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### Social comparisons and chronic illness: research synthesis and clinical implications

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## Social comparisons and chronic illness: research synthesis and clinical implications

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The chronically ill patient must adjust to new life circumstances and manage ongoing threats to personal health. Patients often make comparisons with each other, which can have effects on their psychological and physical well-being. One question is whether health psychologists can develop interventions to strategically facilitate the use of such comparisons to optimise adjustment. This paper critically reviews evidence on patients' comparisons in studies using selection, narration and reaction methods. Discussion focuses on gaps in the empirical literature and describes some new basic concepts in social comparison, which may advance knowledge about the process in medical patients. Recommendations also are provided about the kinds of studies needed to inform the future design of effective social comparison interventions.

**Keywords:** social comparison; chronic illness; physical health status; affect; self-perception; motivation

The leading causes of death in the United States are related to chronic physical illnesses for which cures have not yet been discovered (Xu, Kochanek, Murphy, & Tejada-Vera, 2010). Chronic illness often presents patients with behavioural, cognitive and emotional challenges related to ongoing symptom management; if unaddressed, the stress of these challenges can trigger more serious psychological difficulties (e.g., depression; Derogatis et al., 1983; Peveler, Carson, & Rodin, 2002). In addition, chronic illness often requires patients to modify their self-perceptions. Many illnesses limit or eliminate usual functions because of symptoms (e.g., joint swelling in rheumatoid arthritis) or the consequences of treatment (e.g., fatigue resulting from chemotherapy in cancer). Illness also can pose threats to an individual's resources, quality of life and life expectancy (see Bennenbroek, Buunk, Van der Zee, & Grol, 2002). Such threats, particularly as they affect mortality, can produce psychological stress, anxiety and uncertainty about the future (see Stiegelis et al., 2004). Redefining personal identity in the face of such threats necessitates 'cognitive adaptation' (Taylor, 1983) to the circumstances of living with a chronic illness.

The uncertainty that follows from learning one has, and must adapt to, a serious chronic illness raises questions about both the seriousness of the illness and one's

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personal capabilities (Rodriguez-Maran et al., 2000). According to Festinger (1954), people are highly motivated to assess their capabilities and the correctness of their beliefs and opinions in states of uncertainty, and can do so by comparing themselves with others. Social comparison may help to reduce anxiety if one's response to the circumstances is shared by others (Schachter, 1959) or if other people are even more anxious (see Wills, 1981).

Individuals with chronic illness are likely to encounter information about other patients in their daily lives (e.g., observing or conversing with other patients in physician waiting rooms, learning about a patient through media or third parties). Resulting social comparisons can have a variety of effects on self-perceptions, affect and physical health, and the determinants and consequences of these effects are not yet well understood. For example, exposure to someone who is struggling with the same illness may produce a positive or negative response, depending on the context. Learning about an acquaintance that is doing well may trigger frustration about one's own (worse-off) condition, or provide reassurance that symptoms are not immediately life-threatening. Conversely, learning about a poorly functioning acquaintance may foster appreciation of one's (better-off) status or, conversely, signal that one might get worse in the future (Buunk, Collins, Taylor, VanYperen, & Dakoff, 1990; Wills, 1981).

Recognition of the potential health impact of social comparisons has contributed to an increase in research devoted to comparison processes and outcomes among individuals with chronic illness. Researchers have studied the potential benefits of providing opportunities for comparisons, with the goals of identifying: (1) the types of comparisons which are most widely beneficial and (2) individual differences which moderate the effects of comparisons. These empirical efforts, however, have not followed a simple investigative progression. Rather, research has been conducted using a wide variety of assessment methods, illness diagnoses, outcomes and proposed moderating variables (e.g., personality characteristics). Also, although Festinger's (1954) original impetus was social comparison as a factor in group dynamics and social influence, much of the empirical work on comparisons in chronic illness patients has focused on comparison as an intrapsychic process (i.e., comparisons in the absence of group-based social interaction). This theoretical complexity and empirical variety has generated an array of findings, but the heterogeneity of study methods and results is a challenge for integration (and also contraindicates the use of quantitative synthesis methods).

