UvA-DARE (Digital Academic Repository)

Context effects in the measurement of optimism in probability judgment

Otten, W.; van der Pligt, J.

DOI

[10.1521/jscp.1996.15.1.80](https://doi.org/10.1521/jscp.1996.15.1.80)

Publication date

1996

Published in

Journal of Social and Clinical Psychology

[Link to publication](#)

Citation for published version (APA):

Otten, W., & van der Pligt, J. (1996). Context effects in the measurement of optimism in probability judgment. *Journal of Social and Clinical Psychology*, 15, 80-101.
<https://doi.org/10.1521/jscp.1996.15.1.80>

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

CONTEXT EFFECTS IN THE MEASUREMENT OF COMPARATIVE OPTIMISM IN PROBABILITY JUDGMENTS

WILMA OTTEN AND JOOP VAN DER PLIGT
University of Amsterdam

In two studies we examine the effects of various measurement procedures on the degree of optimism in self-other probability ratings, and also focus on the effects of comparison standard; an others-as-standard perspective was expected to increase optimism as compared to a self-as-standard perspective. Study 1 shows that first estimating other's probability followed by an estimate of own probability (others-as-standard) results in more optimism than the reverse order (self-as-standard); although, Study 2 failed to replicate this effect. Study 2 indicates that when assessing comparative probability ratings on a single scale the question form "compare self to others" (others-as-standard) results in more optimism than the question "compare others to self" (self-as-standard). It is argued that self may function as a habitual reference point in comparative probability ratings, whereas the order of probability estimates and the question form of comparative ratings may create transient reference points. The results of both studies suggest that these transient reference points may reduce the tendency to see the self as better than others. The procedure to measure self-other probability ratings for events may provide a context that affects the amount of optimism observed.

Comparative judgments about the probability of positive and negative life events involve beliefs about oneself and others. Individuals may reach judgments about others while using beliefs about themselves as a standard of comparison. Alternatively, individuals may judge themselves using beliefs about others as a standard of comparison. These two positions are exemplified in two lines of research. The self-as-standard

This research was supported by the Ministry of Health (WVC) Grant 90038.

We would like to thank Martin Broekhuis, Babette Fahlbruch, and Cornelia Niessen for their help and support in preparing and conducting Study 1, Paul van Lange for his conceptual reflection on the ideas presented, and William Klein, Neil Weinstein, and one anonymous reviewer for their helpful comments on an earlier version of this paper.

Correspondence concerning this article should be addressed to Wilma Otten, University of Amsterdam, Faculty of Psychology, Social Psychology Unit, Roetersstraat 15, 1018 WB Amsterdam, The Netherlands. E-mail address: SP_OTTEN@MACMAIL.PSY.UVA.NL.

CONTEXT EFFECTS AND OPTIMISM

81

perspective is most prominent and accepted in theories relevant to the so-called "false consensus effect," which assumes that judgments of others' preferences, behaviors, or characteristics are guided by beliefs about oneself (cf. Dawes, 1989; Marks & Miller, 1987; Ross, Greene, & House, 1977). The others-as-standard perspective is prominent in social comparison research. In this tradition beliefs about others' standing on a given dimension are employed as a reference point for reaching conclusions about oneself (Festinger, 1954; Wood, 1989).

The present research examines the role of contextual information such as comparison standard on self-other probability judgments regarding the occurrence of *negative* life events. These probability judgments tend to be characterized by an optimistic tendency: one's own probability to encounter negative events is usually judged to be lower than other's probability ("unrealistic optimism," Weinstein, 1980). We will argue that the measurement procedure determines the comparison standard when judging self-other probabilities and that the others-as-standard perspective enhances optimism relative to the self-as-standard perspective.

Comparing own probability to encounter negative events with that of others can be conceived as (based on) a similarity rating between self and others on a particular aspect. Research on the effect of contextual information on self-other similarity ratings is quite extensive compared to research addressing self-other probability ratings, and research on similarity ratings has resulted in some insights that could be applied to self-other probability ratings.

For self-other similarity ratings the difference between a *habitual* and *transient* reference point is relevant. The self is referred to as a habitual reference point (Holyoak & Mah, 1982) that is spontaneously invoked in each self-related judgment, because self may be construed as a prototype that is represented as a rich and well-articulated cognitive structure (see Higgins & Bargh, 1987). Relative to this representation of self, the representation of others—or the average or typical other—is assumed to be less elaborate and to consist of fewer features. According to this literature, self will be the comparison standard in self-other judgments because of the stronger developed self-representation. However, this tendency to use self as a reference point may be overcome by contextual information that provides transient reference points.

A number of studies show that self-other *similarity* judgments are affected by the *form* of the question asked; when self (target) is judged relative to others (comparison standard), self and other are judged as less similar than when others are judged relative to self (see Karylowski, 1990; Karylowski & Skarzynska, 1992). This so-called "asymmetry effect" is based on the assumption that "self relative to others" constitutes an others-as-standard perspective, whereas "others relative to self" con-

stitutes a self-as-standard perspective. Assuming that self-other probability ratings are a special form of self-other similarity ratings, we expect greater optimistic bias when other (rather than self) is the comparison standard.

One explanation for the asymmetry effect in self-other similarity ratings is based on Tversky's (1977) work on the feature matching model. His model assumes that (a) the rich representation of self entails a larger number of features than the representation of others, and (b) the self-representation contains a relatively larger proportion of unique features than the representation of others. In comparing self to others, self seems more unique and therefore less similar to others, whereas in comparing others to self, others seem less unique and hence more similar to self.

