Social comparison and coping with radiation therapy
Bennenbroek, F.T.C.

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Chapter 5
How do cancer patients respond to different dimensions of social comparison information: Is personality important?

Abstract
The present study examined the effects of social comparison information on the mood of cancer patients. The effects of three audiotapes, containing different types of social comparison information, were examined using a control group for comparison. On the procedural tape, a man and woman discussed their illness and radiation therapy; on the emotion tape, they focused on emotional reactions to their illness and treatment; while on the coping tape they focused on the way they had been coping. Furthermore, it was examined whether neuroticism, extraversion, and social comparison orientation influenced the effects of these different kinds of social comparison information. The results indicated that individuals high in neuroticism, introverts, and individuals with a high social comparison orientation reacted negatively to the emotion tape. The effects of procedural and coping information seem to be largely unaffected by these personality traits.

In recent years, there has been considerable interest in social comparison processes among cancer patients (e.g., Tennen, et al., 2000; Wood & Van der Zee, 1997). This interest not only concerns theoretical issues, but also the practical uses of social comparison information. More and more, patient information materials contain social comparison information, that is, information about how fellow patients experience or have experienced their disease and related issues. These fellow patients may not only provide information about their disease and treatments, but they may also provide sensory information about how they felt during treatments, or how they experienced the side effects of those treatments. Indeed, cancer patients often report that the kind of information they receive from fellow patients is unique, and that only fellow patients realize what they are going through (Gray, et al., 1997).

The notion that fellow patients can provide valuable information is in line with Festinger’s social comparison theory (1950, 1954). He hypothesized that people have a need to accurately evaluate their opinions and abilities. When no objective (i.e., non-social) information is available, people will try to evaluate their opinions and abilities by comparing themselves with similar others.

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1 This chapter is based on: Bennenbroek, F.T.C., Buunk, B.P., Stiegelis, H.E., Hagedoorn, M., Sanderman, R., & Van den Bergh, A.C.M. (submitted). How do cancer patients respond to different dimensions of social comparison information: Is personality important?
When cancer patients experience a lack of objective information, it can, therefore, be assumed that their need for social comparison information (i.e., information about how fellow patients are doing, feeling and coping) is enhanced (Festinger, 1954). In fact, some studies indicate that even when objective information is available, people remain interested in social comparison information (Miller, 1977; Willemsen & Van den Berg, 1986). Although many studies have focused on social comparison preferences among cancer patients, an increasing number of studies focus on the effects of social comparison information (see Wood & Van der Zee, 1997, for a review). Van der Zee, Oldersma et al. (1998), for example, found that patients experienced more positive and less negative affect after reading interviews with fellow patients doing better (upward social comparison) than after reading interviews with fellow patients doing worse (downward social comparison). However, it seems that the effects of social comparison information are not straightforward. That is, the effects of social comparison information are not inherent to its direction (upward or downward). Two important factors seem to influence the effects of social comparison information. First, individual differences seem to play an important role in social comparison processes (Olson & Evans, 1999; Wheeler, 2000). Reis et al. (1993), for example, found that individuals low in self-esteem reported a higher increase in self-esteem following downward comparison than those high in self-esteem. Although most studies have focused on self-esteem (e.g., Aspinwall & Taylor, 1993) and depression (e.g., Ahrens & Alloy, 1997), increasing attention is given to the role of other personality characteristics, such as neuroticism, extraversion, and, more recently, social comparison orientation (e.g., Gibbons & Buunk, 1999; Van der Zee, Oldersma, et al., 1998). Second, the dimension of the comparison information seems to influence social comparison processes. The dimension of comparison concerns a specific feature (e.g., emotional reactions or coping ability) on which people compare themselves with others. Gibbons and Gerrard (1989, 1991) and Wood and Taylor (1991) were the first to acknowledge the importance of the dimension of comparison. Gibbons and Gerrard (1989), for example, found that comparing with others who were coping better, especially when facing adversity, improved mood. Several studies have subsequently examined social comparison processes on two dimensions relevant in health settings, namely, illness severity and coping ability (Bennenbroek, et al., 2002; Buunk, 1999; Ybema & Buunk, 1999). Bennenbroek et al. (2002), for example, found that cancer patients prefer information about others doing better when comparing on the illness severity dimension, while their preference for upward comparison information is even more evident when comparing on the coping dimension.