The present review is an integration of current knowledge about predictors and consequences of comparisons for patients with chronic illness. The focus is on patients' individual (intrapsychic) experience of comparing with other patients who have the same illness. The broader social comparison literature has generated a catalogue of findings and principles, which we extrapolate to the patient experience. Throughout this review, we present the most general and pertinent information specific to patients, whilst attempting to preserve significant details. To accomplish this task and make a complex literature comprehensible, we first introduce frequently used social comparison terms, which are relevant to patients with chronic illness. We then present different methodological approaches, delineate the research questions which have been posed and identify the strengths and weaknesses of each approach. Finally, we discuss the implications of current findings for the development and testing of comparison interventions to improve patient health and well-being.

### **Key features of social comparison**

Comparisons vary by dimension, direction, perceived similarity to the target and mode. In this section, each of these distinguishing features and their variations is defined. Later in the empirical review, we discuss how each of these features (i.e., aspects of the comparison process) may influence the outcome of a given comparison. It is worth noting that dimension, direction and mode are considered to be aspects of the comparison target or situation. These aspects are independent of the individual who makes the comparison, although individual differences in each of these aspects (e.g., whether certain individuals make 'X' type of comparison frequently or infrequently) can be measured with various methods. Perceived similarity can be considered a product of both person and target that may show both stable and dynamic characteristics. As we will discuss, the consequences of comparison dimension, direction and mode may depend on how similar patients believe they are to the target.

#### ***Dimension of comparison***

*Dimension* refers to the attribute that an individual uses as the basis for comparison, such as extraversion, proficiency in a foreign language or health status. Festinger (1954) initially identified opinions and abilities as the two primary dimensions of comparison. Schachter (1959) and others suggested that individuals also compare how well they are adjusting to (or coping with) stressful circumstances. As the incidence of serious physical illness necessitates physical and psychological adjustment, patients should be motivated to compare how they are coping to relative to other patients, in addition to comparing prognoses or symptom frequency and severity.

#### ***Direction of comparison***

*Direction* is determined by the standing of the target with whom the comparison is made. Comparisons with an individual who is perceived to be 'better off' are referred to as *upward* comparisons, whereas comparisons with someone 'worse off' are referred to as *downward* comparisons. Evaluations towards others at the same level of skill or status are referred to as *lateral* comparisons.

#### ***Perceived similarity***

The psychological consequences of comparing may depend not only on the direction and underlying attributes of a target but also on the degree of perceived *similarity* with the target. Perceived similarity is akin to the subjective assessment of closeness, shared circumstances or attainment likelihood (e.g., Collins, 1996; Lockwood & Kunda, 1997; Tesser, Millar, & Moore, 1988), which is tied to beliefs about the degree one is currently (or likely to become) like the target. There are different perspectives on these psychological constructs (e.g., Mussweiler, 2003), but we will focus on Buunk and Ybema's (1997) Identification/Contrast Model (I/C Model) because it has been most extensively applied to medical patients. More recent approaches (Mussweiler, 2003; Wheeler, Martin, & Suls, 1997) may help fill gaps and resolve

ambiguities described in the review; these approaches will be described in the General Discussion.

According to the I/C Model, perceiving oneself as, or likely to become, similar to an upward (i.e., better-off) target should induce identification. Identification, in turn, creates optimism and motivation for achieving a particular outcome, such as greater subjective well-being. Contrast with a downward (i.e., worse-off) target (i.e., perceiving oneself as dissimilar; cf. Taylor and Lobel's (1989) 'downward evaluation') should lead to reassurance about one's superior standing. Upward identification and downward contrast are characterised as 'positive-outcome comparisons' because they lead to favourable self-judgements and positive affect.

In contrast to Festinger (1954), who emphasised self-evaluation as the motivation for social comparison, Wills (1981) proposed that comparisons are used strategically to boost subjective well-being (i.e., self-enhancement). As downward contrasts are likely to be self-enhancing, the selective use of downward contrasts may be important when the person feels threatened (e.g., chronic illness) to defend or boost self-esteem (see also Taylor, Wood, & Lichtman, 1983). Conversely, contrast with a superior target may remind people about their lower standing and lead to feelings of inadequacy, frustration or depression. Identification with a downward target also may create expectations of decline, leading to feelings of anxiety, depression and anger. Hence, upward contrast and downward identification are conceptualised as 'negative-outcome comparisons', because they should produce negative affect and unfavourable self-judgements (Buunk & Ybema, 1997).

