THE EFFECTS OF VIDEO AND NONNEGATIVE SOCIAL FEEDBACK ON DISTORTED APPRAISALS OF BODILY SENSATIONS AND SOCIAL ANXIETY1, 2

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Summary.—The effects of video feedback and nonnegative feedback from other people were examined as possibly ameliorating distorted appraisals of bodily sensations, as well as subjective and physiological anxiety in socially anxious individuals. Nonnegative feedback from a confederate emphasized the absence of negative outcomes (e.g., did not seem to tremble) rather than the presence of positive outcomes (e.g., looked calm). Socially anxious students were randomly assigned to either the experimental group, which received video and social feedback \((n = 12)\), or the control group \((n = 13)\). Participants were asked to give a videotaped speech twice. After the first speech, the experimental group watched the videotape of their speech and received feedback from a confederate, whereas the control group watched the video of another person’s speech. The intervention improved distorted appraisal of bodily sensations and anticipatory anxiety for the experimental group. However, there were no differential effects on anxiety between the groups during speeches.

Social phobia is characterized by a strong and persistent social anxiety that refers to a fear of social or performance situations in which an individual might feel embarrassment or humiliation (American Psychiatric Association, 2000). Cognitive models of social phobia (Clark & Wells, 1995; Rapee & Heimberg, 1997; Hofmann, 2007) emphasize negatively distorted appraisals of bodily sensations (e.g., palpitations, trembling, sweating, and blushing) as a key factor in the maintenance of social phobia symptoms. Previous research has shown such distorted appraisals of bodily sensations seem to involve (1) socially anxious individuals’ overestimating the extent to which their bodily sensations are visible to other people (McEwan & Devins, 1983; Bruch, Gorsky, Collins, & Berger, 1989; Alden & Wallace, 1995; Mansell & Clark, 1999) and (2) socially anxious individuals’ fears of negative evaluation by other people who might observe the bodily sensations (Clark, 2001; Roth, Antony, & Swinson, 2001). Kanai, Sasagawa,

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2The research was supported by a grant from the Japan Society for the Promotion of Science (Grant-in-Aid for JSPS Fellows, No. 17·3170) to the first author.
Chen, Suzuki, Shimada, and Sakano (2009) found these two aspects of appraisal were associated with each other and with social anxiety.

Cognitive models of social phobia have suggested that video feedback may be an effective approach to reducing overestimations of how visible bodily sensations are to others. Video feedback may reduce the discrepancy between an individual’s subjective view of his appearance and his actual appearance. Previous research has examined the effects of video feedback on underestimation of task performance (e.g., kept eye contact, understandable speech, stuttered) and overestimation of bodily sensations (e.g., blushed) has been included in the underestimation of their performance (Rapee & Hayman, 1996; Harvey, Clark, Ehlers, & Rapee, 2000; Rodebaugh & Chambliss, 2002; Rodebaugh, 2004; Smits, Powers, Buxkamper, & Telch, 2006). However, since cognitive models of social phobia emphasize the role of biased processing of bodily sensations in social phobia (e.g., Roth, et al., 2001; Mansell, Clark, & Ehlers, 2003), it would be important to focus on modification of distorted appraisals of bodily sensations through video feedback. Because overestimation of how visible bodily sensations are to other people seems related to a discrepancy between self-perception of appearance and actual appearance (McEwan & Devins, 1983; Alden & Wallace, 1995), video feedback may be a useful technique for correcting distorted appraisals of bodily sensations (Clark & Wells, 1995).

Rapee and Hayman (1996) found that video feedback was more effective in modifying distorted self-perceptions of performance than providing no such video feedback. However, no effects of video feedback on anxiety are typically found (e.g., Rodebaugh & Rapee, 2005). Rapee and Hayman (1996) suggest that future research should investigate further the anxiety-reducing effects of video feedback by combining a video with other methods of feedback, such as input from others. Hirsh and Clark (2007) noted that objective performance feedback from other people would be therapeutic, in terms of addressing distorted self-appraisals. Individuals with social phobia could compare the objective feedback with their self-ratings and then understand that their anxiety symptoms are not as visible to others compared with their original impressions. Huppert, Roth, and Foa (2003) used confederate feedback (along with video feedback) to help patients disconfirm erroneous impressions of how they are perceived by others (see also Clark, Ehlers, McManus, Hackman, Fennell, Campbell, et al., 2003). Alden, Mellings, and Laposa (2004) reported that patients with social phobia, who received nonnegative feedback emphasizing absence of negative outcomes (e.g., did not look anxious or freeze), had comparable anxiety to a nonpatient control group before a subsequent social interaction, whereas patients who received positive feedback emphasizing presence of positive
outcomes (e.g., looked calm) had higher anxiety than the controls. Adding nonnegative feedback on low visibility of bodily sensations may enhance the beneficial effects of video feedback on anxiety responses.

