well or poorly one did in a situation.

Study 2

The results of Study 1 indicate that TOESCI occurred. That is, social comparison information had—overall—more of an impact on participants' self-evaluations than temporal comparison information, even among those who explicitly endorsed mastery-based goals. In Study 2, we sought to replicate TOESCI while also testing whether a subsequent

intervention can help individuals overcome it. Hypothesis 3 states that it takes an explicit reminder about one's mastery-based goal in order for one to primarily rely on temporal comparison information—that is, in order for one to align one's goal and performance self-evaluation criteria. Our logic here is based on classic research on attitudes, which suggests that when an attitude is not very strongly associated with a desired behavioral response, people often have to be explicitly reminded of their attitude in order for them to align their behavior with it (Fazio, 1986). For instance, Snyder and Swann (1976) found that attitude–behavior correlations were significantly higher if participants were first explicitly instructed to consider their views toward affirmative action before reading a court case. If we apply the same logic to the present work, an explicit reminder of one's mastery-based goal could increase people's reliance on temporal comparison information to the point that it actually predicts their performance self-evaluations better than social comparison information.

Method

Sample, procedure, and measures. The sample consisted of 250 undergraduates (30.4% male, $M_{age} = 20.42$). The procedure, design, task, and measures were almost identical to those in Study 1, with two exceptions. The first crucial difference in this study is that, after completing Version 1, *all* participants were recommended to adopt a mastery-approach goal (Elliot & McGregor, 2001; Van Yperen, 2003): "to do better on Version 2 relative to Version 1 of the task." It was then emphasized that if they improved on Version 2 relative to Version 1, they would have done a good job. In addition, it was explicitly stated that how others did on this task (better or worse) was unimportant and irrelevant to them for how they felt and what they thought. To further intensify this goal manipulation, participants were asked to elaborate on their assigned mastery-based goal by describing a situation, including their thoughts and feelings, in which they had reached a similar goal—that is, a situation in which they had improved and sincerely felt indifferent to others' performances (cf. Poortvliet et al., 2007; Van Yperen et al., 2011).

Second, we included two performance evaluations in this study: one identical to that used in Study 1 (for the purpose of replication) and another that focused on their mastery-based goal (to test the effect of the explicit reminder; see Hypothesis 3). Thus, after responding to the performance evaluation measure from Study 1, participants were additionally asked how well they think they did on the d2 task considering their goal to do better on Version 2 than on Version 1 (1 = *very poor* to 10 = *excellent*).

Results

Manipulation checks. A great majority (87%) correctly recalled their score on Version 2 relative to Version 1, and
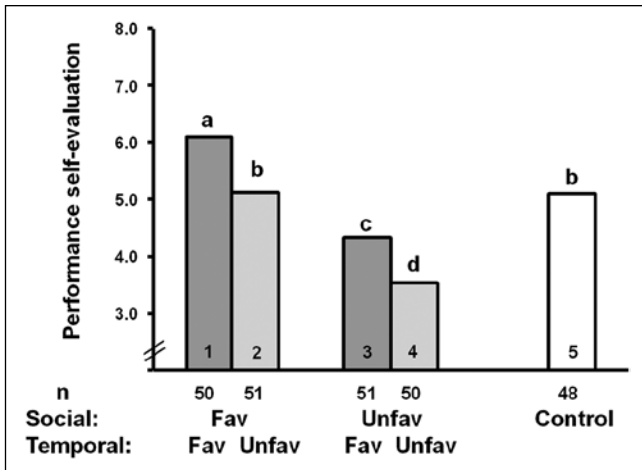
Figure 2. Performance self-evaluation as a function of comparison information (social vs. temporal and favorable vs. unfavorable) by individuals endorsing a situationally induced mastery-approach goal (Study 2).

93% of the participants correctly recalled their scores on both versions relative to those of others. In the subsequent analyses, all participants were included. Also in Study 2, analyses without the participants who failed either manipulation check did not change the results.

Performance self-evaluation. For the purpose of replication, we first tested the hypothesis (Hypothesis 1) that social comparison is the main driver of individuals' self-evaluations across goal types. A 2 (Social comparison [favorable, unfavorable]) × 2 (Temporal comparison [favorable, unfavorable]) ANOVA indicated no interaction ($p = .75$), but both main effects were significant. Consistent with the results of Study 1, temporal comparison information led participants to evaluate their performances more positively when it was favorable ($M_{fav} = 5.21$, $SD = 2.01$) as opposed to unfavorable ($M_{unfav} = 4.33$, $SD = 2.10$), $F(1, 198) = 11.49$, $p = .001$, $\eta_p^2 = .05$. We also again found a larger main effect of social comparison information, with participants evaluating their own performances more positively when it was favorable ($M_{fav} = 5.60$, $SD = 1.88$) as opposed to unfavorable ($M_{unfav} = 3.93$, $SD = 1.98$), $F(1, 198) = 40.32$, $p < .001$, $\eta_p^2 = .17$. Note that, despite the initial instructions to pursue a mastery-based goal and to focus on temporal comparisons, the effect size was still larger for social comparison information than for temporal comparison information ($\eta_p^2 = .17$ vs. $\eta_p^2 = .05$; see Note 1 on comparing effect sizes). This means that TOESCI also occurred in Study 2.

