resembles the role of ankyrin-G in axon initial segments, where it binds to and coordinates the localization of three proteins required for the initiation and regulation of action potentials (Nav1.6, KCNQ2 and 3 channels, and 186-kD neurofascin) (29, 30). Without ankyrin-G, axon initial segments lose these proteins and express dendritic markers (31). In epithelial cells, ankyrin-G is required both for targeting E-cadherin to the plasma membrane and for biogenesis of the lateral membrane (6, 17). We hypothesize that, in addition to targeting the CNG channel, ankyrin-G can interact with other ROS membrane proteins, as well as proteins required for their ROS trafficking, and these interactions are essential for ROS morphogenesis. A conserved ankyrin-G–based mechanism may thus be shared by photoreceptors, neurons, and epithelial cells that accomplishes both the targeting of membrane-spanning proteins to specialized plasma membrane domains as well as assembly and/or maintenance of these domains.

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The Surprising Power of Neighborly Advice

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Two experiments revealed that (i) people can more accurately predict their affective reactions to a future event when they know how a neighbor in their social network reacted to the event than when they know about the event itself and (ii) people do not believe this. Undergraduates made more accurate predictions about their affective reactions to a 5-minute speed date ($n = 25$) and to a peer evaluation ($n = 88$) when they knew only how another undergraduate had reacted to these events than when they had information about the events themselves. Both participants and independent judges mistakenly believed that predictions based on information about the event would be more accurate than predictions based on information about how another person had reacted to it.

People make systematic errors when attempting to predict their affective reactions to future events, and these errors have social (1–3), economic (4–8), legal (9, 10), and medical (11–22) consequences. For example, people have been shown to overestimate how unhappy they will be after receiving bad test results (23), becoming disabled (14, 19–21), or being denied a promotion (24), and to overestimate how happy they will be after winning a prize (6), initiating a romantic relationship (24), or taking revenge against those who have harmed them (3). Research suggests that the main reason people mispredict their affective reactions to future events is

that they imagine those events inaccurately (25). For example, people tend to imagine the essential features of future events but not the incidental features (26–28), the early moments of future events but not the later moments (17, 24), and so on. When mental simulations of events are inaccurate, the affective forecasts that are based on them tend to be inaccurate as well.

Attempts to improve the accuracy of affective forecasting have generally concentrated on improving the accuracy of mental simulation, and the results have been disappointing (29–33). Some interventions have failed (16), and those that have successfully reduced forecasting errors in one situation have typically failed to reduce them in others (27, 29). But mental simulation is not the only way to make an affective forecast. The 17th century writer François de La Rochefoucauld suggested that rather than mentally simulating a future event, people should consult those who

have experienced it. "Before we set our hearts too much upon anything," he wrote, "let us first examine how happy those are who already possess it" (34). La Rochefoucauld was essentially suggesting that forecasters should use other people as surrogates for themselves, and the advantages of his "surrogation strategy" are clear: Because surrogation does not rely on mental simulation, it is immune to the many errors that inaccurate simulations produce.

The disadvantages of surrogation are also clear: Individuals differ, and thus, one person's affective reaction is almost certainly an imperfect predictor of another's. But there are at least two reasons to suspect that affective reactions are not as different as people may believe. First, affective reactions are produced in large part by physiological mechanisms that are evolutionarily ancient, which is why people the world over have very different beliefs and opinions but very similar affective reactions to a wide range of stimuli (35), preferring warm to cold, satiety to hunger, friends to enemies, winning to losing, and so on. An alien who knew all the likes and dislikes of a single human being would know a great deal about the entire species. Second, people tend to marry, befriend, work with, and live near those who share their preferences and personality traits (36, 37), and thus the people from whom they are especially likely to receive surrogation information—the neighbors in their social networks—are especially likely to share their affective reactions. In short, there is little disagreement among people about the sources of pleasure and pain, and even less disagreement among neighbors. These facts suggest that surrogation may be more powerful than people realize.

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We tested this hypothesis in two experiments. The events we studied were (i) speed dating, in which undergraduate women predicted how much they would enjoy a 5-min speed date with an undergraduate man, and (ii) peer-evaluation, in which undergraduates predicted how they would feel after being evaluated by a peer (38). In both experiments, we gave participants either information that allowed them to simulate the future event (simulation information) or information about the affective reaction of a fellow undergraduate who had experienced the same event in the past (surrogation information). We predicted that participants would make more accurate affective forecasts when they knew nothing about the future event and knew only how someone in their social network had reacted to it.