Previous studies have investigated the effects of video feedback on subjective anxiety, whereas its effects on physiological measures remain to be explored (Rapee & Hayman, 1996; Rodebaugh, 2004). Lang (1968) suggested that anxiety involves three components, namely, subjective, physiological, and behavioral. The present study was designed to examine the effectiveness of the intervention on both subjective and physiological anxiety.

Rodebaugh and Chambless (2002) investigated whether discrepancies between ratings of performance by themselves and ratings by objective observers moderated the effects of video feedback. Participants with high self-observer discrepancies distorted their appraisals from actual performance reflected by observers’ ratings and believed themselves to look more anxious than participants with lower discrepancies. Rodebaugh and Chambless (2002) found that only participants with high discrepancies between self- and observer ratings showed beneficial effects of video feedback on self-perceptions of performance in a second speech task. Rodebaugh and Rapee (2005) replicated these findings using data from Rapee and Hayman (1996). Rodebaugh (2004) also found that self-observer discrepancy is a strong predictor of beneficial effects of video feedback. Therefore, the first goal of the present study was to investigate whether video and nonnegative feedback by a confederate provided more reduction of the anxiety response and less distorted appraisals of bodily sensations than no feedback. Second, this study was a replication and extension of Rodebaugh and colleague’s findings of possible beneficial effects on distorted appraisals of bodily sensations.

The hypotheses tested were as follows: (1) participants who received video feedback and nonnegative social feedback would provide lower ratings of distorted appraisals of bodily sensations and would show lower anxiety than those scored prior to feedback; (2) the feedback group would show greater reductions in distorted appraisals and anxiety responses than the group without feedback; and (3) these effects would be greater for participants with high self-observer discrepancies than for those with low self-observer discrepancies.

**Method**

**Participants**

To select socially anxious participants, 600 Japanese undergraduate students (349 women, 175 men, 76 participants’ data on sex were missing; $M$ age = 19.9 yr., $SD$ = 1.8) completed the Japanese version of the Social Phobia Scale (Kanai, Sasagawa, Chen, Suzuki, Shimada, & Sakano, 2004).
Ninety-one individuals (60 women, 25 men, 6 participants’ data on sex were missing) scored more than one standard deviation above the mean value reported in Kanai, et al. (2004) on the Social Phobia Scale \((M=19.1, SD=12.6)\); 34 of these individuals had provided contact information. There was no difference in the Social Phobia Scale scores between the individuals who gave their contact information \((n=34; M=39.4, SD=9.5)\) and those who did not give their contact information \((n=57; M=40.9, SD=8.3; t_{89}=0.80, p=0.43)\). Twenty-five people scheduled participation (18 women, 7 men; \(M\) age = 19.6 yr., \(SD=1.3\), range: 18–22; \(M\) Social Phobia Scale score = 38.2, \(SD=7.7\)). Participants were randomly assigned to either the experimental group or the control group, with sex matched to ensure similar sex distributions in the two groups. A participant who was assigned to the experimental group refused to participate in this experiment because he feared the speech task. Twelve participants (9 women, 3 men) were assigned to the experimental group, and 13 participants (9 women, 4 men) were assigned to the control group.

**Materials**

*The Japanese version of the Social Phobia Scale (SPS; Kanai, et al., 2004).* — This is a 20-item instrument used for screening socially anxious individuals. The items are rated on a 5-point Likert-type scale and are designed to assess anxiety in performance situations in the presence of others and while being observed by others. Participants were asked to rate the extent to which they felt that each statement was characteristic of them on a scale ranging from 0: Not characteristic at all to 4: Extremely characteristic. The original version of the SPS (Mattick & Clarke, 1998) has been translated into Japanese by the first author. The accuracy of representation of the translated version was checked and modified by two clinical psychologists and three people residing in the U.S. Back-translation was conducted by a native speaker of English who was knowledgeable about psychology in order to assure the accuracy of the translated version of this scale. The Japanese version has been shown to be reliable and valid for the assessment of social anxiety (Kanai, et al., 2004); it has been found to have high internal consistency (Cronbach’s \(\alpha=0.91\)); to be positively correlated with Japanese versions of the Liebowitz Social Anxiety Scale and the Fear of Negative Evaluation Scale; to discriminate social phobia patients from healthy controls; and to predict state anxiety in public-speaking situations (Kanai, et al., 2004).