Hoorens and Buunk (1993) observed an asymmetry effect in self-other probability ratings: first estimating other's probability, followed by an estimate of own probability resulted in stronger optimism than the reverse order. Assuming that the first judgment serves as a reference point for the second judgment, these findings suggest that an others-as-standard perspective decreases the perceived similarity between self and other in probability ratings resulting in a greater optimistic bias compared to a self-as-standard perspective.

Hoorens and Buunk (1993) did not attribute their results to a cognitive mechanism, but instead proposed a motivational explanation for this asymmetry effect in self-other probability judgments: "... individuals may not like the idea of seeing their own future as similar to that of others. Indeed, the best way of being different is being better" (p. 299). This relates to Codol's explanation (e.g., 1987) for the asymmetry effect in self-other similarity ratings; using others as standard of comparison threatens an individual's uniqueness and therefore heightens the tendency to differentiate oneself from others. More generally, the self-other asymmetry effect is interpreted as a "sign of personal identity affirmation and defense" (Codol, Jarymowicz, Kaminska-Feldman, & Szuster-Zbrojewicz, 1989, p. 12).

All these findings suggest that the procedure to measure self-other probability judgments may affect the comparison standard used in these judgments. Hoorens and Buunk (1993) made a similar suggestion. They used an *indirect* procedure in which own and others' probability are assessed separately and the difference score is computed. A variety of scales are used in this indirect procedure, and in the present studies we also pay attention to the effects of these different scales. Some rely on 101-point response scales (percentages) ranging from "no chance" to "certainty" (e.g., Burger & Burns, 1988; Hoorens & Buunk, 1993; McKenna, Warburton, & Winwood, 1993; Van der Velde, Hooykaas, & Van der Pligt, 1992; Van der Velde, Van der Pligt, & Hooykaas, 1994;

Whitley & Hern, 1991; Zakay, 1983), others use 7- or 10-point Likert scales ranging from "not at all likely or will not happen" to "extremely likely or will happen" (e.g., Burger & Palmer, 1992; Perloff & Fetzer, 1986; Whalen et al., 1994; for further variations see Gerrard & Warner, 1994; Hansen, Raynor, & Wolkenstein, 1991; Jacobs Quadrel, Fischhoff, & Davis, 1993). Probability ratings for others sometimes concern "the average other," sometimes "the typical other." Hoorens and Buunk (1993) showed that these targets result in similar degrees of optimism. Unfortunately, most studies using separate assessments for self and other do not report effects of the order in which own and other's probability are assessed. Hoorens and Buunk (1993) observed an order effect, however Perloff and Fetzer (1986) and Whalen and colleagues (1994) did not. In the present research we assume that in the indirect measurement procedure the self-other order constitutes the self-as-standard perspective and the other-self order forms the others-as-standard perspective.

Another prevailing method to measure self-other probability judgments is a *direct* comparison (Weinstein, 1982). For example, "Compared to other Rutgers' [University] students of my sex, my chances are much below average (-3), average (-2), a little below average (-1), average for other students of my sex (0), a little above average (+1), above average (+2), or much above average (+3)." Weinstein (1983, 1984, 1987) and others (e.g., Eiser, Eiser, & Pauwels, 1993) have employed this procedure. Some researchers used response scales ranging from -5 to +5 (McKenna, 1993). A variation on this direct assessment of comparative judgment on a single scale concerns measures that ask participants to place themselves in a percentile (Svenson, 1981). This approach thus seems to provide a context with an others-as-standard perspective, i.e., "compared to other students." In the present research the question form in the direct procedure will be systematically varied, and the assumption is that the "self relative to others" creates an others-as-standard perspective, whereas the "others relative to self" creates a self-as-standard perspective.

In the direct and indirect measurement procedure a mean comparative rating or difference score significantly less than zero indicates an optimistic bias. This follows from the reasoning that it would be extremely unlikely for most individuals in a group to have a lower than average probability if the probabilities for the occurrence of an event are normally distributed. As described above, both measurement procedures can provide self-as-standard or others-as-standard perspectives that may affect the extent of optimistic bias. However, there are some basic differences between the two procedures. Most importantly, relative to the indirect procedure, the direct procedure provides a much stronger com-

parative frame. Moreover, the two procedures tend to rely on different numerical values and verbal labels of the response scales. Finally, in both procedures response scales with a varying number of categories are used, especially in the indirect procedure (i.e., 101-point scales versus 7-point scales). As Schwarz (1994) points out, these differences in measurement procedures form different contexts in which a judgment is reached. The present research will explore the effects of some of these variations in measurement procedures, including the number of categories of the response scale.

CURRENT RESEARCH AND HYPOTHESES

In two studies we seek to demonstrate that the comparison standard employed affects the extent of optimism observed. We expect that the self-other asymmetry effect observed in similarity judgments also applies to self-other probability judgments. The others-as-standard is expected to enhance optimistically biased judgments as compared to the self-as-standard perspective. We expect that in the *indirect* measurement procedure the order in which own and other's probability are collected will affect the comparison standard employed to reach a judgment: the other-self order constitutes an others-as-standard perspective and is expected to reveal stronger optimism than the self-other order. In the *direct* measurement procedure the question form "compare self to others" will serve as an others-as-standard perspective, and is expected to enhance optimistic judgments relative to the question form "compare others to self."

Study 1 examines the order effect in the indirect measurement procedure. In addition, the effects of using a direct measurement procedure versus an indirect procedure are studied. Finally, Study 1 investigates the effects of varying the number of categories provided in the response scale. Study 2 examines the effects of comparison standards in both measurement procedures and the effects of the time-lag between self and other judgments in the indirect procedure.