In the present study, the effects of social comparison information on three dimensions were examined, using a control group for comparison. Cancer patients...
who were about to undergo radiation therapy were provided with audiotaped social comparison information on one of three dimensions. The purpose of these audiotapes was to prepare the patients for the impending period of radiation treatments and to reduce negative feelings. On each of the three tapes, individuals who acted as cancer patients who had already undergone radiation therapy recounted different aspects of their experiences with cancer and radiation therapy. However, on each audiotape, they focused on different aspects. On the first tape, they focused on the procedural aspects of the experience (procedural tape); on the second tape, they focused on the emotional aspects (emotion tape); and on the third tape, they focused on coping aspects (coping tape). Furthermore, it was examined whether personality traits influenced the effects of these three dimensions of social comparison information on mood. In other words, it was examined what kind of information would be most beneficial for which individual. The focus was on three personality traits, namely, neuroticism, extraversion, and social comparison orientation. First, the different dimensions on which the social comparison information was provided are discussed; then the personality traits and how they may influence the effects of the different dimensions.

**Procedural Tape**
On the procedural tape, the patients focused on their experiences with various aspects radiation therapy: how the cancer was discovered, what happened during the treatments, which side effects they experienced, and how the check-ups went after the radiation therapy had ended. A large number of interventions to prepare patients for radiation therapy have been effective in increasing knowledge about radiation therapy, reducing anxiety, and reducing disruption of daily activities (see Ream & Richardson, 1996, for a review). Information about experiences from fellow patients can be an important supplement, as it provides cancer patients with the opportunity to compare themselves and their situation with (the situation of) fellow patients. Kulik and Mahler (2000) have suggested that when people are faced with a novel (health) threat, they experience an increased desire for social comparison information relevant to that threat. They further hypothesized that people primarily choose their comparison others for their ability to reduce uncertainty (e.g., provide cognitive clarity) about the threat situation, and to a lesser extent for their comparison potential. In other words, they hypothesized that cancer patients would use information about fellow patients who had already undergone radiation therapy first and foremost to get a better idea of what to expect, and to a lesser extent as an opportunity to compare themselves or their situation.
**Emotion Tape**
Patients may experience uncertainty about their emotional reactions to their disease and treatment. Even though every individual reacts differently to these kinds of circumstances, fellow patients who have already undergone the treatment are able to provide information about the kinds of emotions they experienced during radiation therapy, thus providing a point of reference. Research has indicated that uncertainty about emotions can promote the need for social comparison (Cottrell & Eppley, 1977; Kulik & Mahler, 2000). However, little attention has been given to the specific effects of comparing one’s emotions with those of similar others when facing a serious health threat. Spiegel and Diamond (2001) suggested that cancer patients who are uncertain about their emotional responses may learn from fellow patients that they reacted quite normally to the situation. Information about the emotional reactions of fellow patients can thus normalize and validate patients’ emotions. On the emotion tape, the patients, therefore, focused on their emotional reactions to cancer and radiation therapy.

**Coping Tape**
On the coping tape, the patients focused on how they had coped with various aspects of cancer and radiation therapy. Presenting patients with a positive coping model may increase their ability to cope with the situation and their self-efficacy. Self-efficacy refers here to personal judgments of how well one is able to implement behavior to cope with one’s disease and treatment (Bandura, 1986). By comparing with others who are coping well, patients may learn how to improve their own situation, and, at the same time, they may be given motivation and hope (Taylor & Lobel, 1989). Indeed, studies indicate that people facing a health threat are particularly interested in comparing themselves with others who are coping well (Bennenbroek, *et al.*, 2002; Buunk, 1995). It is likely that such comparisons are motivated by a desire to improve oneself and one’s situation, while comparison on the illness severity dimension is not. After all, fellow patients who are coping well can provide more useful information on how to improve one’s situation than fellow patients who are doing well physically.