*Distorted appraisals of bodily sensations.* — These were assessed by having participants rate the extent to which they appraised seven bodily sensations on 7-point Likert-type scales, with anchors of 1: Not at all and 7 Extremely. The seven bodily sensations that were investigated are as follows: blushing, sweating, nervousness of face, shaky voice, trembling, mental
blanks, and palpitation. Distorted appraisals of bodily sensations were assessed by measuring the two aspects described above: (a) Overestimation of visibility of bodily sensations: “How much do/did you fear that each bodily sensation is/was visible to others now/during the speech?” and (b) Fear of negative evaluation by others regarding the bodily sensations: “How much do/did you fear that you are/were negatively evaluated by others regarding each bodily sensation now/during the speech?” These scales were presented on a computer screen, and participants were asked to indicate the extent to which the two aspects were applicable to each of seven bodily sensations by pressing a single corresponding computer key. Scores on the two aspects were calculated by summing the scores for the seven bodily sensations (range: 7–49). The scales were developed by Kanai, et al. (2009) on the basis of previous research (McEwan & Devins, 1983; Bruch, et al., 1989; Clark, 2001; Roth, et al., 2001) and have been shown to be reliable and valid for the assessment of distorted appraisals of bodily sensations in social anxiety (Kanai, et al., 2009). These scales have high internal consistency (α = .88–.92) and are positively correlated with the Japanese versions of the Social Phobia Scale and the Social Interaction Anxiety Scale (Kanai, et al., 2009). Moreover, it was shown in the present study that these scales had high internal consistency (visibility: α = .75–.89, fear of negative evaluation: α = .84–.91).

Subjective anxiety.—These were reported verbally, with ratings ranging from 0: I do not feel anxious at all to 100: I feel extremely anxious.

Heart rate.—Heart rate was recorded using the Biolab system (Autogen Corporation). Measured heart rate was based on an interbeat interval (IBI). Three Ag-AgCl pregelled disposable electrodes were placed on the participant’s skin surface of both forearms to assess variations in IBI, with a reference electrode being placed on the nondominant forearm. IBIs were later transformed into beats per minute (bpm). Heart rate was transformed into z scores at the index of change from baseline, to control for individual differences at baseline. Baseline values for heart rate were calculated as the mean during the last 2 min. of a 6-min. baseline period. The time intervals of measurement for each phase (before the first speech, during the first speech, while watching the video, before the second speech, during the second speech, and at the end of the experiment) were 2 min., and average heart rate values for each phase were calculated. Because breathing patterns alter heart rate (Jennings, Berg, Hutcheson, Obrist, Porges, & Turpin, 1981), the mean values for the 2 min. rather than the peak values were used.

Procedure

Participants were tested individually in a soundproof chamber with a constant temperature of 22±1°C. They were asked to limit exercise, eat-
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ing, smoking, and intake of caffeine and alcohol from 1 hr. before the beginning of the experiment. When a participant arrived, each was asked to sit in an armchair in the chamber. All participants provided their written informed consent to participate after they were instructed that the study was designed to investigate physiological changes and appraisals of bodily sensations when making speeches and after they were assured of confidentiality. Participants were also guaranteed that they could terminate their participation at any time if they wished. They answered some questions about their physical conditions including the consumption of caffeine, nicotine, and alcohol. After electrodes and sensors were attached, a 6-min. baseline recording of heart rate was made while the participants rested quietly. Physiological recording was then suspended, and the participants reported their subjective anxiety. They were then given detailed instructions that they would be asked to give a 2-min. video-recorded speech about their campus life to a confederate twice, and that the quality of their speech performance and how anxious they appeared would be assessed by the confederate. While the participants assigned to the experimental group were told they would watch the video of their first speech after it was recorded, those in the control group were told they would watch a videotaped TV program after the first speech. After the participants rated their subjective anxiety again, they were each given a 2-min. preparatory interval to organize the speech content without a written outline or notes. Participants were then asked to answer some questions regarding appraisals of bodily sensations.

Two women and two men (research assistants) took the roles of confederates and were instructed to remain impassive during the experiment and pretend to assess the participant’s performance using paper and a pen. The confederate was always an unfamiliar person of the opposite sex seated at a 2-m distance. A video camera was located behind and to the right of the confederate, and only the participant’s performance was recorded. After the participants rated their subjective anxiety, the experimenter left the room (prior to beginning the speech task). Participants then gave the first speech to the confederate. Immediately after the first speech, participants were asked to rate their subjective anxiety and their appraisals of bodily sensations during their speech.