STUDY 1

METHOD

Design

The three independent between-subjects variables constituted a 2 (Comparison Procedure: direct vs. indirect) by 2 (Number of Categories: few vs. many) by 2 (Order: own probability as first or second judgment)

factorial design. Participants were randomly assigned to the different cells of the design.

Participants

Eighty respondents participated in the study (23.8% male and 76.3% female, mean age 19.5 years). They were recruited with ads in university, local and national newspapers, and announcements on university information boards. Participants were paid 20 Dutch guilders (approximately 10 American dollars) for their participation. Eighty-four percent of the participants studied at the University of Amsterdam; the remaining participants studied at colleges in Amsterdam.

Procedure

The questionnaire was administered in two sessions, each lasting about 45 minutes, in a classroom setting in groups of 8 to 20 participants. The first session was scheduled in the morning and the second session in the afternoon; the start of both sessions was separated by four hours. The questionnaire also included questions concerning preventive behaviors and intentions, but this article will discuss only the effects of measurement procedure on self-other probability ratings.

Events

Ten different negative events were judged by each participant: (1) Having to stay in bed with flu for one or more days next winter, (2) Getting infected with the AIDS-virus because of your sexual behavior, (3) Not completing your degree in the designated time, (4) Catching a sexually transmitted disease, (5) Getting a drinking problem, (6) After several years your friend decides to end the relationship, (7) Getting a fracture, (8) Getting financial problems during your education, (9) Your home or room is burglarized, and (10) Getting skin cancer. A pilot study indicated that these events were in the realm of the participants' experience and varied in perceived seriousness and controllability of the consequences.

Independent Variables

Comparison Procedure. Half the participants ($n = 40$) made a *direct* comparison between own probability and the probability for a typical other on a single scale. In each question the typical other was described as "a random other person of your age and gender, who also studies in Amsterdam"; in the remainder of this article we will denote this as (*typical*) *other*.¹ The direct comparison was formulated as follows: "Imag-

1. In Dutch "typical" denotes a strange or weird person, therefore the formulation "a random other person" was chosen which implies an arbitrary other person.

ine yourself a random other person of your age and gender, who also studies in Amsterdam. Compare the probability that the event will happen to you personally with the probability that the event will happen to this random person." Responses were collected on a scale with endpoints labeled as "own probability is very much lower than other's probability" and "own probability is very much higher than other's probability."

The other half of the participants ($n = 40$) used an *indirect* comparison procedure. This procedure consisted of separate assessments of own probability and the probability for a typical other. The question, "How probable do you think it is that the event will happen to you (this random person)?" was answered on a scale with endpoints labeled as "the event will certainly not happen" and "the event will certainly happen." The difference between these two scores constituted the comparative probability measure.

Number of Categories. Half the participants ($n = 40$) answered on 9-point scales ("few" categories), and the other half ($n = 40$) responded to 101- or 201-point scales ("many" categories). The response scale with few categories ranged from -4 through 0 to +4 for the direct comparison procedure, and from 1 to 9 for the indirect procedure. In the direct comparison procedure the scale with many categories consisted of writing down a number between -100 and +100. The phrasing of the question and the labeling of the response categories was similar to the scale with few categories (-100 = own probability is very much lower, 0 = both probabilities are equal, +100 = own probability is very much higher). In the many categories condition in the indirect comparison procedure similar formulations of the questions and labeling of the response scales were used for the assessment of own and other's probability as in the few categories condition. For the scale with many categories participants could write down a number between 0 and 100, which were also labeled as 0 = the event will certainly not happen, and 100 = the event will certainly happen.

Order. In the *indirect* comparison procedure, an order manipulation provided the variation in comparison standard: half of the participants ($n = 20$) first assessed own probability in the first session followed by an estimate for a typical other in the second session (self-as-standard perspective), whereas for the remaining half of the participants ($n = 20$) this order was reversed (others-as-standard perspective).

To ensure experimental sessions of equal length we introduced an added task in the *direct* comparison procedure: half of the participants ($n = 20$) first assessed their own probability, followed by the direct comparison, and for the remaining participants ($n = 20$) this order was reversed. In this direct comparison procedure own probability was

assessed on a scale with many categories if the direct comparison was also rated on a many categories scale, whereas own probability was assessed on a scale with few categories when the direct comparison was assessed on a few categories scale.

Dependent Variables

Judgmental Dimensions. Each participant provided self-other difference ratings on four different dimensions: (1) the *probability* that the event will happen, (2) the *vulnerability* to the event, (3) the *danger* that the event will happen, and (4) the *risk* that the event will happen. The order of the events to be judged was randomized for each dimension, and all ten events were judged on one dimension at the same time. The judgments were interspersed with other tasks and spread out over the questionnaire. Thus, in the larger questionnaire participants first provided probability ratings for all events at the same time, followed by the vulnerability ratings as the fifth task, the danger ratings as the ninth task, and the risk estimates as the final, twelfth task. Analyses showed that the self-other difference ratings on all four dimensions were interrelated (for the ten events Cronbach's alphas ranged from .61 to .89). Therefore, the ratings on these four dimensions were combined into one *probability* dimension.