Although different dimensions of social comparison information may serve different goals and thus have different effects, each dimension may be more beneficial for some individuals than for others. In the present study, the influence of three personality characteristics, namely, neuroticism, extraversion, and social comparison orientation were examined.

**Neuroticism**
A considerable amount of research has examined the moderating effects of neuroticism on the affective responses of cancer patients to social comparison
information (e.g., Van der Zee, et al., 1998; Van der Zee, Oldersma, et al., 1998). Neuroticism is a personality trait characterized by a tendency to experience negative, distressing emotions and to possess associated behavioral and cognitive traits. Features that define this trait are fearfulness, irritability, low self-esteem, social anxiety, poor inhibition of impulses, and helplessness (Costa & McCrae, 1987). In general, people high in neuroticism tend to set extremely high standards for themselves and tend to underestimate their own performance (Eysenck, 1947). This may cause them to feel less confident in their ability to deal with a threatening situation. More importantly, neuroticism is associated with an information processing style that is harmful to the self (Young & Martin, 1981). That is, when confronted with information about fellow patients, individuals high in neuroticism tend to focus on the negative implications of such information. Therefore, it is expected that those high in neuroticism will experience a more negative mood after listening to the audiotapes than individuals low in neuroticism (Hypothesis 1).

Furthermore, differences in reactions between those high and low in neuroticism may depend on the dimension of the information. Confrontation with a fellow patient who is coping successfully, for example, may lead to frustration for those high in neuroticism. Van der Zee et al. (1998) found less positive and more negative reactions to fellow patients who were adjusting well among cancer patients high in neuroticism. Furthermore, because of the emotional instability characteristic of individuals high in neuroticism (Costa & McCrae, 1985), listening to fellow patients expressing positive as well as negative feelings may upset them further. In contrast, patients talking about procedural aspects may be less likely to be interpreted negatively. Therefore, it is expected that those high in neuroticism will experience more negative moods than those low in neuroticism, especially after listening to the emotion tape and the coping tape (Hypothesis 2).

**Extraversion**

Very little research has focused on the role of extraversion in moderating the effects of social comparison information. Extraversion is a personality trait characterized by sociability, gregariousness, optimism, and affiliative tendencies (Costa & McCrae, 1985; Hills & Argyle, 2001), as well as by having numerous friendships, well-developed social skills, enterprising vocational interests, and participation in sports and clubs (McCrae & Costa, 1999). Furthermore, extraverts are characterized by seeking arousal producing stimuli, while introverts will attempt to avoid arousal producing stimuli (Berlyne, 1960; Eysenck, 1981).

A link between extraversion and social comparison processes has been established by only a few studies (e.g., Olson & Evans, 1999; Van der Zee, et al., 1996). A study among cancer patients, for example, revealed that extraverts were more inclined to compare themselves with others doing worse than were introverts (Van der
Zee, et al., 1998). However, it has never been examined whether extraverts react differently to different types of social comparison information than introverts. It is, therefore, difficult to formulate a hypothesis based on empirical considerations. However, a difference in the arousal evoking potential of the different audiotapes may prove useful. The emotion tape presents cancer patients talking about positive as well as negative emotions, thus displaying arousal. The coping tape and the procedural tape present cancer patients talking about mostly neutral or positive aspects, thus displaying less arousal. It can, therefore, be argued that the emotion tape will evoke the most arousal in the listener. Because extraverts have a preference for arousal producing stimuli, while introverts have an aversion to arousal producing stimuli, it is expected that extraverts will experience a less negative mood after listening to the emotion tape than introverts (Hypothesis 3). No differences are expected between extraverts and introverts after listening to the procedural and the coping tapes.