As cognitive preparation prior to viewing a video has increased the effects of video feedback (Harvey, et al., 2000; Kim, Lundh, & Harvey, 2002; Rodebaugh, 2004), the experimental group viewed the videos of their speeches, following two steps of Harvey, et al. (2000): (1) estimating and imagining of the performance and appearance of bodily sensations in detail while closing the eyes for 2 min., and (2) instructions to watch the video objectively with a detached third-person perspective and to view the
videos from the viewpoint of how they looked, rather than how they felt, during the speech. Participants rated the vividness of the imagery with anchors of 0: Not vivid at all and 9: Extremely vivid. Participants were able to form moderately vivid images of themselves giving the speech \( (M = 5.1, SD = 2.1) \).

The experimental group then watched the videos of their speeches. During the video feedback, the experimenter left the room. After receiving the video feedback, participants filled out the scales measuring visibility of bodily sensations. Participants in the experimental group were provided with the visibility ratings they had made before video feedback and were asked to compare these with those obtained after video feedback. They were also provided with false results of an assessment that indicated a more positive assessment of performance than did their own estimates. These scores were created based on Kanai, et al. (2009), one standard deviation lower than the students’ mean scores. The values were 2: Blushing, 1: Sweating, 2: Nervousness of face, 2: Shaky voice, 1: Trembling, 1: Mental blanks, and 1: Palpitation. The same score was given each participant irrespective of the actual performance. They were told that these ratings were made by the confederate. They compared these results with their rating before video feedback. Participants rated whether the confederate’s data indicated better performance than they thought with anchors of 0: Evaluations from the confederate were not better than they thought at all and 9: Evaluations from the confederate were extremely better than they thought. Overall, participants perceived evaluations from the confederate as better than they thought they did \( (M = 8.5, SD = 1.5) \). Furthermore, the extent to which they believed these evaluations to be real was rated with anchors of 0: Not real at all and 100: Extremely real, at the end of the experiment. Results indicated that the participants had a moderate belief that the evaluations were actually made by the confederate \( (M = 68.3, SD = 23.3) \).

The control group was not given any feedback. They watched a video of another person’s speech, a member of the House of Representatives giving a speech during the plenary session of the House (Japan Broadcasting Corporation). Emotionality of the video was assessed using a visual analogue scale anchored at 0: Extremely negative, 50: Neutral, and 100: Extremely positive. The mean value of the emotionality of the video was 42.1 \( (SD = 14.0) \), ensuring that the speech video was emotionally neutral.

After viewing the video, participants gave the second speech, which followed the same procedure as the first. The theme of the second speech was the same as in the first speech, as was the confederate. The speech performance was evaluated again. After completion of all tasks, debriefing procedures were held and participants were given a coupon book worth
¥500 (approximately $5) as payment. The debriefing included the following: the confederate had pretended to evaluate the speech. The results of the evaluation were false and were prepared by the experimenter. Recent studies have reported that evaluations by others regarding speech performance are better than self-appraisals. Therefore, if their performances were actually evaluated, similar positive results would be expected. At the time when this study was conducted, an institutional review board had not been established; however, this study complied with the Helsinki Declaration and written informed consent by participants was obtained.

**Observer Ratings**

Following the protocol of previous studies on video feedback (Rapee & Hayman, 1996; Rodebaugh & Rapee, 2005), two graduate students in a clinical psychology course, blind to the group of each participant, rated the visibility of bodily sensations of the experimental group during the first speech. The observers received training on the rating procedure using the control group’s data, and they discussed interpretation of scale items. The two-way random intraclass correlation coefficients (ICC) for consistency of the means showed substantial reliability (ICC = 0.69; Landis & Koch, 1977). The self-observer discrepancy was created using the average of the two ratings as observer rating scores.

**Results**

**Participant Characteristics**

The mean values of the Social Phobia Scale score in the experimental and control groups were 39.3 (SD = 9.7) and 37.2 (SD = 5.5), respectively. Participants in the experimental and control groups had an average age of 20.2 yr. (SD = 1.2) and 19.2 yr. (SD = 1.3). Participants by group did not differ from one another in the Social Phobia Scale score and age (Social Phobia Scale: \( t_{23} = 0.65, p = 0.53 \); age: \( t_{23} = 2.04, p = 0.053 \)).