Transformations. In order to compare the responses on the different scales responses are transformed to the scales with the most categories, i.e., the 201-point scale. For the direct comparison procedure the 9-point scale ranging from -4 to +4 was converted into a 201-point scale with values ranging from -100 through 0 to +100 ($x' = 25x$). In the indirect comparison procedure the estimate for the typical other was subtracted from the own probability estimate. For the scale with many categories this resulted in a scale ranging from -100 through 0 to +100. For the scale with few categories this resulted in a scale ranging from -8 through 0 to +8 and this difference scale was converted into a 201-point scale with values ranging from -100 through 0 to +100 ($x' = 12.5x$). For all conditions values smaller than zero indicated optimism (own probability is lower than other's probability), a value equal to zero signified a neutral response (no difference between both probability estimates), and values larger than zero denoted pessimism (own probability is higher than other's probability).

RESULTS

The self-other difference ratings on the probability dimension were averaged over the ten events, although the internal consistency of this measure was relatively low (Cronbach's $\alpha = .51$). The overall mean (M

$= -9.34$, $SD = 10.23$) differed from zero ($t(79) = 8.16$, $p < .001$) indicating that across the ten events ratings were optimistically biased, i.e., own probability was judged lower than other's probability. The effects of the manipulations were analyzed by performing a 2 (Comparison Procedure: direct vs. indirect) by 2 (Number of Categories: few vs. many) by 2 (Order: own probability as first or second judgment) Analysis of Variance, where the mean self-other probability rating was the dependent variable.

Comparison Standard (Order)

A main effect of Order was obtained ($F(1, 72) = 13.95$, $p < .001$): less optimism was found if own probability was judged first ($M = -5.62$, $SD = 8.93$) than when other's probability was judged first ($M = -13.05$, $SD = 10.20$). Our prediction concerned the effect of order in the indirect procedure given that it would provide a variation in comparison standard, whereas the order manipulation in the direct procedure was only intended as an additional task. However, no interaction between Order and Comparison Procedure was observed ($F(1, 72) = 0.10$, ns). To examine how Order affected the self-other probability rating in the direct and indirect procedures separately, simple main effect analyses were conducted.

In the indirect procedure the order manipulation ($F(1, 72) = 8.21$, $p < .01$) influenced the self-other probability rating as expected: the other-self order ($M = -10.44$, $SD = 8.73$) revealed more optimism than the self-other order ($M = -2.38$, $SD = 5.83$). Thus, the others-as-standard perspective resulted in stronger optimistic judgments than the self-as-standard perspective. An unexpected order effect in the direct procedure ($F(1, 72) = 5.84$, $p < .05$) showed that a direct comparative judgment preceded by an estimate of own probability ($M = -8.86$, $SD = 10.37$) resulted in less optimism than a comparative judgment that was not preceded by rating one's own probability ($M = -15.66$, $SD = 11.09$).

Context Effects of Comparison Procedure and Number of Categories

A main effect for Comparison Procedure was observed ($F(1, 72) = 8.65$, $p < .01$): the direct procedure ($M = -12.26$, $SD = 11.14$) evoked more optimism than the indirect procedure ($M = -6.41$, $SD = 8.39$). Also, the scale with few categories ($M = -12.03$, $SD = 11.21$) resulted in more optimism than the scale with many categories ($M = -6.64$, $SD = 8.45$) ($F(1, 72) = 7.34$, $p < .01$). Although no interaction was observed between Comparison Procedure and Number of Categories ($F(1, 72) = 1.54$, ns) and also no three-way interaction ($F(1, 72) = 0.69$, ns), the extent of optimism was examined separately in the four conditions, because each condition is characterized by the use of a different scale.

The direct comparison using a scale with few categories resulted in the

FIGURE 1. Distribution of participants over the self-other probability ratings, classified in 10-point categories, in the direct and indirect comparison procedure as a function of number of response categories in Study 1.

most pronounced optimistic judgment ($M = -16.19$; $t(19) = 5.86$, $p < .001$), whereas the indirect procedure using a scale with many categories evoked the least optimistic judgment ($M = -4.95$; $t(19) = 2.63$, $p < .05$). The direct procedure using a scale with many categories ($M = -8.33$; $t(19) = 4.46$, $p < .001$) and the indirect procedure using a scale with few categories ($M = -7.87$; $t(19) = 4.23$, $p < .001$) revealed similar, more moderate degrees of optimism. Figure 1 displays the frequency distribution of the self-other probability ratings in the four conditions using different scales. It shows that in the direct comparison using a scale with few categories (right panel) participants are more inclined to score in the optimistic range of the scale (i.e., -4 to -1 on the original scale), than in the other three conditions.

DISCUSSION

Overall, our findings confirm the previously documented optimistic bias: individuals judged their own probability of encountering future negative events to be lower than that of others. In addition, the context provided by direct or indirect measurement procedures using response scales with a few or many categories influences the extent to which these judgments were optimistically biased. The direct procedure employing

a scale with few categories showed stronger optimistic responses than a scale with many categories. However, we cannot conclude that participants in this context were genuinely more biased or that the specific scale did not allow more moderate expressions of optimism. For instance, the direct procedure using a scale with few categories provides only a few options to express optimism compared to a direct scale with many response categories. In addition, a very optimistic individual may be inclined to use the ends of the direct scales (i.e., "very much lower than") but not the ends of the indirect scales (i.e., "the event will certainly/certainly not happen"). We think that the use of a direct scale with just a few categories—the traditional approach to the measurement of self-other probabilities—increases optimistic responses as compared to the other measurement procedures, especially indirect procedures that employ percentage estimates for own and other's probability.

In the indirect measurement procedure the other-self order resulted in more optimism than the self-other order. Assuming that the first judgment indeed provided a comparison standard for the second judgment, we conclude that the expected effect of the comparison standard was observed: the others-as-standard perspective elicited more optimistically biased judgments than the self-as-standard perspective.