Social comparison orientation

A number of researchers have suggested that people vary in their interest in comparing themselves with others (e.g., Brickman & Bulman, 1977; Steil & Hay, 1997; Taylor, et al., 1992). To differentiate between individuals who have a high interest in social comparison and those with a low interest, Gibbons and Buunk (1999) introduced the concept of social comparison orientation. This refers to the disposition of individuals who are strongly focused on social comparison, are particularly sensitive to their own standing relative to others, and are interested in information about the thoughts and behaviors of others in similar situations. According to Gibbons and Buunk (1999), individuals high in social comparison orientation are characterized by a heightened uncertainty about themselves, accompanied by a relatively strong dependency on other people for their self-evaluation. A study among cancer patients found that patients high in social comparison orientation were indeed more inclined to select and attend to information from fellow patients (Van der Zee, Oldersma, et al., 1998).

Besides having a greater interest in comparison information, people high in social comparison orientation are also more strongly affected by social comparison (Gibbons & Buunk, 1999). This seems to be particularly the case when it involves comparing oneself with others doing poorly. In several studies, it was found that people high in social comparison orientation experience more negative affect after comparing themselves with others doing poorly than those low in social comparison orientation (Buunk, et al., 2001; Van der Zee, Oldersma, et al., 1998). Because the emotion tape is the only tape containing aspects that could be interpreted as downward comparison information (as it also presents negative emotional reactions), it is expected that individuals high in social comparison orientation will report more negative mood after listening to the
emotion tape than those low in social comparison orientation (Hypothesis 4). Exploratory analyses were performed to examine whether individuals high in social comparison orientation would react differently to the procedural tape and the coping tape than those low in social comparison orientation.

**Method**

**Procedure**

Patients were approached in the three hospitals with radiation therapy departments in the northern part of the Netherlands. In each department, an assistant would check incoming patient files to see whether patients met the inclusion criteria. The patients had to be newly diagnosed cancer patients with breast cancer, cervical cancer, head and neck cancer, or prostate cancer. They had to be treated with external radiation therapy with curative intent for a period of four to seven weeks. They could not be participating in another psycho-oncological study and had to have sufficient knowledge of the Dutch language.

Once it was determined that a patient met the inclusion criteria, (s)he was approached by his/her radiation oncologist with a request to participate in the study. The patients were given written information about the study, which they could read in their own time. They could then send an informed consent form to the researchers, indicating that they would participate in the study. Of the 319 eligible patients, 226 agreed to participate in the study (71% response rate). The main reasons for non-response were not being interested (12%), feeling it was too burdensome (6%), or a poor physical or mental condition (3%). Next, patients were randomly assigned to one of the three experimental conditions, each with a different audiotape, or to the control group. Patients assigned to an experimental condition who did not own a tape recorder were provided with one. In the week prior to the start of their treatment, the patients received the questionnaire and an audiotape.

**Sample**

The majority of the respondents was female (65%). Their ages ranged between 29 and 81 years of age (\(M = 60\)). The sample consisted of patients who were treated for breast cancer (\(N = 131\)), prostate cancer (\(N = 61\)), cervical cancer (\(N = 17\)), and head and/or neck tumors (\(N = 17\)). About 36% of the patients had primary education or lower professional training, 49% had high school education or middle professional training, and 15% had a higher education or higher professional training. All patients were about to undergo radiation therapy. In addition, 53% of the patients had received or were receiving a secondary treatment; 46% surgery, 23% varied chemotherapy, and 31% other secondary treatment. The elapsed time since first diagnosis between 1 and 36 weeks, with an average of eight weeks.
Development of the audiotapes

A total of 20 cancer patients were interviewed in order to gather the necessary information for developing the audiotapes. These patients were either still undergoing radiation therapy or had recently received their last treatment. The scripts of the audiotapes were based on information extracted from these interviews, information from medical staff, and information from relevant literature. The scripts of the audiotapes represented an interview in which one male patient and one female patient who have already undergone radiation treatment are recounting their experiences.