In experiment 1, we created a speed-dating service in which undergraduate men and women had brief "getting acquainted" conversations. We included 8 men and 33 women who were undergraduates at Harvard University, unmarried, and self-identified as heterosexual. There were eight speed-dating sessions, each of which included one of the eight men and between two and eight of the women. No one participated in more than one session. In each session, the man was first escorted to the speed-dating room, where he completed a short personal profile listing his name, age, height, hometown, and residence, as well as his favorite movie, sport, book, song, food, hangout, and college class. His photograph was taken and printed. Next, a woman was escorted to the speed-dating room and left to have a 5-min private conversation with the man. Next, the experimenter escorted the woman to another room where she reported how much she had enjoyed the speed date by marking a 100-mm continuous "enjoyment scale" whose end points were marked not at all and very much. This report is hereinafter referred to as her affective report.

Next, a second woman was given one of two kinds of information: simulation information (which consisted of the man's personal profile and photograph) or surrogation information (which consisted of the affective report provided by the first woman). The second woman was then asked to predict (on the enjoyment scale) how much she would enjoy her speed date with the man. This prediction is hereinafter referred to as her affective forecast.

After making her prediction, the second woman was shown the kind of information (simulation or surrogation) that she had not already received. We did this to ensure that each woman had the same information about the man before the actual speed date. The only difference between the two conditions, then, was whether the second woman had surrogation information or simulation information when she made her forecast.

Next, the second woman was escorted to the dating room, had a speed date, and then reported how much she enjoyed it (on the enjoyment scale). This report is hereinafter referred to as her affective report. The second woman also reported

whether she believed that simulation information or surrogation information would have allowed her to make the more accurate prediction about the speed date she had and about a speed date that she might have in the future. This process was repeated in an alternating pattern for each additional woman until the session ended. [For a full description of the procedure, see (39)].

Affective forecasting error was calculated by taking the absolute difference between the affective forecast and affective report of each woman (except the first woman, who made no affective forecast). Raw data may be seen in fig. S1, a and b. Women were considerably more accurate when they used surrogation information (mean ± SD, 11.42 ± 8.70 mm) than when they used simulation information (22.38 ± 10.79 mm) [$t(23)$ = 2.78, P = 0.01]. Relative to simulation, surrogation reduced the size of the affective forecasting error by 49%. Ironically, 75% of the women believed that simulation information would have allowed them to make a more accurate forecast about their date with the man they met, and 84% believed that simulation information would allow them to make a more accurate forecast about a future date with a different man.

One potential concern about these results is that the simulation information (which was provided by the men) may not have been entirely accurate, and its inaccuracy may have contributed to the inaccuracy of the forecasts that were based on it. The data do not support this suggestion. If men portrayed themselves as better than they actually were, then women who used simulation information should have overestimated how much they would enjoy the date. In fact, women underestimated how much they would enjoy the date (see supporting online text). Nonetheless, we conducted a second experiment in which simulation information was completely accurate. In addition, we collected data on the perceived utility of simulation and surrogation from an independent panel of judges rather than from the participants themselves.

Experiment 2 had three parts. In part one, 17 women and 8 men who were undergraduates at Harvard University served as surrogates. Surrogates were told that they would write a story and that a peer in an adjoining room would evaluate the story and use it to classify them as one of three personality types. In fact, there was no peer. Surrogates read detailed descriptions of the type A, type B, and type C personalities. The description of the type A personality was positive, the description of the type B personality was neutral, and the description of the type C personality was negative. For example, people with type C personalities were said to "sacrifice their beliefs because they seek contentment rather than challenge" and "when long-term relationships end it is usually because the person's partner has found a more suitable alternative." Previous studies have shown that few people classify themselves as type C, and most feel unhappy

when they are so classified by a peer (24, 40). Surrogates then wrote stories that were ostensibly given to their peer in the adjoining room. Ten minutes later, the experimenter informed the surrogates that they had been classified as type C by their peer. Ten minutes later, surrogates reported their current affective state by marking a continuous 100-mm "feeling scale" whose end points were labeled very bad and very good. These reports are hereinafter referred to as the surrogates' affective reports.