Unexpectedly, in the direct measurement procedure comparative judgments revealed less optimism when they were preceded by an estimate of own probability than when no judgment preceded these ratings. It could well be that the preceding estimate of own probability made self more salient in the following self-other judgment. When no judgment preceded the self-other rating the question form of the latter rating (i.e., "compare self to others") probably constituted an others-as-standard perspective. Following this reasoning, these results also suggest that an others-as-standard perspective enhances optimistically biased judgments in the direct measurement procedure relative to a self-as-standard perspective.

A limitation of this study is the time-lag of four hours between either the self and other's rating in the indirect measurement procedure, or the direct comparative probability rating and the assessment of own probability in the direct procedure. Most other studies using an indirect procedure did not have such a time-lag. In addition, the assumption that own probability estimate (given four hours before the comparative rating) may serve as a "prime" is rather tentative. Study 2 addresses this limitation.

STUDY 2

This study examines the effects of comparison standard on direct and indirect self-other probability judgments. As before, we expect that in

the indirect measurement procedure the other-self order will reveal stronger optimism than the self-other order. In the direct measurement procedure the question form "compare self to others" is assumed to provide an others-as-standard perspective, and thus is expected to enhance optimistic judgments compared to the question form "compare others to self" (which is assumed to constitute a self-as-standard perspective). Thus, for each measurement procedure we expect a main effect of the comparison standard.

The observation in Study 1 that a preceding estimate of own probability appears to provide a self-as-standard perspective for the following comparative judgment is examined in Study 2. In the present study participants were asked to make a direct comparative judgment preceded by an estimate of own probability, or an estimate of other's probability. A control group with no preceding judgment is also included. The hypothesis is that the preceding judgment affects the salience of self and other in comparative judgment; i.e., a preceding self-estimate fosters a self-as-standard perspective, whereas a preceding other's estimate will provide an others-as-standard perspective. Thus, this hypothesis concerns a main effect of preceding judgment on the amount of optimism observed: relative to no preceding judgment, a preceding judgment of other's probability is expected to lead to more optimism, whereas a preceding self-estimate is expected to induce less optimism.

Karylowski and Skarzynska (1992) showed that priming of self-knowledge results in the asymmetry effect in self-other similarity judgments, whereas priming of knowledge about the other or no priming did not result in an asymmetry effect. They explain these results by proposing that self is not a single, highly accessible representation (i.e., habitual reference point) but a conglomerate of context-specific self-prototypes (cf. Markus & Wurf, 1987). The priming of self-knowledge activates a specific self-prototype making the features of self available, resulting in an asymmetry effect. Following Karylowski and Skarzynska's (1992) reasoning, we expect an interaction between preceding judgment and question form in the direct procedure. An asymmetry effect in self-other probability ratings is only expected to be observed when this direct comparative judgment is preceded by an estimate of own probability. Thus, this hypothesis concerns the effect of preceding judgment on the magnitude of the asymmetry effect.

We propose that the salience of self and other in the indirect procedure is affected by the time-lag between both judgments. An increasing time-lag should make the first judgment less salient when the second judgment is made, and thus reduce the salience of the comparative frame in which self and other's judgment are made. This implies that an

the assessment of other's probability [or own probability] for these ten events (level "none," $n = 81$; number of participants across the two levels of Comparison Standard: "self-as-standard" $n = 44$, "others-as-standard" $n = 37$). At the second level, one of the probability estimates was assessed at the beginning of the first questionnaire, and the second probability assessment was located at the end of the first questionnaire. At this second level both probability estimates were separated by the remaining questions in the questionnaire, resulting in a time-lag of about ten minutes (level "minutes," $n = 83$; "self-as-standard" $n = 40$, "others-as-standard" $n = 43$). Finally, at the third level, the probability judgments were separated by a week; one of the judgments was collected at the start of the first questionnaire and the other at the beginning of the second questionnaire (level "week," $n = 91$; "self-as-standard" $n = 43$, "others-as-standard" $n = 48$).

Dependent Variables

In the indirect comparison procedure other's probability estimate was subtracted from own probability estimate, so that this difference score ranged from -8 through 0 to +8. In the direct comparison procedure the 9-point scale ranging from -4 to +4 was transformed into a 17-point scale such that this scale also ranged from -8 through 0 to +8 ($x' = 2x$). In the direct comparison procedure with a self-as-standard perspective the response scale was reverse-coded in order to make the answers comparable to the others-as-standard perspective. For all conditions values smaller than zero indicated optimism (own probability is lower than other's probability), zero signified a neutral response, and values larger than zero denoted pessimism (own probability is higher than other's probability).

RESULTS

Results are described for each design separately. As in Study 1 the analyses concerned the mean self-other scores across the ten negative events (Cronbach's $\alpha = .75$). The grand mean was significantly smaller than zero, indicating optimistically biased judgments ($p < .001$).

Crossing Comparison Procedure with Comparison Standard

A 2 (Comparison Procedure: direct vs. indirect) by 2 (Comparison Standard: self-as-standard vs. others-as-standard) ANOVA showed a main effect of Comparison Standard ($F(1, 484) = 8.40, p < .01$) that was moderated by an interaction with Comparison Procedure ($F(1, 484) = 15.66, p < .001$). Simple main effect analyses showed as expected that in

the direct procedure the others-as-standard perspective ($M = -1.36, SD = 1.66$) revealed more optimism than the self-as-standard perspective ($M = -0.49, SD = 1.52$) ($F(1, 484) = 22.37, p < .001$). However, in the indirect procedure the others-as-standard perspective ($M = -0.82, SD = 1.04$) resulted in the same extent of optimism as the self-as-standard perspective ($M = -0.69, SD = 1.35$) ($F(1, 484) = 0.58, ns$).