Follow-up analyses (LSD tests), which included the control condition, provided additional evidence that mastery goal individuals' self-evaluations were mainly driven by social comparison information. As shown in Figure 2, favorable social comparison yielded more positive self-evaluations when the corresponding temporal comparison information was unfavorable, as compared to when the social

comparison information was unfavorable but the temporal comparison information was favorable (Bar 2 vs. Bar 3; $M_{diff} = 0.78$, $SE = .37$, $p = .04$). Thus, also in Study 2, empirical support was obtained for Hypothesis 1.

Also in line with the findings in Study 1, follow-up analyses (LSD tests) further indicated that temporal comparison only added to the social comparison individuals were making anyway—such that unfavorable temporal comparison information either only attenuated the positive effect of favorable social comparison information (Bar 1 vs. Bar 2; $M_{diff} = 0.98$, $SE = .37$, $p = .009$) or exacerbated the negative effect of unfavorable social comparison (Bar 3 vs. Bar 4; $M_{diff} = 0.81$, $SE = .37$, $p = .03$). These effects virtually mirror those observed in Study 1 among individuals who freely adopted a mastery-based goal (see Figure 1) and accordingly provide additional support for Hypothesis 2: Temporal comparison only adds to the social comparison individuals are making anyways, particularly among mastery goal individuals.

However, the main purpose of Study 2 was to test whether it takes an explicit reminder to align one's explicit mastery-based goal with the criteria one actually uses in performance self-evaluations (Hypothesis 3). To test this hypothesis, we ran the same 2 (Social comparison [favorable, unfavorable]) × 2 (Temporal comparison [favorable, unfavorable]) ANOVA on the item assessing how well participants thought they did on the d2 task considering their goal to do better on Version 2 than on Version 1. The results (finally) indicated only a main effect of temporal comparison information, $F(1, 198) = 78.09$, $p < .001$, $\eta_p^2 = .28$, and no main or interactive effects of social comparison (ps $> .20$), which supports Hypothesis 3: The reminder seemed to effectively extinguish the otherwise overpowering effect of social comparison among mastery goal individuals. That is, when participants were explicitly reminded to consider their mastery-based goal, favorable temporal comparison information did produce a more positive self-evaluation ($M_{fav} = 6.29$, $SD = 2.51$) than *unfavorable* temporal comparison information ($M_{unfav} = 3.67$, $SD = 2.19$).

Study 3

Study 3 was meant to effectively replicate, in a work setting, what we observed with the student samples from the first two studies. Here we measured (rather than manipulated) the types of comparisons used for one's performance self-evaluation and then regressed the workers' subsequent performance self-evaluations on the types of comparisons used. Our objective was to demonstrate that although workers perceive temporal comparison as more important for their performance self-evaluations, they nevertheless rely primarily on social comparisons when evaluating their recent job performance.

We also sought to demonstrate the same effects on another outcome variable—namely, positive affect. From a

cybernetic perspective, positive affect may be expected to increase in response to feedback indicating goal progress (e.g., Carver & Scheier, 1998). However, positive affect can also increase as a function of one's automatic evaluations of stimuli in the environment; the stimuli need not be goal-related per se, but instead be either generally associated with a positive or negative valence, or associated with some goal the person is not explicitly aware of (Leander, Moore, & Chartrand, 2009). Thus, it is conceivable that one could feel positive affect from receiving positive social comparison information combined with negative temporal comparison information, even if one explicitly holds a mastery-based goal.

Sample

The sample consisted of 87 call center agents (59.8% male) from a telecommunications company who received job-based pay. They completed the brief paper-and-pencil questionnaire at the workplace. No one refused to participate. Ages ranged from 18 to 48 years ($M = 21.62$ years, $SD = 5.12$). Participants' education level was as follows: 27.6% had a bachelor's degree or higher, 66.7% had technical or vocational training at an intermediate level, and the remaining 5.7% had technical or vocational training at the lowest level. Participants' job tenure was less than 1 year (48.3%), 1 to 2 years (25.2%), 2 to 3 years (12.6%), or 3 years or more (12.6%). The number of hours employed ranged from 8 to 32 hr per week ($M = 14.45$ hr, $SD = 4.66$).