Before the audiotapes were recorded, radiation oncologists and a number of cancer patients reviewed the scripts. On the basis of their comments and recommendations, some small alterations were made to the scripts. Next, the audiotapes were recorded with the help of professional actors, a director, and a sound technician. After recording, the audiotapes were once again reviewed and approved by the medical staff of all three hospitals involved in the present study.

Similarities and differences in the audiotapes

Each script was written to match the other scripts as much as possible on the subjects which were addressed, the order of the subjects, the use of language, and total length of the audiotape. The main subjects that were addressed on all the audiotapes were the way the diagnosis was made, the radiation treatment, the possible side effects of the treatment, and the changes after the treatment had ended. However, the audiotapes differed in the way these topics were addressed, as each audiotape focused on a different dimension. The audiotapes were roughly 25 minutes long.

Instruments

In the week prior to the start of their radiation treatments, the patients received a questionnaire with several different sections.

Neuroticism was measured using a 12-item subscale from the 48-item version of the Eysenck’s Personality Questionnaire (EPQ; Eysenck & Eysenck, 1991; Sanderman, et al., 1995). For each item, the participants had to respond with ‘Yes’ or ‘No’ to a personality describing statement. For example, ‘Does your mood often go up and down?’ Cronbach’s alpha for this scale was $\alpha = .81$.

Extraversion was measured using a 12-item subscale from the same version of the EPQ. Again, the participants had to respond with ‘Yes’ or ‘No’ to each personality describing statement. For example, ‘Do you like meeting new people?’ Cronbach’s alpha for this scale was $\alpha = .81$.

Individual differences in social comparison orientation were measured using the Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons &
Table 1
Regression analysis of negative mood on neuroticism (N) and dummy variables D1 (procedural vs. control), D2 (emotion vs. control), and D3 (coping vs. control). Additional analyses yielded interaction effects of D4 (emotion vs. coping), D5 (emotion vs. procedural), and D6 (procedural vs. coping).

<table>
<thead>
<tr>
<th>Negative mood</th>
<th>R² change</th>
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<tr>
<td>D1</td>
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<tr>
<td>D2</td>
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<td>6.06*</td>
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<tr>
<td>D3</td>
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<td>-.04</td>
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<tr>
<td>Step 2</td>
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<tr>
<td>N x D1</td>
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<td>-7.14**</td>
</tr>
<tr>
<td>N x D2</td>
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<td>-2.30</td>
</tr>
<tr>
<td>N x D3</td>
<td></td>
<td>-6.10*</td>
</tr>
<tr>
<td>N x D4</td>
<td></td>
<td>-4.67†</td>
</tr>
<tr>
<td>N x D5</td>
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<tr>
<td>N x D6</td>
<td></td>
<td>-.87</td>
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</table>

** p < .01, * p < .05, † p < .10

Buunk, 1999). The participants could indicate on a 5-point scale whether they agreed with statements on social comparison habits, ranging from 1 = I disagree strongly to 5 = I agree strongly. For example: ‘I always like to know what others in a similar situation would do’. The reversed items (‘I am not the type of person who compares often with others’ and ‘I never consider my situation in life relative to that of other people’) were removed from the analyses, because of very low item-total correlations ($r = -.006$ and $r = .159$, respectively). Cronbach’s alpha for the resulting scale was $\alpha = .83$.

After the patients had listened to the audiotape, a manipulation check was performed to examine the extent to which the patients had compared themselves with the patients on the tape. The patients were asked to indicate whether or not they had compared themselves and/or their situation to the (situation of) the fellow patients on the tape. They could respond with ‘No’, ‘Yes, I compared myself
with the man on the tape', ‘Yes, I compared myself with the woman on the tape', or ‘Yes, I compared myself with the man and the woman on the tape'.