The specific contrast between the direct comparison with no preceding judgment and the indirect comparison with no time-lag showed no main effect of Comparison Standard, but a similar interaction with Comparison Procedure ($F(1, 152) = 4.57, p < .05$). Simple main effect analyses indicated that Comparison Standard only affected the self-other ratings in the direct procedure ($F(1, 152) = 4.11, p < .05$): the others-as-standard perspective ($M = -1.51, SD = 1.66$) revealed more optimism than the self-as-standard perspective ($M = -0.87, SD = 1.49$). Within this specific contrast also a main effect for Comparison Procedure was observed ($F(1, 152) = 3.95, p < .05$): the direct procedure ($M = -1.20, SD = 1.60$) displayed more optimism than the indirect procedure ($M = -0.73, SD = 1.20$).

Crossing Preceding Judgment with Comparison Standard

Focusing on the direct comparison procedure, the effect of Preceding Judgment was examined by a 3 (Preceding Judgment: none vs. other vs. self) by 2 (Comparison Standard: self-as-standard vs. others-as-standard) ANOVA. As the analysis of the overall design showed, Comparison Standard exerted a strong influence on the comparative judgments ($F(1, 227) = 17.62, p < .001$) such that the others-as-standard perspective ($M = -1.36$) revealed more optimism than the self-as-standard perspective ($M = -0.49$). Two hypotheses were tested for the effect of Preceding Judgment. The first hypothesis concerning the main effect of Preceding Judgment, indicating that relative to no preceding judgment, a preceding judgment of other's probability would serve as an others-as-standard perspective and reveal more optimism, whereas a preceding self-estimate would function as a self-as-standard perspective and lower the extent of optimism. The main effect for Preceding Judgment did not reach significance ($F(2, 227) = 2.19, ns$). However, planned comparisons showed that comparative ratings after assessing own probability ($M = -0.67, SD = 1.47$) resulted in less optimism than a comparative judgment not preceded by any estimate ($M = -1.20, SD = 1.60$) ($F(1, 227) = 4.31, p < .05$). The comparative judgment preceded by other's probability estimate ($M = -0.90, SD = 1.82$) did not differ from the other two comparative estimates.

The second hypothesis concerned the interaction between Preceding Judgment and Comparison Standard, such that the effect of Comparison Standard would be stronger when the judgment of own probability

TABLE. Effect of Preceding Judgment and Comparison Standard in the Direct Comparison Procedure on the Degree of Optimism (Study 2).

Comparison standard	Preceding judgment		
	None	Self	Other
Self-as-standard			
M	-0.87	-0.36	-0.30
SD	1.49	1.49	1.54
Others-as-standard			
M	-1.51	-0.97	-1.66
SD	1.66	1.41	1.87

Note. Scores can range from -8 (optimism) to +8 (pessimism).

preceded the comparative judgment. Although no interaction was observed ($F(2, 227) = 1.39, ns$), planned comparisons between both comparison standards within each condition of Preceding Judgment indicated that contrary to the hypothesis the effect of Comparison Standard was more pronounced when an estimate of other's probability preceded comparative judgment ($F(1, 227) = 14.35, p < .001$), than when an estimate of own probability preceded ($F(1, 227) = 2.73, p < .10$), or no preceding judgment was required ($F(1, 227) = 3.34, p < .10$). Preceding Judgment did not affect the comparative ratings in either the others-as-standard perspective or the self-as-standard perspective (see Table).

Crossing Time-lag with Comparison Standard

The effect of Time-lag within the indirect comparison procedure was analyzed by a 3 (Time-lag: none vs. minutes vs. week) by 2 (Comparison Standard: self-as-standard vs. others-as-standard) ANOVA. The expectation was that an increase in time-lag would reduce optimistic tendencies, and attenuate the effect of comparison perspective. However, no main effect of Time-lag was observed ($F(2, 249) = 1.69, ns$). Planned comparisons indicated that when both estimates were not separated by time ($M = -0.73, SD = 1.20$) the same extent of optimism was found as when both estimates were separated by minutes ($M = -0.94, SD = 1.35$) or separated by a week ($M = -0.61, SD = 1.04$). The latter two estimates differed slightly ($F(1, 249) = 3.37, p < .07$) indicating that more optimism was observed when the time-lag between both estimates was smaller, providing modest support for our hypothesis. No main effect of Comparison Standard was observed ($F(1, 249) = 0.82, ns$), and also the interaction was nonsignificant ($F(2, 249) = 0.42, ns$). Moreover, planned comparisons showed that the effect of Comparison Standard was not observed in any condition of Time-lag.

GENERAL DISCUSSION

The current findings support our claim that the procedure used to measure self-other probability judgments affects the amount of optimistic bias observed due to the context that this procedure provides. The major proposition is that an others-as-standard perspective will be more likely to produce optimistically biased ratings than a self-as-standard perspective. Study 1 showed this effect for the indirect measurement procedure, in which self and other's probability are estimated separately. Study 2 failed to replicate this effect. Study 2, however, indicated that for the direct procedure, in which the comparative ratings are measured on a single scale, optimistic bias was greater when other was the comparison standard than when self was the comparison standard.