**Manipulation Check of Anxiety-provoking Effects of the Speech Task**

Table 1 shows mean ratings of subjective anxiety and heart rate in each group as a function of the speech task. To examine the anxiety-provoking effects of the speech task, a two-way analysis of variance (ANOVA; group: experimental, control; phase: baseline, after instruction, after preparation of speech content, during the first speech) was conducted on subjective anxiety ratings. This analysis revealed significant main effects of group and phase (group: \( F_{1,23} = 17.20, p < .001; \eta_p^2 = 0.43 \); phase: \( F_{3,69} = 45.16, p < .001; \eta_p^2 = 0.66 \)). The experimental group reported higher subjective anxiety than the control group. Paired comparisons of phase indicated that subjective anxiety ratings gradually became higher across the experiment and that anxiety during the first speech was the highest. No interac-
tion was found. Thus, the subjective anxiety was adequately heightened by the speech task, regardless of group.

**Effects on Distorted Appraisals of Bodily Sensations**

Table 2 shows mean values of visibility scores and fear of negative evaluation scores for each group. Differences across both types of score between the groups at baseline were examined using t tests. The experimental group had higher mean visibility scores ($t_{23} = 3.38, p = .003; \text{Cohen's } d = 1.41$), but not fear of negative evaluation scores ($t_{23} = .92, p = .37; \text{Cohen's } d = 0.38$). To control for individual differences at baseline, difference scores were calculated by subtracting the score obtained before the first speech from the scores obtained during the first speech, before the second speech, and during the second speech, respectively. Positive change scores, therefore, indicate increases in distorted appraisals.

To examine whether distorted appraisals of bodily sensations in the experimental group were reduced after both types of feedback compared to those in the control group, two-way mixed-design ANOVAs with repeated measurement of phase [group: experimental, control; phase: during the first speech (before video), before and during the second speech (after video)] were conducted on each appraisal score. These analyses yielded

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**Table 1**

**Descriptive Statistics For Subjective and Physiological Anxiety**

<table>
<thead>
<tr>
<th></th>
<th>Experimental ($n = 12$)</th>
<th>Control ($n = 13$)</th>
<th>Interaction of Group and Phase Between Speeches 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Subjective anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>59.6</td>
<td>19.8</td>
<td>38.5</td>
</tr>
<tr>
<td>After instruction</td>
<td>72.9</td>
<td>14.8</td>
<td>51.2</td>
</tr>
<tr>
<td>Before Speech 1</td>
<td>82.9</td>
<td>11.4</td>
<td>60.0</td>
</tr>
<tr>
<td>During Speech 1</td>
<td>91.7</td>
<td>11.1</td>
<td>74.6</td>
</tr>
<tr>
<td>After video</td>
<td>62.1</td>
<td>19.1</td>
<td>46.5</td>
</tr>
<tr>
<td>Before Speech 2</td>
<td>65.0</td>
<td>11.1</td>
<td>61.9</td>
</tr>
<tr>
<td>During Speech 2</td>
<td>67.9</td>
<td>18.9</td>
<td>65.6</td>
</tr>
<tr>
<td>At the end</td>
<td>25.4</td>
<td>19.7</td>
<td>21.2</td>
</tr>
<tr>
<td>Heart rate, bpm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>80.5</td>
<td>12.8</td>
<td>81.6</td>
</tr>
<tr>
<td>Before Speech 1</td>
<td>95.7</td>
<td>23.2</td>
<td>92.1</td>
</tr>
<tr>
<td>During Speech 1</td>
<td>104.4</td>
<td>28.3</td>
<td>113.3</td>
</tr>
<tr>
<td>During video</td>
<td>82.4</td>
<td>16.5</td>
<td>86.1</td>
</tr>
<tr>
<td>Before Speech 2</td>
<td>87.8</td>
<td>17.6</td>
<td>91.3</td>
</tr>
<tr>
<td>During Speech 2</td>
<td>98.2</td>
<td>24.0</td>
<td>102.6</td>
</tr>
<tr>
<td>At the end</td>
<td>80.9</td>
<td>13.8</td>
<td>82.8</td>
</tr>
</tbody>
</table>

*Note.* —Ratings of anxiety before and during the speech were separately analyzed using analyses of variance to compare mean anxiety before and after the video (Speeches 1 and 2, respectively) at the corresponding phase. *$p < .05$. †$p < .01$. 