In part two, 28 men and 60 women who were undergraduates at Harvard University served as forecasters. Forecasters were also told that they would write a story and that a peer would evaluate the story and then classify them as one of three personality types. Half the forecasters were randomly assigned to receive simulation information. These forecasters were shown complete descriptions of the three personality types and were asked to predict (on the feeling scale) how they would feel if their peer classified them as each of the three types. These forecasters, therefore, had complete and accurate information about the upcoming event.

The remaining forecasters were assigned to receive surrogation information. Instead of being shown the descriptions of the three personality types, these forecasters were shown the affective report of one randomly selected surrogate from part one who had been classified as a type C, and they were asked to predict how they would feel if their peer classified them as each of the three types. These predictions are hereinafter referred to as the forecasters' affective forecasts. After making these forecasts, forecasters in the surrogation condition were shown the descriptions of the three personality types.

All forecasters then wrote a story, were told that their peer had classified them as a type C, and reported how they felt (on the feeling scale). These reports are hereinafter referred to as the forecasters' affective reports.

Affective forecasting error was calculated by taking the absolute value of the difference between each forecaster's affective forecast and affective report. (Raw data may be seen in fig. S2, a and b). As in experiment 1, forecasters were considerably more accurate when they used surrogation information (12.50 ± 14.10 mm) than when they used simulation information (33.75 ± 22.01 mm) [$t(86)$ = 5.38, P < 0.001]. Relative to simulation, surrogation reduced the size of the affective forecasting error by 63%.

In part three, 23 men and 40 women who were undergraduates at Harvard University served as judges. The judges were told about the procedure for part one and were asked to rank several pieces of information based on how useful each piece would be in allowing them to estimate the affective response of a participant. These included simulation information (complete descriptions of each of the three personality types) and surrogation information (the affective report of another randomly selected participant). Judges

believed that simulation information would be more useful (rank, mean ± SD, 1.45 ± 0.694) than surrogation information (2.1 ± 0.718) [$t(61) = 4.18$, $P < 0.001$].

In two experiments, participants more accurately predicted their affective reactions to a future event when they knew how a neighbor in their social network had reacted to it than when they knew about the event itself. Women made more accurate predictions about how much they would enjoy a date with a man when they knew how much another woman in their social network enjoyed dating the man than when they read the man's personal profile and saw his photograph. Men and women made more accurate predictions about how they would feel after being evaluated by a peer when they knew how another person in their social network had felt after being evaluated than when they previewed the evaluation itself. Although surrogation trumped simulation, both participants and independent judges had precisely the opposite intuition (41). By a wide margin, they believed that simulation was more likely than surrogation to produce accurate affective forecasts.

Two points are worthy of note. First, surrogation is by definition superior to simulation when individual differences are relatively small and simulations errors are relatively large, and it is inferior to simulation when the opposite is true. Although there is no way to know which of these is more typical in everyday life, the situations we studied—dating and peer-evaluation—are by no means exotic. Furthermore, our experiments provided an especially conservative test of the power of surrogation because participants received surrogation information from a person who happened to attend the same university as they did but with whom they had no personal relationship. In everyday life, people are likely to receive surrogation information from those with whom they affiliate, and because people affiliate with those who are similar, their surrogates are even more likely to share their preferences and predilections. This suggests that the potential utility of surrogation information may be greater in vivo than our experiments suggest.

Second, although our experiments demonstrate the power of surrogation, they also suggest that people may not normally take advantage of this power. Our participants mistakenly believed that simulation was the superior strategy even after it had failed them, which suggests that people may be reluctant to engage in surrogation if they have the opportunity to do otherwise. Participants in the surrogation conditions of our experiments were unable to engage in mental simulation because they knew little or nothing about the future event and thus had no choice but to rely on the surrogation information we provided. But given people's mistaken beliefs about the relative ineffectiveness of surrogation and their misplaced confidence in the accuracy of their own mental simulations (39), it seems likely that in everyday life, La Rochefoucauld's advice—like the advice of good neighbors—is more often than not ignored. When we want to know our emotional futures, it is difficult to believe that a neighbor's experience can provide greater insight than our own best guess.

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Supporting Online Material for

The Surprising Power of Neighborly Advice

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This PDF file includes

MATERIALS & METHODS

Experiment 1: Speed Dating

Participants were given course credit for their participation.

The male Participant reported to a different room than did the female participants to eliminate the possibility that they would meet prior to the experiment.