Procedure and Measures

Using electronic performance monitoring, key performance metrics (e.g., average handle time, calls per hour, call quality, phone occupancy, etc.) were obtained and aggregated into single scores.[3] At the work site, these scores and a brief paper-and-pencil questionnaire were handed out by a research assistant. The scores participants received were unambiguous, genuine, and authorized by their supervisor—that is, they received *actual* intrapersonal (i.e., their actual job performances in Week 1 and Week 2) and interpersonal (i.e., their position in the Week 2 ranking) comparison information about their job performances in the 2 weeks prior to assessment. To ensure that participants processed the comparison information accurately, they were asked to indicate their scores and their position in the ranking.

Performance self-evaluation. Participants were then asked to evaluate their job performance in a manner consistent with Studies 1 and 2: "How do you evaluate your last week's [date specified] job performance? Please give your mark." Ratings were given on a 10-point scale (1 = *very poor*, 10 = *excellent*).

Positive affect. Participants' affective states were assessed immediately after workers' performance self-evaluations.

Positive affect was measured using four items: After seeing my last week's job performance scores, I feel (a) pleased, (b) happy, (c) proud, and (d) relaxed (rated 1 = *not at all* to 5 = *extremely;* α = .91).

Rated importance of workers' explicit criteria for their performance self-evaluation. We then assessed the perceived importance of social and temporal comparison information for workers' performance self-evaluation. Participants were asked, "How important to you are the following criteria for your self-evaluation?" The four criteria we presented were as follows: (a) My last week's job performance was better than others' job performances (*social, favorable*), (b) My last week's job performance was worse than others' job performances (*social, unfavorable*), (c) My last week's job performance was better than my own job performance in the preceding week (*temporal, favorable*), and (d) My last week's job performance was worse than my own job performance in the preceding week (*temporal, unfavorable*; all rated 1 = *very unimportant* to 7 = *very important*).

Rated importance of workers' subsequent achievement goals (see also Study 1). Participants then indicated their job-related achievement goals for the upcoming week. The four goals were as follows: (a) to do better than others (performance-approach), (b) not to do worse than others (performance-avoidance), (c) to do better than last week (mastery-approach), and (d) not to do worse than last week (mastery-avoidance; all rated 1 = very unimportant to 7 = very important).

Results

Performance self-evaluation. To effectively replicate TOESCI in a work setting, we first tested the hypothesis (Hypothesis 1) that social comparison is the main driver of individuals' self-evaluations across goal types. We conducted a hierarchical regression predicting participants' performance self-evaluations from their sex, job tenure, level of education, number of hours employed (i.e., control variables; Step 1), the four evaluation criteria (Step 2), their two-way interactions (Step 3), three-way interactions (Step 4), and four-way interaction (Step 5). Results indicated that only Step 2 was significant—the main effects of the four criteria, $F_{\text{change}}(4, 78) = 4.48$, $p = .003$, $R^2_{\text{change}} = .18$; other ps > .30. Specifically, the only criteria that significantly predicted participants' performance self-evaluations were the two forms of social comparison information: performing worse than others (β = −.38, $p = .002$) and performing better than others (β = .23, $p = .04$). Temporal comparisons did not predict workers' performance self-evaluations (ps > .70).

A second hierarchical regression analysis produced similar results when examining the objective performance data and ranking information. When entering the control variables (Step 1), employees' position ranking and actual change in job performance (i.e., social vs. temporal comparison information; Step 2), and their interaction (Step 3) as

predictor variables, only Step 2 was significant, F_{change} (2, 80) = 12.76, $p < .001$, R^2_{change} = .23; other $ps > .17$. Specifically, only the social comparison information (i.e., position ranking) predicted participants' self-evaluations ($\beta = -.46$, $p < .001$); the temporal comparison information (i.e., change in job performance) was not significant ($\beta = .14$, $p = .17$).

Positive affect. We ran both hierarchical regressions again, but now with participants' positive affect as the dependent variable. Again, in the first analysis, only Step 2 was significant—the main effects of the four criteria, F_{change} (4, 78) = 5.05, $p = .001$, R^2_{change} = .19; other $ps > .36$. In line with the performance self-evaluations, the only criteria that significantly predicted participants' positive affect were the two forms of social comparison information: performing worse than others ($\beta = -.29$, $p = .01$) and performing better than others ($\beta = .25$, $p = .02$). Temporal comparisons did not predict positive affect ($ps > .18$).

Similarly, using the objective performance data and ranking information as predictors of positive affect, only Step 2 was significant, F_{change} (2, 80) = 4.98, $p = .009$, R^2_{change} = .10; other $ps > .10$. Again, only the social comparison information (i.e., position ranking) predicted participants' self-evaluations ($\beta = -.31$, $p = .006$); the temporal comparison information (i.e., change in job performance) was not significant ($\beta = .09$, $p = .41$). In line with Hypothesis 1, these findings indicate that social comparison is the main driver of individuals' positive affect as well.