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two significant interactions between group and phase (visibility score: $F_{2,46} = 9.23, p < .001; \eta_p^2 = 0.35$; fear of negative evaluation score: $F_{2,46} = 19.04, p < .001; \eta_p^2 = 0.45$). Simple main effect tests indicated there were significant main effects of phase in the experimental group (visibility score: $F_{2,22} = 20.34, p < .001; \eta_p^2 = 0.65$; fear of negative evaluation score: $F_{2,22} = 32.54, p < .001; \eta_p^2 = 0.75$). Multiple comparisons using a Bonferroni adjustment indicated that the experimental group scored lower on distorted appraisals after feedback than they did before. There were also significant main effects of group at “before and during the second speech” (visibility score: before the second speech: $F_{1,23} = 11.29, p = .003; \eta_p^2 = 0.33$; during the second speech: $F_{1,23} = 7.78, p = .01; \eta_p^2 = 0.25$; fear of negative evaluation score: before the second speech: $F_{1,23} = 10.15, p = .004; \eta_p^2 = 0.31$; during the second speech: $F_{1,23} = 7.61, p = .01; \eta_p^2 = 0.25$). After the feedback, the experimental group scored lower on distorted appraisals than the control group. Uncontrolled effect sizes for repeated measures were calculated using the following formula (Cohen, 1988): Effect size = [mean ratings before (during) Speech 1 – mean ratings before (during) speech 2]/pooled standard deviation (Table 3). Cohen (1988) has proposed a three-fold classification of effect size: small (0.20–0.49), medium (0.50–0.79), and large (0.80 and above). Whereas the effect sizes in the experimental group were above 0.80, those in the control group were below 0.35. Controlled effect sizes in which the postintervention means for the experimental group were compared with those of the control group were computed using the following formula (Cohen, 1988): Controlled effect size = [mean of change scores before (during) speeches for control group – mean of change scores before (during) speeches for experimental group]/pooled standard deviation. The postintervention controlled effect sizes were above 0.80 for both appraisals of

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Experimental ($n = 12$)</th>
<th>Control ($n = 13$)</th>
<th>Interaction of Group and Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Visibility of bodily sensations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before Speech 1</td>
<td>30.0</td>
<td>8.4</td>
<td>18.6</td>
</tr>
<tr>
<td>During Speech 1</td>
<td>33.0</td>
<td>7.6</td>
<td>23.4</td>
</tr>
<tr>
<td>Before Speech 2</td>
<td>18.3</td>
<td>5.9</td>
<td>19.8</td>
</tr>
<tr>
<td>During Speech 2</td>
<td>20.5</td>
<td>7.4</td>
<td>20.8</td>
</tr>
<tr>
<td>Fear of negative evaluation by others regarding bodily sensations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before Speech 1</td>
<td>30.1</td>
<td>8.9</td>
<td>26.4</td>
</tr>
<tr>
<td>During Speech 1</td>
<td>33.1</td>
<td>7.8</td>
<td>27.1</td>
</tr>
<tr>
<td>Before Speech 2</td>
<td>21.0</td>
<td>7.1</td>
<td>26.5</td>
</tr>
<tr>
<td>During Speech 2</td>
<td>20.0</td>
<td>7.6</td>
<td>25.1</td>
</tr>
</tbody>
</table>

*Note.—Analyses of variance were conducted on change scores from the score obtained before the first speech. *$p < .001.$
bodily sensations. Video feedback and nonnegative feedback from other people together reduced distorted appraisals of bodily sensations.

**Effects on Subjective Anxiety**

The difference in subjective anxiety between groups at baseline was examined using a t test. The experimental group showed a higher subjective anxiety level than the control group ($t_{23} = 2.82, p = .01; \text{Cohen’s } d = 1.18$). To control for individual differences at baseline, difference scores were calculated as follows: subtracting the subjective anxiety rating at baseline from that at each phase. To compare subjective anxiety after the intervention to those before the intervention, a two-way mixed-design ANOVA with repeated measures was conducted on subjective anxiety before the speech, with group and phase (before the first and second speech) as the independent variables. This analysis revealed a significant interaction between group and phase ($F_{1,23} = 9.34, p = .006; \eta^2_p = 0.29$). A simple main effects test revealed a significant effect of phase in the experimental group ($F_{1,23} = 14.65, p = .001; \eta^2_p = 0.39$). The experimental group had lower subjective anxiety after feedback than before ($d = 0.86$). There was no significant main effect of phase in the control group ($d = −0.09$). The controlled effect size was large (1.26). Video feedback and nonnegative feedback from others reduced subjective anxiety ratings before the second speech.