Relative to using self as standard of comparison, using others as standard of comparison may threaten the need to see oneself as a person with a unique identity (cf. Codol, 1987). To defend or enhance this personal identity the difference between self and others might be accentuated, generally in a direction favorable to the self. On the other hand, Tversky's feature matching model (1977) may also provide an explanation for the effects of comparison standard. The representation of self contains a larger proportion of unique features than the representation of others, and these unique features stand out when others' representation is used as a standard of comparison. This reasoning, however, cannot explain why the accentuated difference between self and others tends to be in a self-serving or self-enhancing direction.

Study 2 also examined whether increasing the time-lag between the judgment of own and other's probability would affect the obtained effects on optimism. We assumed that when own and other's probability are assessed consecutively, both self and other and their comparative frame are salient. The salience of both self and other was expected to diminish when the time-lag between both judgments would increase. Results showed a slightly reduced optimistic bias with a time-lag of one week compared to a time-lag of ten minutes, yet there was still an optimistic bias.

These time-lag results seem to imply that it is not necessary that both self and other are salient to arrive at optimistically biased judgments. This is in line with Harris and Middleton's (1994) observation that optimistically biased judgments are observed even when one group of persons provides the estimate for own probability and another group the probability estimate for the other. These effects can be related to the idea that self serves as a habitual reference point (see Holyoak & Mah, 1982; Karylowski, 1990; Karylowski & Skarzynska, 1992) when judging other's probability. Although judging own probability may be a difficult

task, assessing probability for another could be even more demanding so that self is used as reference point irrespective of whether a self-estimate is explicitly requested.

A tentative explanation for the absence of an effect of comparison standard in the indirect procedure in Study 2 rests on the assumption that self is used as a habitual reference point in both judgments. It could be that the order of own and other's probability judgment constitutes a transient reference point that is sometimes too weak to overcome the tendency to use self as a habitual reference point. It is unclear, however, why this was not the case in Study 1.

Study 2 clearly demonstrated that in the direct measurement procedure the question form "compare self to others" (others-as-standard perspective) leads to more optimistic bias in self-other probability judgment than the formulation "compare others to self" (self-as-standard perspective). The latter formulation could also trigger another mechanism that may explain the findings. Asking participants to indicate whether other's probability is higher, equal or lower than own probability (self-as-standard) may have emphasized that one was claiming lower probability than others, compared to the others-as-standard perspective. Thus, in the self-as-standard perspective claiming invulnerability explicitly goes at the expense of others (i.e., attributing higher risk to others). Such a claim could be seen as "inappropriate," and one needing proper justification (cf. Tetlock & Boettger, 1994; Weigold & Schlenker, 1991). This concern may in turn result in better scrutiny of the arguments supporting the self-other difference. Future research could address this justification explanation by focusing on experimental conditions in which it is suggested that individual judgments will be validated or verified. For example, people may have to explain their optimistic responses to a panel of experts or the experimenter. Such conditions probably create a conflict between self-serving and accuracy goals.

Study 2 also examined whether preceding the comparative judgment by an estimate of own or other's probability would affect the degree of optimism. Results of both Study 1 and Study 2 provide modest support for the claim that a preceding own probability estimate provides a self-as-standard perspective and reduces optimism relative to a comparative judgment that is not preceded by such an estimate. Contrary to expectations, Study 2 showed that the asymmetry effect was most pronounced when an estimate of other's probability preceded the comparative judgment. This finding suggests that optimism in the others-as-standard condition is enhanced further when an estimate of other's probability preceded the comparative rating, again supporting the idea that as the salience of others-as-standard is increased, optimistic bias increases.

Both studies showed that the direct measurement procedure results in more optimism than the indirect procedure. Although it is tempting to conclude that the stronger comparative frame in the direct procedure accounts for this result, inherent differences between both procedures preclude this inference. For instance, the direct scales provide respondents with less opportunity to express their optimism than the indirect scales. This could be remedied by using a direct scale that covers the same range as the difference score of the absolute scales in the indirect procedure. However, the labeling of the ends of the scales in the direct procedure (i.e., "very much lower than") and the indirect procedure (i.e., "the event will certainly/certainly not happen") provide an inherent difference between both procedures. Overall, our data indicate that the traditional measurement approach (see Weinstein, 1982) provides a context in which the prevalence of optimistic bias may be more pronounced for three reasons: (1) the use of only a few categories to express optimism, (2) the use of scale-end labels such as "very much lower/higher," and (3) the introduction of an others-as-standard perspective.

Our finding that an others-as-standard perspective enhances optimism compared to a self-as-standard perspective, confirms previous research showing that variations in the measurement context can have a significant influence on the responses observed (see Schwarz, 1994). These context effects do not apply to situations in which the objective is to compare the extent of optimism between events or experimental conditions, but do apply to research focusing on the absolute level of optimism associated with a particular event. Further research should address the underlying mechanisms for the obtained findings and disentangle the role of feature matching processes, need for uniqueness, and the perceived social appropriateness of claiming relative invulnerability.

REFERENCES

- Burger, J.M., & Burns, L. (1988). The illusion of unique invulnerability and the use of contraception. *Personality and Social Psychological Bulletin*, 14, 264-270.
- Burger, J.M., & Palmer, M.L. (1992). Changes in and generalization of unrealistic optimism following experiences with stressful events: Reactions to the 1989 California earthquake. *Personality and Social Psychological Bulletin*, 18, 39-43.
- Codol, J.P. (1987). Comparability and incomparability between oneself and others: Means of differentiation and comparison reference points. *European Bulletin of Cognitive Psychology*, 7, 87-105.
- Codol, J.P., Jarymowicz, M., Kaminska-Feldman, M., & Szuster-Zbrojewicz, A. (1989). Asymmetry in the estimation of interpersonal distance and identity affirmation. *European Journal of Social Psychology*, 19, 11-22.
- Dawes, R.M. (1989). Statistical criteria for establishing a truly false consensus effect. *Journal of Experimental Social Psychology*, 25, 1-17.