Rated importance of explicit criteria for performance self-evaluation. In line with the findings in Studies 1 and 2, a within-subjects ANOVA revealed that the workers, despite relying primarily on social comparison information, nevertheless rated temporal comparison information as being more important to their performance self-evaluations than social comparison information, $F(1, 85) = 4.34$, $p = .04$, $\eta^2_p = .05$. In addition, favorable comparison information was perceived as marginally more important than unfavorable comparison information, $F(1, 85) = 3.37$, $p = .07$, $\eta^2_p = .04$. The interaction was not significant, $F(1, 85) = 1.41$, $p = .24$, $\eta^2_p = .02$. As shown in Figure 3, pairwise comparisons (*t* tests) indicated that the mastery-based criterion of improvement in job performance (*temporal, favorable*) was perceived as a more important criterion for their performance self-evaluation (*M* = 4.70, *SD* = 1.50) than each of the other three other criteria ($ps < .05$). These results are consistent with the idea that people explicitly prefer and endorse temporal comparison information over social comparison information.

Rated importance of subsequent achievement goals. An ANOVA indicated that for the upcoming week, workers were still more likely to endorse mastery-based goals than performance-based goals, $F(1, 85) = 33.70$, $p < .001$, $\eta^2_p = .28$, and more likely to endorse avoidance goals relative to approach goals, $F(1, 85) = 10.42$, $p < .01$, $\eta^2_p = .11$. These two main
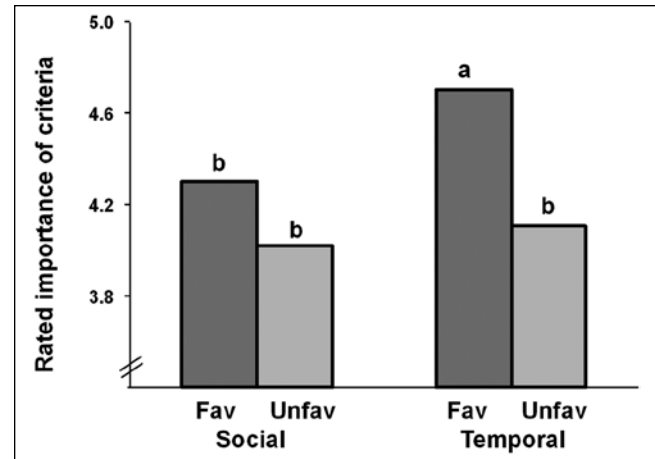

Figure 3. Rated importance of workers' explicit social comparison criteria (favorable and unfavorable) and temporal comparison criteria (favorable and unfavorable) for their performance self-evaluation (Study 3).
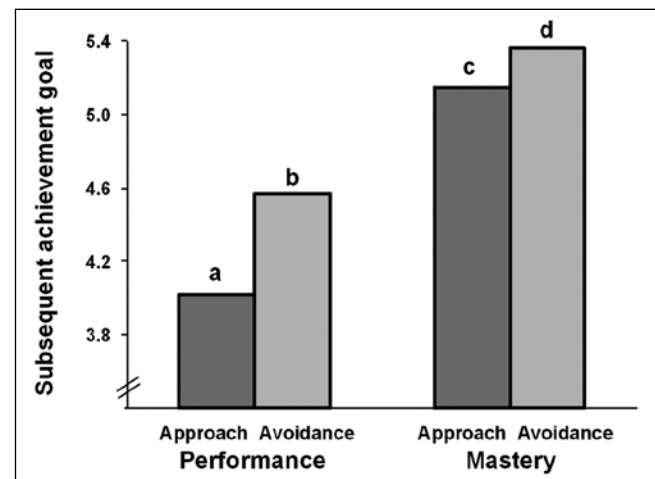

Figure 4. Rated importance of the four subsequent achievement goals from the 2 (performance vs. mastery) × 2 (approach vs. avoidance) achievement goal framework (Study 3).

effects were qualified by a significant interaction, $F(1, 85) = 5.45$, $p = .02$, $\eta^2_p = .06$. As shown in Figure 4, workers were most likely to adopt mastery-avoidance goals (MAv; *M* = 5.36, *SD* = 1.36; $ps < .001$) and mastery-approach goals (MAp; *M* = 5.15, *SD* = 1.30), followed by performance-avoidance goals (PAv; *M* = 4.57, *SD* = 1.73) and performance-approach goals (PAp; *M* = 4.02, *SD* = 1.80). Thus, also in Study 3, we observed TOESCI as well as individuals' persistence in endorsing mastery-based goals. These results highlight how the evaluation criteria one actually uses for one's performance self-evaluation do not always align with one's explicit and freely adopted evaluation criteria and achievement goals.