### ***Mode of comparison***

Finally, learning about relative standing can occur through different *modes*: proximally through *contact* or *affiliation with* a comparison target, or distally by receiving *information* (e.g., mass media, mention of friends). These two different ways of receiving information about relative standing may serve different purposes and have different consequences. For example, Taylor and Lobel (1989) proposed that individuals prefer *information about* downward targets (allowing individuals to evaluate themselves favourably), but prefer *contact with* upward targets (providing instruction, motivation and hope for improvement).

### ***Additional individual difference and situational moderators***

Individual differences and situational factors may increase the likelihood of comparing or selectively interpreting comparison information. For instance, individuals who are high in *neuroticism* or *depressive symptoms* tend to seek out comparison information that confirms their negative views of the world (see Van der Zee, Buunk, & Sanderman, 1996a). This underlying tendency may increase their use of comparisons associated with negative affect (e.g., downward identification; Buunk et al., 1990). The use of, or desire for, comparison information may itself be a person-level characteristic. Buunk and colleagues (Dijkstra, Buunk, Toth, & Jager, 2008; Gibbons & Buunk, 1999) identified trait-like differences, referred to as 'Social Comparison Orientation [SCO]', in '...the extent to which (individuals) are inclined to compare themselves with people or images of others' (Dijkstra et al., 2008, p. 128). Yet, these authors also acknowledge that the desire for comparisons may vary as a

function of circumstances (see Gibbons & Buunk, 1999). For individuals with chronic illness, comparisons should be more likely to occur during times of high anxiety or uncertainty (e.g., increased illness severity) and when objective information about one's status is scarce (Festinger, 1954; Schachter, 1959).

*Perceived control* over the dimension of comparison also can affect comparison consequences. Comparisons on an attribute believed to be highly controllable can provide information about behavioural changes, which might improve personal standing on the dimension in question. For example, Testa and Major (1990) demonstrated the influence of perceived control by showing that individuals who failed a test and were told that they could not improve their scores reported greater negative affect in response to an upward target versus those told that they could improve their scores. With respect to health, a (hypothetical) woman who believes her weight is directly related to diet and exercise (i.e., high perceived control) may feel dejected after an upward comparison (or satisfied after a downward comparison), but become highly motivated to adhere to a diet and exercise regimen. In contrast, someone who believes her genes are the major contributor to being overweight (i.e., low perceived control) may experience positive or negative affect without the benefit of increased motivation for positive behaviour change.

*Type of illness* also may affect the use and interpretation of comparisons (Heidrich, 1996). Some illnesses are more severe and life-threatening; some, if detected early, can be cured; others (e.g., arthritis) are degenerative, which portends a future of reduced role function and increased dependence on others. The extent to which the disease is characterised by symptom flares or abrupt extended episodes also may be critical to the use of comparisons among patients with distinct illnesses. Likewise, perceived control over symptoms may play an important role in the use of comparisons. For example, cancer and arthritis symptoms can be relieved somewhat with self-care, but the progression of these conditions typically is not under direct patient control. In contrast, diabetes and heart disease are both severe conditions, but patient self-management (e.g., of medication adherence, diet and exercise) tends to be associated with better long-term outcome. Thus, cancer and arthritis may be perceived as less 'controllable' than diabetes or heart disease, at least in the long term.

Another factor that may influence patients' use or preferences for upward or downward comparisons is the *length of time* between diagnosis (or treatment) and the time of outcome assessment. As described earlier, some comparisons may be used to adjust to a new lifestyle or reduce initial distress, which suggests that comparisons might be most beneficial immediately after diagnosis. Over time, patients' use of social comparisons might change, either with reference to specific types of comparisons or the overall frequency of comparison. Patients with degenerative illnesses actually might increasingly use (specific) comparisons as the symptoms worsen over time.