*Negative mood* was measured using a shortened version of the Profile of Mood States (V-POMS; McNair, et al., 1971; Wald, & Mellenbergh, 1990). This questionnaire contains 32 adjectives describing different mood states. The patients were asked to indicate how much the description applied to their moods over the past several days on a 5-point scale (1 = not at all applicable to 5 = very much applicable). To construct the total scale of negative mood, the ‘vigor’ items were reversed, so that a higher score indicated a more negative mood. Cronbach’s alpha for the scale was high, $\alpha = .94$.

**Results**

**Extent of comparison**

To examine the extent to which the patients had compared themselves with the patients on the tapes, a manipulation check was used. The results show that 93% of the patients who had received the procedural tape had indeed compared themselves with the patients on the tape, while this percentage was slightly lower among those who had received the coping and the emotion tapes (79% and 82%, respectively).

**Neuroticism**

In our main analyses, the influence of three personality traits in moderating the effects of the tapes on mood was examined. First, the moderating influence of neuroticism on the effects of the audiotapes was examined. To examine these effects, multiple regression analyses were used. First, social neuroticism and the dummy variables concerning the experimental condition were entered (i.e., the following contrasts: emotion vs. control, procedural vs. control, and coping vs. control). In the second step, the interaction terms between neuroticism and the dummy variables were entered (see Aiken & West, 1991). Additional regression analyses were performed to examine the other possible contrasts (procedural vs. emotion, procedural vs. coping, and emotion vs. coping), and to obtain the slopes of all four conditions (Aiken & West, 1991). To facilitate interpretation of the results neuroticism was standardized (Aiken & West, 1991).

The regression analysis revealed a main effect of the experimental condition on mood (see Table 1). The patients who listened to the emotion tape reported a significantly more negative mood than those in the control group, $B = 6.06$, $p < .05$. As expected, the analysis also revealed a main effect of neuroticism. Overall, individuals high in neuroticism experienced a significantly more negative mood than those low in neuroticism. In addition, it was expected that those high in neuroticism would experience a more negative mood than those low in neuroticism, especially after listening to the emotion tape and the coping tape.
Because the personality traits were interrelated (neuroticism and extraversion, \( r = -.19, p < .01 \); neuroticism and social comparison orientation, \( r = .22, p < .001 \)), regression analyses were performed with these personality traits as covariates. These analyses produced equal results. To facilitate interpretation, only the results of the initial analyses are reported. Furthermore, because neuroticism, extraversion, and social comparison orientation were correlated with uncertainty about cancer and radiation therapy (\( r = .37, p < .001 \); \( r = -.17, p < .05 \); and \( r = .36, p < .001 \), respectively), regression analyses were performed with these personality traits as covariates. These analyses produced highly similar effects. To facilitate interpretation, only the results of the initial analyses are reported.
Table 2
Regression analysis of negative mood on extraversion (E) and dummy variables D1 (procedural vs. control), D2 (emotion vs. control), and D3 (coping vs. control). Additional analyses yielded interaction effects of D4 (emotion vs. coping), D5 (emotion vs. procedural), and D6 (procedural vs. coping).

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<thead>
<tr>
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<th>R² change</th>
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<td>E x D4</td>
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<tr>
<td>E x D6</td>
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**p < .01, *p < .05, †p < .10

(Hypothesis 2). This was partly confirmed by the data (see Figure 1). Neuroticism was positively related to negative mood, especially among those who listened to the emotion tape, but also among those in the control group. Next, it was examined whether those high and low in neuroticism reported significantly different moods in the different conditions. These post hoc analyses indicated that, among those low in neuroticism there were no differences between conditions. All patients low in neuroticism reported equally low negative moods. However, individuals high in neuroticism did report different moods in the different conditions. Patients high in neuroticism reported a significantly more negative mood after the emotion tape than after the procedural tape, B = 9.73, p < .05, and after the coping tape B = -12.23, p < .01, but not a more negative mood than those in the control group, B = 3.35, ns. Furthermore, those high in neuroticism listening to the coping tape reported a significantly less negative mood than those high in neuroticism in the control group, B = -8.79, p < .05. In other words,
in comparison to the control group, the emotion tape did not improve or worsen mood, while the coping tape did improve mood. It seems that the coping tape served as a buffer to the negative consequences of neuroticism.