General Discussion

To the best of our knowledge, this is the first investigation that critically examines an alleged link between individuals' explicit goals (or comparison standards) and the criteria they ultimately use when self-evaluating their performances. Across three studies, we observed TOESCI: a consistent, dominant reliance on social comparisons over temporal comparisons even among individuals with mastery-based goals (either personally adopted or situationally induced). Specifically, in both the lab (Studies 1 and 2) and the field (Study 3), we demonstrated that social comparison overpowers temporal comparison when people are asked to evaluate their own performances after receiving clear and unambiguous comparison information. Relative to temporal comparison information, social comparison information explained by far most of the observed variance in performance self-evaluations (Studies 1-3) and positive affect (Study 3). Interestingly, we observed this pattern among individuals with freely, explicitly endorsed mastery-based goals (Studies 1 and 3), individuals consciously holding a situationally induced mastery-based goal (Study 2), and individuals who emphasized the importance of mastery-based relative to performance-based evaluation criteria for their self-evaluations (Study 3).

In line with our expectations, social comparison was the main driver of individuals' self-evaluations, even among individuals who explicitly endorsed a mastery-based goal. Accordingly, for mastery goal individuals, their explicit goal and preference did not align with the type of feedback information they primarily used in their performance self-evaluations. Also for them, temporal comparison only added to the social comparison they were going to make anyway. Most notable, mastery goal individuals evaluated their performance more positively when social comparison information was favorable and temporal comparison was unfavorable than when the favorability of the information was reversed. These results are especially intriguing given that participants, basically, under-utilized the opportunity to serve their self-enhancement needs; they could have emphasized the favorable temporal comparisons when performing worse than others, but they did not. It is conceivable to us that neglecting clear and unambiguous social comparison information violates people's desire to take their self-evaluations seriously (Allison, Messick, & Goethals, 1989; Van Yperen, 1992), even if it would be self-enhancing. The tendency to de-emphasize favorable temporal comparison information when performing worse than others highlights our main finding that individuals' performance self-evaluations are primarily driven by social comparison and only further adjusted by temporal comparison.

We observed similar effects on positive affect, which is interesting because it means that mastery goal individuals could feel more or less positive about their performance for reasons unrelated to their mastery-based goal (i.e., regardless of whether they worsened or improved over the last time). Indeed, favorable social comparison information was positively related to workers' positive affect whereas unfavorable social comparison was negatively related to positive affect—and yet, neither favorable nor unfavorable temporal comparisons explained additional variance of positive affect. The results for positive affect both corroborates the main finding and also suggests the potential ease with which social comparison information could misinform the feedback loop system. It is conceivable that individuals with mastery-based goals feel good often only because they did better than others, regardless of whether or not they actually improved on the task.

Our findings suggest that people tend toward social comparisons habitually, even when such evaluation criteria are misaligned with one's explicit goal. Other work highlights how social comparison is exacerbated by the social value and societal relevance of the social comparison standard (e.g., Garcia, Tor, & Gonzalez, 2006; Garcia, Tor, & Schiff, 2013). For example, being nearly the best or worst tends to make social comparison information even more salient, especially for performance goal individuals. When room for improvement is small (i.e., when ranks are high), mastery goal individuals also tend to direct their focus (even more) on social comparison information (Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2009). Others (e.g., Zell & Alicke, 2010) emphasized that people tend to rely most on *local* social comparison information, such as small groups that occur early in development among family members, schoolmates, and friends. In line with the current findings (cf. Gilbert et al., 1995), this tendency implies that people may de-emphasize more diagnostic information such as objective criteria (Klein, 1997) or comparisons with aggregates and larger samples (Zell & Alicke, 2010). In addition, the role people enact appeared to have an impact on their reliance on social comparison. Relative to self-evaluations, evaluating someone else's performance leads observers to completely ignore temporal comparison information and focus only on social comparison information (Zell & Alicke, 2009). Based on the present findings, we suspect that this pattern also holds among observers who explicitly endorse and prefer mastery-based goals over performance-based goals. If mastery goal observers do consider temporal comparison information, it might only add to the social comparison they were going to make anyway.

Important to note is that our results do not suggest—nor do we assume—that social comparisons and temporal comparisons are mutually exclusive processes; people tend to engage in both comparison processes simultaneously and both appear to be relevant for performance goal individuals as well as mastery goal individuals. Indeed, our main finding is that *social comparison information* is the main driver of individuals' self-evaluations, even among individuals who explicitly endorsed a mastery-based goal. In addition, unfavorable *temporal comparison information* consistently

attenuated the positive effect of favorable social comparison information, also among performance goal individuals (Studies 1 and 2). Because the different kinds of performance information are orthogonal factors, we manipulated (Studies 1 and 2) or measured (Study 3) social comparison information independently of temporal comparison information.