### **Methodological differences in approach to assessment**

Social comparison instigated intentionally by the individual, versus by external, context-dependent cues (i.e., casual or forced exposure; Gilbert, Giesler, & Morris, 1995; Suls, 1986) may have distinct affective, behavioural, or self-evaluative motivations and consequences. Further, how social comparison activity is assessed

may affect the conclusions drawn about both the process (i.e., steps involved in comparing with others) and outcomes. We use this rationale in developing our framework for presenting the results of relevant studies; that is, according to the method used to capture comparison.

Wood's (1996) taxonomy of comparison assessment methods provides a comprehensive, intuitive and recognised approach to organising the description of the process features and outcomes for patients with chronic illness. She (Wood, 1996) distinguished among selection, narration and reaction methods. *Selection methods* present opportunities for patients to consciously choose information about someone who is doing well or doing poorly. For example, patients may be told that they can choose between two packets of information – one about a 'better off' patient (i.e., upward target) and one about a 'worse-off' patient (i.e., downward target). Studies using this method capture the choice of one target rather than another (or several others). According to Wood (1996), selection methods permit researchers to identify the conditions under which certain comparisons are made. Cross-sectional analyses also can be used to study whether certain comparison choices are associated with positive or negative health-relevant experiences (e.g., satisfaction with life, depressive symptoms).

*Narration methods* collect descriptions of naturally occurring comparison activity, as reported by patients. This approach typically employs forced-choice or open-ended items, which are presented verbally (in interviews) or in written form (in paper-and-pencil or electronic questionnaires). Explicit items such as 'how often do you compare yourself to people who are better off than you are?' (upward comparison) are rated by the patients or coded by researchers. Less explicit questions inquire about illness experiences, allowing patients the opportunity to spontaneously mention comparisons. Narration studies most often rely on global, retrospective self-reports, thus introducing the potential for recall biases. A handful of studies, however, have included 'naturalistic' assessment of comparisons as they occur in daily life (e.g., Bogart & Helgeson, 2000). Narration methods thus typically provide for cross-sectional analysis of, and conclusions regarding, comparisons as they co-occur with other experiences (e.g., illness symptoms).

*Reaction methods* use experimental or quasi-experimental designs to manipulate the receipt of social comparison information and subsequently measure patient responses. Patients are typically exposed to a target (often vs. no exposure) or to one of several targets that differ on one or more features (e.g., dimension). Experimental methods have most often been used to test basic predictors and consequences of social comparison (e.g., personality characteristics, affective response). Fewer studies have been conducted to assess whether comparison information produces beneficial effects (i.e., interventions); as noted, however, interest in this area has recently increased. Investigation of the potential benefits of comparison may be particularly informative about improving patient care, as certain comparisons may be related to positive health outcomes, processes and/or behaviours. Nonetheless, the concurrent use of multiple research methodologies continues to inform our understanding of comparison processes and outcomes.

As previously mentioned, assessment of comparisons has been diverse; such diversity has resulted in distinctions that are even more fine-grained than Wood's taxonomy. For instance, Wood does not explicitly distinguish between studies that differ in terms of item response options or time orientation, but these differences may

affect patients' interpretations of, and responses to, various comparisons. In the present review, we attempt to track these distinctions without becoming lost in minutia. Separate tables, rather than text, are devoted to each type of assessment; critical differences are also highlighted in the text.

### **Social comparison in chronic illness: summary and goals of the present review**

Extant work based on Festinger's (1954) original theory shows that the use, interpretation and outcome of a comparison is a function of multiple contextual and individual difference variables, including the method for assessing comparison behaviour (Wood, 1989). In the last 30 years, social comparison theory has been applied extensively in the area of chronic illness. The patient's experience of chronic physical illness, particularly for cases with vague prognosis (i.e., ambiguous objective information), may present an ongoing threat to self-concept and create uncertainty about current and future health status. Such uncertainty should prompt patients to use social comparison to both reduce uncertainty and restore a sense of self (Heidrich & Ryff, 1993). Potential treatment implications of social comparison (e.g., Buunk, Gibbons, & Visser, 2002) have been discussed, and a small set of studies have examined the effects of incorporating comparison information into psychosocial interventions.