After the experiment, female participants were asked whether they had ever met the male participant before (on a 4 point scale where 1 = "Friends", 2 = "Acquainted", 3 = "Seen Around", 4 = "Never Noticed") and whether they had seen the male participant in the waiting area that day before the experiment began (on a 3-point scale where 1 = "Yes, and I thought he was involved in the study", 2 = "Yes, but I didn't think he was involved in the study", 3 = "No"). Only one female participant reported that she and the male participant were friends, and she also indicated that they had discussed the experiment before it began. Because their friendship and discussion could conceivably have influenced the male participant's subsequent interaction with other female participants, we excluded all the data from the 5 participants in this session. Thus, 8 men and 33 women were included in the analyses.

- Two female participants reported being acquainted with the male participant but also reported that they had not seen him in the waiting area before the experiment began. In other words, these two female participants did not know the identity of the male participant when they made predictions. Excluding the data from these two participants had no significant influence on any of the analyses reported and thus their data were retained.

- Female participants were also asked whether they had seen any of the other female participants in the waiting area before the experiment began, and if so, whether they had ever met that female participant. Thirteen of the 25 female participants reported that they had seen another female participant in the waiting area before the experiment began, but none reported having met one of them before. Whether or not a female participant saw another female participant in the waiting area was unrelated to her prediction accuracy: $t(23) = .121, p = .905$ across conditions.

During the speed date, the man and woman were instructed to talk about anything they wished other than the experiment itself.

After the speed date, the second woman also reported how much she liked the man, how much she wanted to befriend the man, and how much she wanted to have a romantic relationship with the man. She made these reports by marking three continuous 100 mm scales whose endpoints were labeled *not at all* and *very much*.

The 2nd woman in each session was randomly assigned to receive surrogation or simulation information. If the 2nd woman was randomly assigned to receive simulation information, then the 3rd woman received surrogation information (by being shown the affective report of the 2nd woman), the 4th woman received simulation information, the 5th woman received surrogation information (by being shown the affective report of the 4th woman), and so on. If the 2nd woman was randomly assigned to receive surrogation information (by being shown the affective report of the 1st woman), then the 3rd woman received simulation information, the 4th woman received surrogation information (by being shown the affective report of the 3rd woman), and so on.

Experiment 2: Peer Evaluation

Part 1: Method for Surrogates

Participants were recruited through the Harvard University Department of Psychology Study Pool and who were paid $7 for their participation.

Surrogates first provided a baseline measure of their current feelings by marking a continuous 100 mm scale whose endpoints were labeled *very bad* and *very good*.

The complete description of the Type A personality was as follows: "In addition to being extraordinarily well-rounded, these people have exceptional qualities that often lead others to refer to them as gifted. Although these people generally get along well with others, they occasionally find themselves bored by those who do not share their gifts. These people are rarely resented for their obvious superiority; others usually admire them. These people tend to excel in professional occupations that require exceptional creativity or analytic thinking. They are rather selective in their personal relationships, but the few they foster tend to be lifelong.

Their romantic relationships also tend to endure. Divorce rates are below the national average in this group. When long-term relationships end it is almost always because these people have found a more suitable and rewarding alternative. These people tend to have a realistic picture of their own talents, though they occasionally underestimate themselves and may be capable of even greater achievements than they realize."

The complete description of the Type B personality was as follows: "These people are particularly competent and well-adjusted and, although they are average in many respects, they almost always have one or more 'remarkable' qualities such as an artistic or athletic talent, high intelligence, or good social skills. These people generally get along well with others and tend to be put in leadership positions, though occasionally others may feel jealous or threatened by them. They tend to be successful in a wide variety of careers, but especially in professional occupations that require special skills and high levels of dedication. They seek both fulfillment and excitement in their personal relationships, and their romantic relationships are usually successful as long as they are with partners who do not share their 'remarkable' quality. Divorce rates tend to be below the national average in this group, and when long-term relationships do end it is usually by mutual consent. On some occasions, these people overestimate their own ability and may take on more than they can handle, but they tend to deal with stress well and tend not to repeat the same mistake twice."