The conclusion that people primarily rely on social comparison when self-evaluating their performances raises the question whether this tendency is optimal for self-regulation. Several studies demonstrate functional benefits of social comparison under particular conditions, including attainability (Lockwood & Kunda, 1997), having a good health status (Brakel, Dijkstra, Buunk, & Siero, 2012), and being low in narcissism (Bogart, Benotsch, & Pavlovic, 2004). Indeed, Lockwood and Kunda (1997) showed that superior performers in a self-relevant domain provoke self-enhancement and inspiration when role models' success seems attainable (i.e., when individuals feel that they still have enough time to achieve comparable success or believe that their own abilities can improve over time). However, there is also evidence that social comparisons could undermine optimal self-regulation. For example, superior role models provoke self-deflation when their success is perceived as unattainable (Lockwood & Kunda, 1997). Similarly, White et al. (2006) demonstrated that individuals who make frequent social comparisons are more likely to experience envy, guilt, regret, and defensiveness (cf. Smith & Kim, 2007); they are also more likely to lie, blame others, and have unmet cravings (White et al., 2006). Similarly, sensitivity to social comparison information is negatively related to feelings of happiness (Lyubomirsky & Ross, 1997) and individuals high in social comparison orientation tend to be higher in negative affectivity and neuroticism (Gibbons & Buunk, 1999). As discussed in the introduction, the achievement goal literature provides additional evidence that social comparison may not be ideal in terms of downstream effects on self-regulation. Although meta-analyses indicate that, in general, a positive link exists between performance-based goals and performance attainment (e.g., Hulleman, Schrager, Bodmann, & Harackiewicz, 2010), these social comparison-based goals are also consistently associated with a series of negative outcomes.

In contrast, a focus on mastery-based goals – and the temporal comparisons associated with them – is generally considered the ideal type of competence-based regulation and facilitative for intrinsic motivation, collaboration, and performance attainment (e.g., Elliot, 2005; Midgley et al., 2001; Pintrich, 2000; Van Yperen & Orehek, 2013). Therefore, to optimize self-regulation, it is important to know if—and how—the tendency to rely on social comparison rather than temporal comparison can be overcome. One of the main contributions of the present research is that we show that an explicit reminder to align one's explicit mastery-based goal with the criteria one actually uses in performance self-evaluations can help to align one's mastery-based goal with its corresponding evaluation criteria. Such a reminder could increase the goal's accessibility in one's mind while also providing a public justification to rely on temporal comparison information instead. This finding is certainly encouraging but more importantly, it suggests that one may have to explicitly shift one's comparison standard to align it with one's mastery-based goal. Indeed, in our society in which excellence and success are often defined in terms of an individual's achievement relative to others (Harackiewicz et al., 1998; Klein, 1997), simply "having" or explicitly endorsing a mastery-based goal does not necessarily change the evaluation criteria one actually uses. To overcome the *inter*personal standards that are likely to be activated unconsciously in many achievement settings, people need to be reminded of their self-referenced goal explicitly—much as how one needs to be reminded of one's attitude to bring one's evaluations into line with it.

Altogether, our findings demonstrate the occurrence of TOESCI, and accordingly, highlight a misalignment between individuals' explicit mastery-based goals and the evaluation criteria they primarily use. This misalignment is particularly intriguing given that one's evaluation criteria should, conceivably, correspond with one's current goal if one's performance self-evaluations are to be at all useful in facilitating effective self-regulation (e.g., Carver & Scheier, 1998). People's dominant reliance on social comparisons seems to operate as a form of evaluative habit that is too rigid to align with one's explicit mastery-based goals and preferred evaluation criteria. Thus, the present studies could yield novel insights into how one's chronic evaluative tendencies could (un)consciously misinform a person's ongoing sense of goal progress—or at least the ability to feel good about that progress. The practical relevance of our findings is that, in achievement settings wherein social comparison information is ubiquitous, it may be that coaches, supervisors, and teachers need to structurally emphasize mastery-based goals and explicitly—and perhaps repeatedly—remind their athletes, subordinates, and students to consider their mastery-based goal when self-evaluating their performances.

Notes

1. Cohen (1988) has provided some useful guidelines for interpreting effect sizes in the behavioral sciences. He characterized effect sizes generated by ANOVAs (η_p^2) around $\eta_p^2 = .01$ as "small," around $\eta_p^2 = .06$ as "moderate," and around $\eta_p^2 = .14$ as "large" (pp. 283-288).