- Eiser, J.R., Eiser, C., & Pauwels, P. (1993). Skin cancer: Assessing perceived risk and behavioural attitudes. *Psychology and Health*, 8, 393-404.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117-140.
- Gerrard, M., & Warner, T.D. (1994). Comparison of marine and college women's HIV/AIDS-relevant sexual behaviors. *Journal of Applied Social Psychology*, 24, 959-980.
- Hansen, W.B., Raynor, A.E., & Wolkenstein, B.H. (1991). Perceived personal immunity to the consequences of drinking alcohol: The relationship between behavior and perception. *Journal of Behavioral Medicine*, 14, 205-224.
- Harris, P., & Middleton, W. (1994). The illusion of control and optimism about health: On being less at risk but no more in control than others. *British Journal of Social Psychology*, 33, 369-386.
- Higgins, E.T., & Bargh, J.A. (1987). Social cognition and social perception. *Annual Review of Psychology*, 38, 369-425.
- Holyoak, K.J., & Mah, W.A. (1982). Cognitive reference points in judgments of symbolic magnitude. *Cognitive Psychology*, 14, 328-352.
- Hoorens, V., & Buunk, B.P. (1993). Social comparison of health risks: Locus of control, the person-positivity bias, and unrealistic optimism. *Journal of Applied Social Psychology*, 23, 291-302.
- Jacobs Quadrel, M., Fischhoff, B., & Davis, W. (1993). Adolescent (in)vulnerability. *American Psychologist*, 48, 102-116.
- Karylowski, J.J. (1990). Social reference points and accessibility of trait-related information in self-other similarity judgments. *Journal of Personality and Social Psychology*, 58, 975-983.
- Karylowski, J.J., & Skarzynska, K. (1992). Asymmetric self-other similarity judgments depend on priming self-knowledge. *Social Cognition*, 10, 235-254.
- Marks, G., & Miller, N. (1987). Ten years of research on the false consensus effect. *Psychological Bulletin*, 102, 72-90.
- Markus, H.R., & Wurf, E. (1987). The dynamic self-concept: A social psychological perspective. *Annual Review of Psychology*, 38, 299-338.
- McKenna, F.P. (1993). It won't happen to me: Unrealistic optimism or illusion of control. *British Journal of Psychology*, 84, 39-50.
- McKenna, F.P., Warburton, D.M., & Winwood, M. (1993). Exploring the limits of optimism: The case of smokers' decision making. *British Journal of Psychology*, 84, 389-394.
- Perloff, L.S., & Fetzer, B.K. (1986). Self-other judgments and perceived vulnerability to victimization. *Journal of Personality and Social Psychology*, 50, 502-510.
- Ross, L., Greene, D., & House, P. (1977). The "false consensus effect": An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, 13, 279-301.
- Schwarz, N. (1994). Judgment in social context: Biases, shortcomings, and the logic of conversation. *Advances in Experimental Social Psychology*, 26, 123-162.
- Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica*, 47, 143-148.
- Tetlock, P.E., & Boettger, R. (1994). Accountability amplifies the status quo effect when change creates victims. *Journal of Behavioral Decision Making*, 7, 1-23.
- Tversky, A. (1977). Features of similarity. *Psychological Review*, 84, 327-352.
- Van der Velde, F.W., Hooykaas, C., & Van der Pligt, J. (1992). Risk perception and behavior: Pessimism, realism, and optimism about AIDS-related health behavior. *Psychology and Health*, 6, 23-38.
- Van der Velde, F.W., Van der Pligt, J., & Hooykaas, C. (1994). Perceiving AIDS-related risk: Accuracy as a function of differences in actual risk. *Health Psychology*, 13, 25-33.

- Weigold, M.F., & Schlenker, B.R. (1991). Accountability and risk taking. *Personality and Social Psychology Bulletin*, 17, 25-29.
- Weinstein, N.D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, 39, 806-820.
- Weinstein, N.D. (1982). Unrealistic optimism about susceptibility to health problems. *Journal of Behavioral Medicine*, 5, 441-460.
- Weinstein, N.D. (1983). Reducing unrealistic optimism about illness susceptibility. *Health Psychology*, 2, 11-20.
- Weinstein, N.D. (1984). Why it won't happen to me: Perceptions of risk factors and susceptibility. *Health Psychology*, 3, 431-457.
- Weinstein, N.D. (1987). Unrealistic optimism about susceptibility to health problems: Conclusions from a community-wide sample. *Journal of Behavioral Medicine*, 10, 481-500.
- Whalen, C.K., Henker, B., O'Neil, R., Hollingshead, J., Holman, A., & Moore, B. (1994). Optimism in children's judgments of health and environmental risks. *Health Psychology*, 13, 319-325.
- Whitley, B.E. Jr., & Hern, A.L. (1991). Perceptions of vulnerability to pregnancy and the use of effective contraception. *Personality and Social Psychology Bulletin*, 17, 104-110.
- Wood, J.V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin*, 106, 231-248.
- Zakay, D. (1983). The relationship between the probability assessor and the outcome of an event as determiner of subjective controllability. *Acta Psychologica*, 53, 271-280.