The complete description of the Type C personality was as follows: "These people are fairly competent and well-adjusted but have few qualities that distinguish them from others. They are generally well-liked, partly because they do not pose a threat to the competencies of others. These people tend to succeed in a wide variety of careers but, because of their ability to get along well with others, mostly excel in jobs requiring them to be part of a team rather than take on individual responsibilities. In their personal relationships, they will sacrifice their beliefs because they seek contentment rather than challenge or excitement. Their romantic relationships are fairly successful as long as they are with a person of the same type. Divorce rates do not differ substantially from the national average in this group and when long-term relationships end it is usually because the person's partner has found a more suitable alternative. These people tend to have a realistic picture of both their talents and their limitations and thus tend to structure

their tasks quite appropriately."

After reading the descriptions of the three personality types but before writing their stories, surrogates were asked to predict how they would feel 10 minutes after being classified as each of the three types. They made these affective forecasts by marking three continuous 100mm scales whose endpoints were labeled *very bad* and *very good*. Next, surrogates reported how well they thought each type described them by marking three continuous 126 mm scales whose endpoints were labeled *not at all* and *very well*. Next, surrogates indicated which of the three personality types best described them.

Part 2: Method for Forecasters

Participants were recruited through the Harvard University Department of Psychology Study Pool and who were paid $7 for their participation.

After making forecasts and reading the descriptions of the three personality types, forecasters reported how well they thought each type described them by marking three continuous 126 mm scales whose endpoints were labeled *not at all* and *very well*. Forecasters then indicated which of the three types best described them.

Part 3: Method for Judges

Participants were recruited through the Harvard University Department of Psychology Study Pool and paid $5 for their participation.

Judges were randomly paired with a particular participant from Part 1 and were asked to rank three pieces of information based on how useful they thought each type would be in helping them estimate that participant's affective report after the participant was classified as a Type C. The three pieces of information were (a) complete descriptions of each of the three personality types (*simulation information*), (b) the affective report of another randomly selected participant

who had been classified as a Type C (*surrogation information*), and (c) the participant's report of how he or she felt before the study began (*baseline information*).

ADDITIONAL RESULTS

Experiment 1: Speed Dating

As Figures 2a and 2b suggest, women in the simulation and surrogation conditions made different predictions ($M_{simulation}$ = 45.31 mm, SD = 16.28 mm, $M_{surrogation}$ = 65.58 mm, SD = 25.40 mm), $t(23)$ = 2.34, p = .025, but did not have different experiences, ($M_{simulation}$ = 62.46 mm, SD = 17.56 mm, $M_{surrogation}$ = 71.84 mm, SD = 20.75 mm), $t(23)$ = 1.22, p = .234.

Seventy five percent of the women believed that simulation information would have allowed them to make a more accurate forecast about the date they experienced,. This number was greater than the indifference level of 50%, $\chi^2(n=24)$ = 6.0, p = .014, and did not differ across conditions (83% in the simulation condition and 67% in the surrogation condition, $\chi^2(n=24)$ = .889, p = .346). Eighty four percent of the women believed that simulation information would allow them to make a more accurate forecast about a future date with a different man. This number was also greater than the indifference level of 50%, $\chi^2(n=25)$ = 11.56, p < .001, and did not differ across conditions (85% in the simulation condition and 83% in the surrogation condition, $\chi^2(n=25)$ = .008, p = .930). There were no differences between women in the simulation and surrogation conditions in terms how much they liked the man ($M_{simulation}$ = 66.3 mm, SD = 19.96 mm, $M_{surrogation}$ = 76.42 mm, SD = 15.89 mm, $t(23)$ = 1.39, p = .177), wanted to befriend the man ($M_{simulation}$ = 64.00 mm, SD = 27.64 mm, $M_{surrogation}$ = 80.50 mm, SD = 17.52 mm, $t(23)$ = 1.76, p = .091), or wanted to have a romantic relationship with the man ($M_{simulation}$ = 33.15 mm, SD = 28.16 mm, $M_{surrogation}$ = 40.42 mm, SD = 25.30 mm, $t(23)$ < 1, p = .506).

Experiment 2: Peer Evaluation

Part 1: Results for Surrogates

Two participants who did not complete all measures and one who classified herself as Type C and thus did not consider the feedback to be negative were removed from the data set, leaving 14 women and 8 men.

Although the main purpose of Part 1 was to collect affective reports from surrogates for use in Part 2 of the experiment, the data they provided also allowed us to assess the accuracy of their affective forecasts. We calculated the affective forecasting error for each participant by taking the absolute value of the difference between each participant's affective forecast and affective report. The average affective forecasting error was 22.9 (SD = 14.1).