2. In pilot studies, we explored different percentile scores, with largely the same results: social comparison information overpowered temporal comparison information. We finally adopted the current percentile scores because these are credible and acceptable, perfectly balanced, and equally strong in the social and temporal comparison information conditions. Nevertheless, participants' subjective experience of their status relative to others may be different in the 4-50 (or 50-96) condition relative to the 50-4 (or 96-50) condition. To address this issue, we explained and explicitly evaluated participants' 27% rank (either 4-50 or 50-4) as *good*, and their 73% rank (either 50-96 or 96-50) as *poor*. In all studies, including pilot studies, almost all participants correctly recalled their score relative to others, and we found no evidence for any difference between both favorable social comparisons conditions, or between both unfavorable social comparison conditions. This finding supports our "unconscious" logic—that participants were consciously aware of both types of stimuli but were unaware of their resulting impact on participants' reported self-evaluations.

3. This aggregation process was conducted by administrators from the telecommunications company by using the software package "Business Objects." As researchers, we obtained only workers' aggregated scores and ranking information.

References

Albert, S. (1977). Temporal comparison theory. *Psychological Review*, *84*, 485-503.

Allison, S. T., Messick, D. M., & Goethals, G. R. (1989). On being better but not smarter than others: The Muhammad Ali effect. *Social Cognition*, *7*, 275-295.

Bar-Anan, Y., Wilson, T. D., & Hassin, R. R. (2010). Post-priming confabulation causes erroneous self-knowledge. *Journal of Experimental Social Psychology*, *46*, 884-894. doi:10.1016/j.jesp.2010.07.007

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trotschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology*, *81*, 1014-1027.

Bogart, L. M., Benotsch, E. G., & Pavlovic, J. D. (2004). Feeling superior but threatened: The relation of narcissism to social comparison. *Basic and Applied Social Psychology*, *26*, 35-44. doi:10.1207/s15324834basp2601_4

Brakel, T. M., Dijkstra, A., Buunk, A. P., & Siero, F. W. (2012). Impact of social comparison on cancer survivors' quality of life: An experimental field study. *Health Psychology*, *31*, 660-670. doi:10.1037/a0026572

Brickenkamp, R. (1981). *Test d2* (7th ed.). Göttingen, Germany: Hogrefe.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York, NY: Cambridge University Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52-72). New York, NY: Guilford Press.

Elliot, A. J., & McGregor, H. A. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology*, *80*, 501-519. doi:10.1O37//OO22-3514.80.3.501

Fazio, R. H. (1986). How do attitudes guide behavior? In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (pp. 204-243). New York, NY: Guilford Press.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*, 117-140.

Garcia, S. M., Tor, A., & Gonzalez, R. (2006). Ranks and rivals: A theory of competition. *Personality and Social Psychology Bulletin*, *32*, 970-982. doi:10.1177/0146167206287640

Garcia, S. M., Tor, A., & Schiff, T. M. (2013). The psychology of competition: A social comparison perspective. *Perspectives on Psychological Science*, *8*, 634-650. doi:10.1177/1745691613504114

Gibbons, F. X., & Buunk, A. P. (1999). Individual differences in social comparison: The development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, *76*, 129-142. doi:10.1037/0022-3514.76.1.129

Gilbert, D. T., Giesler, R. B., & Morris, K. A. (1995). When comparisons arise. *Journal of Personality and Social Psychology*, *69*, 227-236. doi:10.1037/0022-3514.69.2.227

Hanko, K., Crusius, J., & Mussweiler, T. (2010). When I and me are different: Assimilation and contrast in temporal self-comparisons. *European Journal of Social Psychology*, *40*, 160-168. doi:10.1002/ejsp.625

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist*, *33*, 1-21.

Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology*, *94*, 638-645. doi:10.1037//0022-0663.94.3.638

Hendricks, J., & Payne, S. (2007). Beyond the big five: Leader goal orientation as a predictor of leadership effectiveness. *Human Performance*, *20*, 317-343. doi:10.1080/08959280701521983

Holroyd, C. B., Hajcak, G., & Larsen, J. T. (2006). The good, the bad and the neutral: Electrophysiological responses to feedback stimuli. *Brain Research*, *1105*, 93-101. doi:10.1016/j.brainres.2005.12.015

Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin*, *136*, 422-449. doi:10.1037/a0018947

Klein, W. M. (1997). Objective standards are not enough: Affective, self-evaluative, and behavioral responses to social comparison information. *Journal of Personality and Social Psychology*, *72*, 763-774. doi:10.1037/0022-3514.72.4.763

Leander, N. P., Moore, S. G., & Chartrand, T. L. (2009). Mystery moods: Their origins and consequences. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 480-504). New York, NY: Guilford Press.