**Extraversion**

To examine whether the effects of the tapes were influenced by extraversion, similar regression analyses were performed (see Table 2). Regression analysis revealed a main effect of extraversion on negative mood. Extraverts reported a significantly less negative mood than introverts. Furthermore, it was expected that extraverts would report the least negative mood after listening to the emotion tape (Hypothesis 3). This was not confirmed by the data. Post hoc analyses revealed that extraverts reported equally low negative moods in all conditions (see Figure 2). Furthermore, it was examined whether the differences in mood found among introverts in the different conditions were significant. Introverts
reported significantly more negative moods after the emotion tape than in the control group, $B = 12.96, p < .01$, than after the procedural tape, $B = 15.25, p < .01$, and than after the coping tape, $B = -15.91, p < .01$. In other words, in comparison to the control group, the emotion tape worsened mood among introverts. It seems that for extraverts, it did not matter on which comparison dimension they receive comparison information, but for introverts, it did.

**Social comparison orientation**

To examine whether the effects of the tapes were influenced by the social comparison orientation of the patients, regression analyses were again performed (see Table 3). A significant main effect of social comparison orientation on negative mood was found. Those with a high social comparison orientation reported significantly more negative moods than those low in social comparison orientation. Furthermore, it was examined whether the differences found among

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**Table 3**

Regression analysis of negative mood on social comparison orientation (SCO) and dummy variables D1 (procedural vs. control), D2 (emotion vs. control), and D3 (coping vs. control). Additional analyses yielded interaction effects of D4 (emotion vs. coping), D5 (emotion vs. procedural), and D6 (procedural vs. coping).

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<td>-6.45†</td>
<td></td>
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<tr>
<td>SCO x D5</td>
<td>6.47†</td>
<td></td>
</tr>
<tr>
<td>SCO x D6</td>
<td>.10</td>
<td></td>
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</tbody>
</table>

$** p < .01, * p < .05, † p < .10$
those high in social comparison orientation in different conditions were significant (see Figure 3). Individuals with a high social comparison orientation experienced more a negative mood after listening to the emotion tape than in the control group, $B = 10.73, p < .05$, than after listening to the procedural tape, $B = 14.28, p < .01$, and than after the coping tape, $B = -17.71, p < .01$. In other words, in comparison to the control group, the emotion tape worsened the mood for those high in social comparison orientation. Individuals low in social comparison orientation reported equally negative moods in all conditions.

**Discussion**

In the present study, the moderating influence of neuroticism, extraversion, and social comparison orientation on the effects of three different audiotapes containing different dimensions of social comparison information were examined. Although it was not the focus of the present study, it is important to note that
the majority of the patients did indeed compare themselves with the patients on the audiotapes. These results indicate that although the patients may or may not have used social comparison information to reduce uncertainty and promote cognitive clarity (Kulik & Mahler, 2000), they certainly used the information to compare themselves with the patients on the audiotapes.

Focusing on the research questions, it was found that all three personality traits influenced the effects of the social comparison information on mood. As expected, individuals high in neuroticism reported the most negative mood after listening to the emotion tape. For those high in neuroticism, it is clearly more disturbing to listen to fellow patients talk about their emotions than to listen to fellow patients talk about their experiences with radiation therapy and the way they coped with it. Surprisingly, those high in neuroticism in the control group reported an equally negative mood as those high in neuroticism after the emotion tape. It seems that, for those high in neuroticism, it is very disturbing not to receive an intervention when they know fellow patients did receive an intervention. More importantly, those high in neuroticism who listened to the coping tape reported a significantly less negative mood than those high in neuroticism in the control group. Apparently, the information about positive models on the coping tape was not only less of a threat for those high in neuroticism than expected, but it also seems to have had beneficial effects for them. Because the models on the coping tape were developed to be successful, but not extremely successful, it may be that the models were not successful enough to be threatening. For those low in neuroticism, it did not matter which tape they had listened to. They reported similar moods in all conditions.