Part 2: Results for Forecasters

Three men and 3 women were excluded from the analysis because they classified themselves as Type C, leaving 60 women and 28 men in the data set.

As Figures 2a and 2b suggest, participants in the surrogation and simulation conditions made different predictions ($M_{simulation}$ = 32.95 mm, SD = 21.79 mm, $M_{surrogation}$ = 51.91 mm, SD = 15.50 mm), $t(86) = 4.70$, $p < .001$. Participants in these conditions also reported different experiences ($M_{simulation}$ = 63.34 mm, SD = 20.89 mm, $M_{surrogation}$ = 54.14 mm, SD = 18.68 mm), $t(86) = 2.18$, $p = .032$. A linear regression that used Affective Forecasting Error as the outcome variable and Affective Report and Experimental Condition as predictor variables revealed an effect of Experimental Condition even when Affective Report was included in the model, $t(85) = 4.839$, $p < .001$. In other words, when the difference in experience between conditions was statistically held constant, the difference in Affective Forecasting Error between conditions remained highly significant, indicating that the difference in affective forecasting error between conditions did not depend on the difference in experience between conditions.

Part 3: Results for Judges

Judges believed that simulation information would be more useful (mean rank = 1.45, SD = .694) than either surrogation information (mean rank = 2.1, SD = .718), $t(61) = 4.18$, $p < .001$) or baseline information (mean rank = 2.45, SD = .717), $t(61) = 6.48$, $p < .001$.
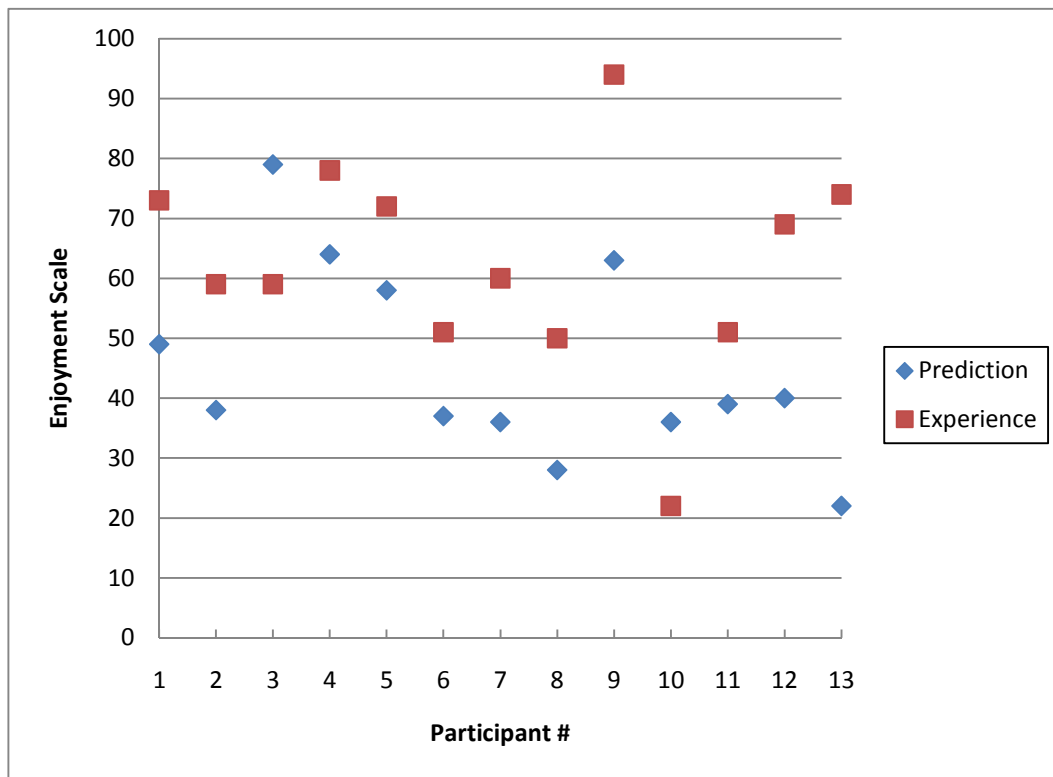
FIGURES