Lockwood, P., & Kunda, Z. (1997). Superstars and me: Predicting the impact of role models on the self. *Journal of Personality and Social Psychology*, *73*, 91-103. doi:10.1037/0022-3514.73.1.91

Lyubomirsky, S., & Ross, L. (1997). Hedonic consequences of social comparison: A contrast of happy and unhappy people. *Journal of Personality and Social Psychology*, *73*, 1141-1157. doi:10.1037/0022-3514.73.6.1141

Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology*, *93*, 77-86. doi:10.1037/0022-0663.93.1.77

Mussweiler, T., Rüter, K., & Epstude, K. (2004). The man who wasn't there: Subliminal social comparison standards influence self-evaluation. *Journal of Experimental Social Psychology*, *40*, 689-696. doi:10.1016/j.jesp.2004.01.004

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, *84*, 231-259. doi:10.1037/0033-295X.84.3.231

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts & P. R. Pintrich (Eds.), *Handbook of self-regulation* (pp. 451-502). San Diego, CA: Academic Press.

Poortvliet, P. M., Janssen, O., Van Yperen, N. W., & Van de Vliert, E. (2007). Achievement goals and interpersonal behavior: How mastery and performance goals shape information exchange. *Personality and Social Psychology Bulletin*, *33*, 1435-1447. doi:10.1177/0146167207305536

Poortvliet, P. M., Janssen, O., Van Yperen, N. W., & Van de Vliert, E. (2009). Low ranks make the difference: How achievement goals and ranking information affect cooperation intentions. *Journal of Experimental Social Psychology*, *45*, 1144-1147. doi:10.1016/j.jesp.2009.06.013

Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist*, *46*, 26-47. doi:10.1080/00461520.2011.538646

Shah, J. Y. (2005). The automatic pursuit and management of goals. *Current Directions in Psychological Science*, *14*, 10-13. doi:10.1111/j.0963-7214.2005.00325.x

Smith, R. H., & Kim, H. (2007). Comprehending envy. *Psychological Bulletin*, *133*, 46-64. doi:10.1037/0033-2909.133.1.46

Snyder, M., & Swann, W. B. (1976). When actions reflect attitudes: The politics of impression management. *Journal of Personality and Social Psychology*, *34*, 1034-1042.

Van Yperen, N. W. (1992). Self-enhancement among major league soccer players: The role of importance and ambiguity on social comparison behavior. *Journal of Applied Social Psychology*, *22*, 1186-1198.

Van Yperen, N. W. (2003). Task interest and actual performance: The moderating effects of assigned and adopted purpose goals. *Journal of Personality and Social Psychology*, *85*, 1006-1015.

Van Yperen, N. W. (2006). A novel approach to assessing achievement goals in the context of the 2×2 framework: Identifying distinct profiles of individuals with different dominant achievement goals. *Personality and Social Psychology Bulletin*, *32*, 1432-1445. doi:10.1177/0146167206292093

Van Yperen, N. W., Hamstra, M. R. W., & Van der Klauw, M. (2011). To win, or not to lose, at any cost: The impact of achievement goals on cheating. *British Journal of Management*, *22*, S5-S15. doi:10.1111/j.1467-8551.2010.00702.x

Van Yperen, N. W., & Janssen, O. (2002). Fatigued and dissatisfied or fatigued but satisfied? Goal orientations and responses to high job demands. *Academy of Management Journal*, *45*, 1161-1171.

Van Yperen, N. W., & Orehek, E. (2013). Achievement goals in the workplace: Conceptualization, prevalence, profiles, and outcomes. *Journal of Economic Psychology*, *38*, 71-79. doi:10.1016/j.joep.2012.08.013

Van Yperen, N. W., & Renkema, L. J. (2008). Performing great and the purpose of performing better than others: On the recursiveness of the achievement goal adoption process. *European Journal of Social Psychology*, *38*, 260-271. doi:10.1002/ejsp.425

Wheeler, L., & Miyake, K. (1992). Social comparison in everyday life. *Journal of Personality and Social Psychology*, *62*, 760-773.

White, J. B., Langer, E. J., Yariv, L., & Welch, J. C. (2006). Frequent social comparisons and destructive emotions and behaviors: The dark side of social comparisons. *Journal of Adult Development*, *13*, 36-44. doi:10.1007/s10804-006-9005-0

Zell, E., & Alicke, M. D. (2009). Self-evaluative effects of temporal and social comparison. *Journal of Experimental Social Psychology*, *45*, 223-227. doi:10.1016/ j.jesp.2008.09.007

Zell, E., & Alicke, M. D. (2010). The local dominance effect in self-evaluation: Evidence and explanations. *Personality and Social Psychology Review*, *14*, 368-384. doi:10.1177/1088868310366144