Furthermore, it was found that extraversion influenced the effects of the social comparison information. As expected, introverts reported more negative moods after the emotion tape than in the control group, after the procedural tape, and than after the coping tape. It was hypothesized that the emotion tape would evoke more negative moods among introverts than the other conditions, because this tape was more likely to evoke arousal. The finding that the emotion tape evoked more negative moods than the procedural and the coping tapes regardless of the patient's personality supports the notion that the emotion tape evoked the most arousal. It was also expected that extraverts would report the least negative affect after the emotion tape. However, extraverts reported an equally negative mood in all conditions. Even though the emotion tape seemed to evoke the most arousal, extraverts did not seem to favor this tape. It may be that the emotion tape is considered arousal evoking only by introverts and not by extraverts. Further research is needed to examine how emotional information, and emotional social comparison information in particular, affects introverts and extraverts.

Finally, it was found that individuals with a high social comparison orientation reported the most negative mood after listening to the emotion tape. As this tape
Additional analyses were performed to examine whether a three-way interaction (social comparison orientation X neuroticism X experimental condition) could be found. Regression analyses, however, indicated no significant three-way interaction on negative mood. 

Has some aspects that could be construed as downward comparison information, this was not unexpected. Other studies have found that individuals with a high social comparison orientation react more negatively to downward comparisons (e.g., Buunk, et al., 2001). Van der Zee, Oldersma, et al. (1998), for example, found that cancer patients with a high comparison orientation experienced more negative affect following downward comparisons than patients low in social comparison orientation.

These results have several important implications for the existing literature. First, while many studies on social comparison have examined the effects of upward and downward comparisons, our findings clearly indicate that it is of great importance to take the dimension of comparison into account when examining the effects of social comparison information. Second, the present study showed that those high in neuroticism, introverts, and people with a high social comparison orientation react quite differently to social comparison information on the emotion dimension than those low in neuroticism, extraverts, and people with a low social comparison orientation. It is, therefore, important to include personality characteristics in research designs when examining social comparison processes. Third, the fact that the moderating effects of neuroticism, extraversion, and social comparison orientation were evident even when the other related personality traits were controlled for (see Footnote 3), underlines the conceptual independence of neuroticism, extraversion, and social comparison orientation, and only strengthens our findings. Their effects can thus be attributed to the actual moderating variable, and not, for example, to a common factor between neuroticism and social comparison orientation. As Gibbons and Buunk (1999) noted, although social comparison orientation is correlated with neuroticism, they are clearly distinct concepts, with different effects on social comparison processes.

In addition to these theoretical implications, the present study may also have important practical implications. It constitutes as a step forward in ascertaining what kind of social comparison information should be given to cancer patients, and whether different kinds of information should be provided to different patients. This seems to be a question without a clear-cut answer. However, the present study has shed light on some important issues and can thus contribute to an answer. That is, some recommendations can be made, as the results clearly indicate that people with different characteristics react differently to social comparison information on the emotion dimension. In light of these results, it would be unwise to include emotional information in patient education materials.

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3 Additional analyses were performed to examine whether a three-way interaction (social comparison orientation X neuroticism X experimental condition) could be found. Regression analyses, however, indicated no significant three-way interaction on negative mood.
without paying attention to specific characteristics of the patient. However, it may be more practical to provide patients with the procedural or the coping tape, as these seem to have favorable effects for all patients, regardless of personality characteristics.