Figure S1a: Affective forecasts (prediction) and affective reports (experience) for each participant in the simulation condition of Experiment 1
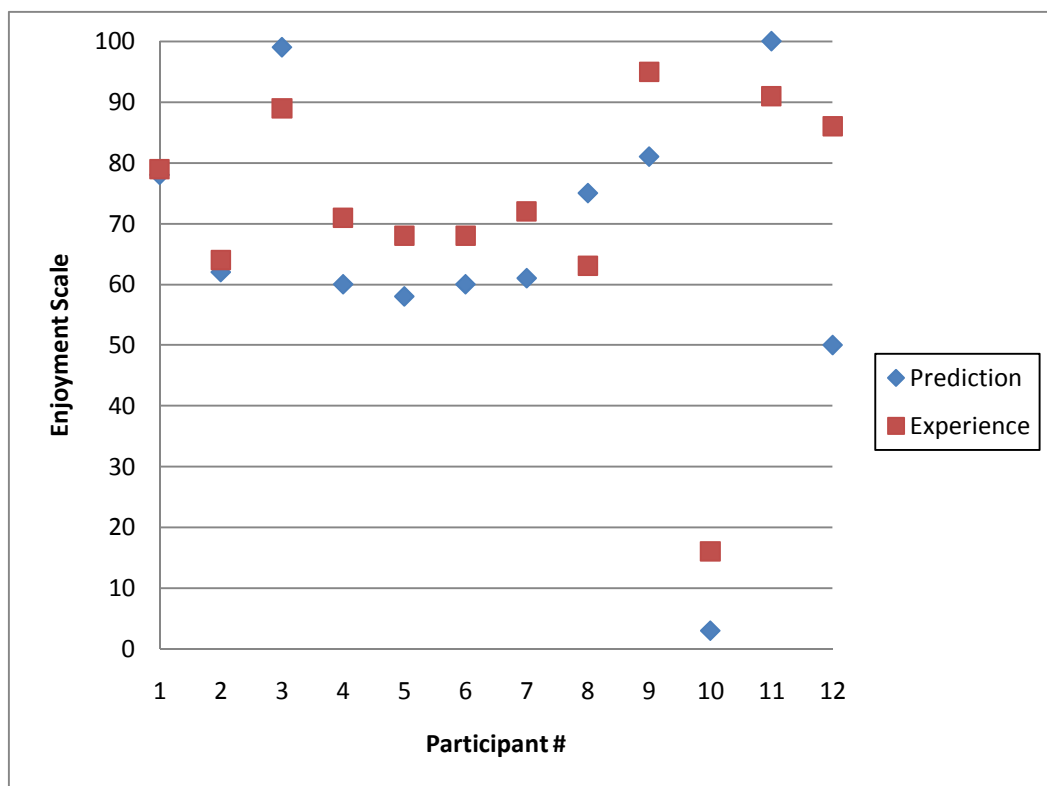
Figure S1b: Affective forecasts (prediction) and affective reports (experience) for each participant in the surrogation condition of Experiment 1