A similar two-way ANOVA conducted on mean subjective anxiety during the first speech and during the second speech showed a significant main effect of phase ($F_{1,23} = 15.53, p = .001; \eta^2_p = 0.40$). Mean rating of subjective anxiety during the second speech was lower than that during the first speech. No significant interaction was found ($F_{1,23} = 3.15, p = .09; \eta^2_p = 0.12$). Both groups rated subjective anxiety lower after the video than before. Uncontrolled effect size in the experimental group was 1.01, whereas effect size in the control group was 0.42. The postintervention controlled effect size was medium (0.74).

**Effects on Physiological Anxiety**

Data from two participants (one in the experimental group and the
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other in the control group) were excluded from the analyses of heart rate, because they reported consumption of beverages containing caffeine within an hour before the experiment. Table 1 shows means of heart rate for each group. To compare heart rate after the intervention to that before, a two-way ANOVA was conducted with group and phase (before the first speech and before the second speech) as independent variables. The interaction between group and phase was significant \( (F_{1,21} = 6.12, p = .02; \eta^2_p = 0.23) \). There was a significant main effect of phase in the experimental group \( (F_{1,21} = 13.01, p = .002; \eta^2_p = 0.38) \). Participants in this group had lower heart rates after the feedback than before \( (d = 0.57) \). There was no main effect of phase in the control group \( (d = 0.04) \). The intervention reduced heart rate, a physiological measure of anxiety, before participants gave the second speech. The postintervention controlled effect size was large \( (1.08) \).

A similar two-way ANOVA was conducted on heart rate, with phase defined as during the first versus the second speech. This analysis revealed a significant main effect of phase \( (F_{1,21} = 12.65, p = .002; \eta^2_p = 0.38) \). Heart rate during the second speech was lower than during the first speech. No significant interaction was found \( (F_{1,21} = 0.66, p = .43; \eta^2_p = 0.03) \). Both groups had lower heart rates after the video than before. The uncontrolled effect size in the experimental group was 0.45, whereas the effect size in the control group was 0.42. The controlled effect size was small \( (−0.35) \).

Relation of Intervention Effects and Self-observer Discrepancy

To investigate whether participants who had a more negatively biased initial appraisal of their bodily sensations benefited more from the intervention, self-observer discrepancy scores were created by obtaining standardized residuals. The standardized residuals were calculated by entering observer ratings of the first speech as predictors of the participants’ visibility ratings for the first speech (see Rodebaugh & Chambless, 2002). High discrepancy scores represent participants’ concerns that their bodily sensations are quite visible to other people. A difference score for visibility was calculated by subtracting the visibility score during the second speech from the corresponding score during the first speech. A difference score for subjective anxiety was also calculated by subtracting the subjective anxiety ratings before the second speech from the ratings before the first. Higher difference scores represent greater reductions in visibility and subjective anxiety. Pearson correlation analyses indicated that self-observer discrepancy scores correlated significantly with reductions in overestimation of visibility \( (r = .60) \) and subjective anxiety before speeches \( (r = .74) \), suggesting self-observer discrepancy was positively related to the efficacy of the intervention.

Discussion

Video feedback and nonnegative feedback by other people reduced
distorted appraisals of bodily sensations and attenuated subjective anxiety and heart rate before participants gave a speech. These results partially supported the hypothesis that participants who received both types of feedback would have lower ratings of distorted appraisals of bodily sensations and rate anxiety lower than the control group. However, robust reductions in subjective anxiety and heart rate during the speech were observed in both groups, which caused no difference between groups. This finding is consistent with the study of Rapee and Hayman (1996), who found no differences in anxiety between a video feedback group and a control group, with reduction in anxiety observed in both groups. They suggested that habituation to speech situations might have “swamped” possible effects of the video feedback; this might also have occurred in the present study.

Before the intervention, the experimental group rated the visibility of bodily sensations and subjective anxiety as being higher than the control group. Because the intervention group had more room for improvement on these measures in comparison to the control group, it is possible that the apparent effects of the intervention were actually the result of regression to the mean. As such, it is suggested these results should be interpreted with caution. Conversely, there were no group differences at baseline for the fear of negative evaluation regarding bodily sensations and heart rate. Therefore, it can be concluded that the reduction in these measures resulting from video and social feedback was clearly caused by the experimental manipulation. Consequently, it is suggested that the combination of video and nonnegative feedback by others was effective in modifying the fear of negative evaluation regarding bodily sensations by others, as well as in reducing anticipatory anxiety in physiological aspects. Present findings also support the cognitive models of social phobia (Clark & Wells, 1995; Rapee & Heimberg, 1997), which emphasize distorted appraisals of bodily sensations as important in maintenance of the symptoms.