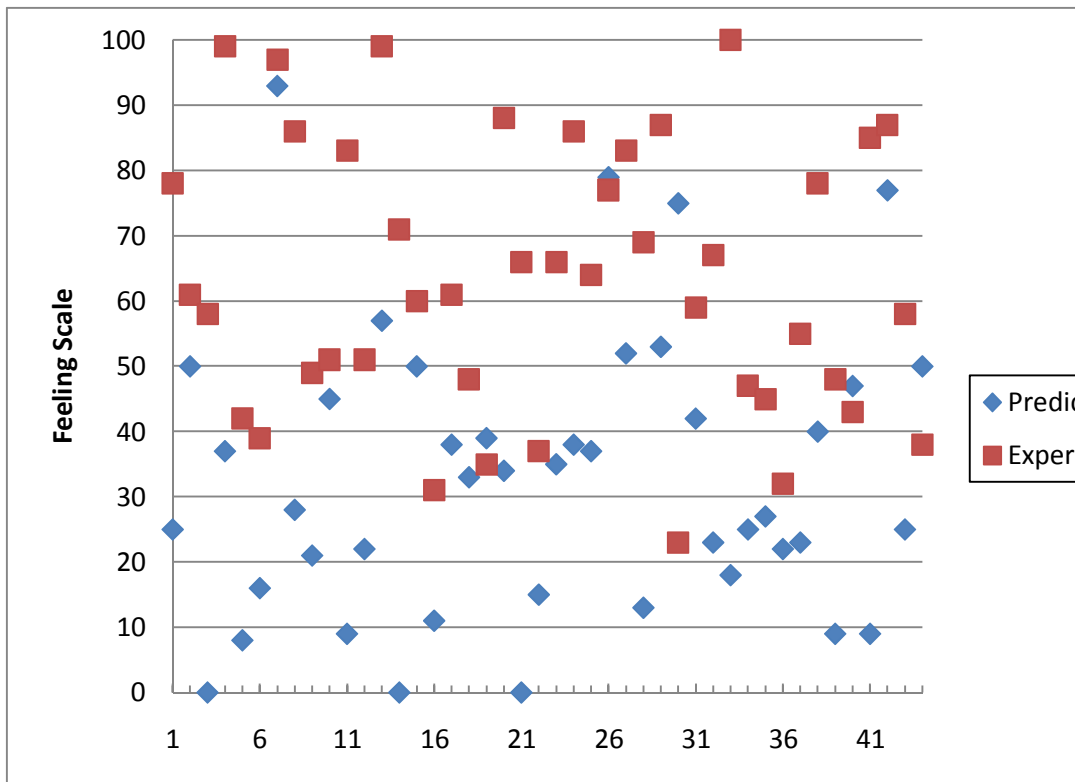
Figure S2a: Affective forecasts (prediction) and affective reports (experience) for each participant in the simulation condition of Experiment 2
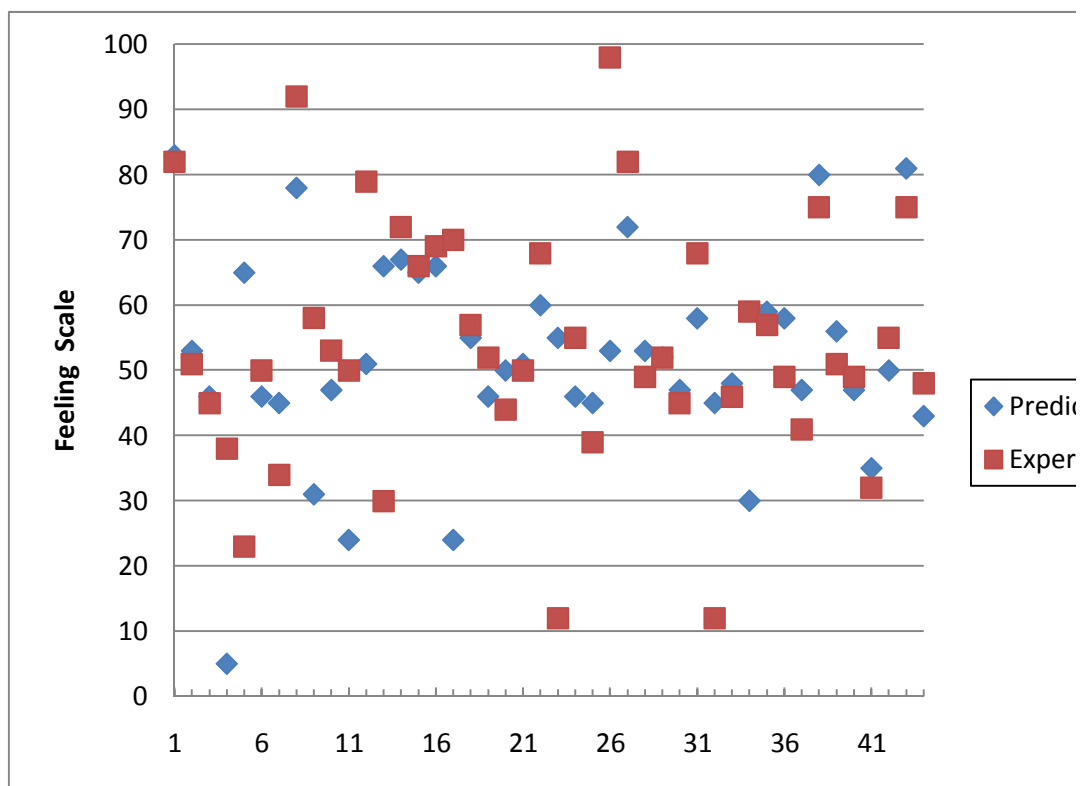
Figure S2b: Affective forecasts (prediction) and affective reports (experience) for each participant in the surrogation condition of Experiment 2