As noted in the Introduction, previous research on video feedback has indicated that video feedback and no-feedback conditions do not produce differential reductions in anxiety. The present study found that video feedback with nonnegative feedback from other people reduced anticipatory anxiety relative to a control condition, as well as modified distorted appraisals of bodily sensations. However, the present design did not include a condition in which the participants received only video feedback. This study targeted distorted appraisals of bodily sensations, whereas the previous studies aimed to modify underestimation of performance (Rapee & Hayman, 1996; Harvey, et al., 2000; Rodebaugh, 2004). It is possible that the different results on anxiety reduction were caused by differences in the intervention target rather than because of the addition of
nonnegative feedback from others. Assigning participants to an experimental group that received only video feedback would have resolved this problem. However, it is also possible to compare the effect sizes of the intervention in this study with those obtained in previous studies of video feedback (e.g., Rodebaugh, 2004). The effect sizes for repeated measures (Cohen, 1988) of video feedback on underestimation of individuals’ performance were 1.27 (in Rapee & Hayman, 1996), 0.63–0.70 (in Harvey, et al., 2000), and 0.66 (in Rodebaugh & Chambless, 2002). The effect sizes for the intervention in this study were therefore larger than those effect sizes found for video feedback or video feedback with cognitive preparation. Although effect sizes in this study should be interpreted with caution given the small sample size, it appears that adding nonnegative feedback by others to video feedback provides better effects than video feedback with cognitive preparation. On the other hand, effects of the intervention must be explored, controlling confederate feedback alone: similar effects could have occurred without video feedback. Future studies should examine the effect of nonnegative feedback by other people.

Self-observer discrepancy was positively related to the efficacy of the intervention in the present study. This result suggests that individuals with high discrepancies between their visibility ratings and the corresponding ratings by independent observers enjoy more beneficial effects of video feedback and nonnegative feedback from others. This result is consistent with findings from previous research (Rodebaugh & Chambless, 2002; Rodebaugh, 2004; Rodebaugh & Rapee, 2005).

Some limitations of the present study should be acknowledged. Participants in this study were a very small and nonclinical sample of undergraduates. However, it is suggested that social anxiety is continuously distributed in the general population, and that patients with social phobia have social anxiety at the more severe end of the social anxiety continuum (Rapee & Heimberg, 1997; Hirsh & Clark, 2004). Stopa and Clark (2001) suggested that a nonclinical sample can be useful in identifying the psychological processes which underlie social phobia. Given that the similarities between patients with social phobia and nonclinical individuals with high social anxiety may not always be observed, Hirsh and Clark (2004) indicated initial reports in analogue studies must be confirmed with subsequent patient studies. Furthermore, given that there were proportionately more women than men participants, the results of this study might be limited to women with social anxiety. Future research should attempt to replicate the present findings using a larger, sex-balanced sample of patients with social phobia.

Although participants were randomly assigned to groups and there was no difference in the Social Phobia Scale scores between them, the experimental group had higher estimates of visibility of their bodily sen-
sations and subjective anxiety than the control group prior to the first speech. The participants in the experimental group were instructed that they would watch a video of their speech performance afterwards, whereas the participants in the control group were instructed that they would watch a videotaped TV program. It is possible these different instructional sets caused different levels of subjective anxiety. In order to produce similarly distorted appraisals and anxiety between groups, future studies should seek to match groups based on initial scores of the main dependent measures, and provide different instructions between the groups after the first speech.

While the experimental group received cognitive preparation, video feedback, and feedback from confederates, the control group only watched a videotape of another person’s speech. Thus, time between the first and second speeches was not controlled between the groups. Future research should control the time by assigning tasks to the control group for an equivalent period. Furthermore, to investigate the differences between the confederates and whether they performed consistently across participants, it is suggested that in future studies a video recording of the confederates’ behavior should be made and rated by independent observers. A video of a member of the Japanese House of Representatives giving a speech was used to control the content of the video between the experimental and control groups as closely as possible. Although the control group rated the video as being neutral, it is possible that watching the performance of a skilled speaker made participants in the control group anxious. Observing a skilled speaker might also have resulted in social learning. Therefore, future studies should use videos with a more neutral and nonsocial content.

REFERENCES


*Accepted August 26, 2011.*