The most recent comprehensive treatment of this subject was published as an edited volume some time ago (Buunk & Gibbons, 1997). Several articles appearing since then have introduced new patient populations and sophisticated research designs. As such, an updated review of the empirical literature appears needed to summarise the current state of the science regarding the use and responses to comparisons made by individuals with chronic illness.<sup>1</sup> In addition, we hoped to identify empirical lacunae and make concrete recommendations for future work, with particular focus on the design of comparison interventions to improve the quality of life and physical health of the chronically ill patient.

### **Organisation of the present review and research questions**

The selection, narration and reaction methods provide answers to somewhat different questions about comparison. The present review will treat each comparison assessment method separately and consider the possible impact of moderating variables before presenting more general conclusions. The following research questions will be addressed:

#### ***Selection methods***

Do patients behaviourally demonstrate a preference (e.g., select one target from a range of options) for certain comparison targets when provided with a choice? Do responses to explicit questions about comparison preference (assessed with narration methods) differ from implicit behavioural indices of preference?

***Narration methods***

How are comparisons typically assessed with these methods? When asked to respond to specific questions about their comparison activity, how do patients with chronic illness evaluate the need, desire, frequency and affective consequences of comparisons? What kinds of patient experiences are associated with different types of comparisons?

***Reaction methods***

How have comparisons been induced? What affective, behavioural and health consequences result from 'forced' exposure to comparison targets? What are the treatment implications of these comparisons?

***Moderating variables***

What individual differences (e.g., neuroticism) or situational factors (e.g., uncertainty, mode of comparison) affect the comparison process and outcomes? Of note, moderating variables are integratively reviewed with respect to each method category and are addressed collectively in our Discussion.

***The implementation question***

A critical question is whether existing knowledge about social comparison in chronic illness is sufficiently advanced to develop psychosocial interventions to promote good health. If the answer is 'yes', then what recommendations follow from the evidence? If the answer is 'no', then what kinds of research are needed before social comparison interventions can be implemented?

**Method*****Literature search***

Web-based literature databases (PsychINFO, PsychARTICLES, MEDLINE) were used to identify peer-reviewed articles relevant to social comparison processes among individuals with chronic illness. Keywords included *social comparison*, *other to self comparison* and *(need for) affiliation*, in combination with *illness*, *chronic illness* and *health*. Abstracts for resulting citations were scanned to determine the use of a chronic illness sample (described below). The reference list of each article was then manually searched to identify additional literature that was not generated through database searching (i.e., back-citations). An initial search was conducted between September 2008 and February 2009; additional searches were conducted periodically between June 2009 and January 2011. As a result, studies that were published between 1954 (Festinger's seminal social comparison publication) and December 2010 were eligible for inclusion in the present review. Studies that met the inclusion criteria (see below) were all published between 1985 and 2010.

### ***Inclusion criteria***

Published articles were included in the present review if five criteria were met. First, articles were only included if they were available in English. Second, participants in each study had to be adults (i.e., age 18 and older), as children's comparison processes may be different than those of adults (see Ruble & Frey, 1987). Third, participants had been diagnosed with a chronic physical illness, defined as 'long-lasting' or 'irreversible' (Helgeson, 2004), with patient status determined via self-report or physician identification.<sup>2</sup> Chronic mental illness (e.g., schizophrenia) and conditions resulting from accidents (e.g., traumatic brain injury) were not reviewed. Comparison processes in these patients may be distinct from comparison processes among individuals with chronic physical illness, in terms of the difficulties associated with each class of conditions and the importance assigned to comparison information.

Studies of patients with chronic pain not attributable to a known medical or organic condition also were not included for several reasons. Individuals whose physical symptoms are not attributable to a known disease process are distinct from other patients: these individuals are often subject to an ongoing search for medical explanations, and may thus have repeated, negative interactions with the health care system (Fink & Rosendal, 2008; Nimnuan, Hotopf, & Wessely, 2000; Ursin, 1997), which perpetuate chronic high anxiety and uncertainty about their conditions. These subjective states may affect the use or importance of comparisons among chronic pain patients differently from patients whose symptoms can be traced to a specific diagnosis – leading to social comparisons and outcomes that are qualitatively different in this subpopulation. Because the proposed differences between patients with specific diagnoses already present a complex picture, the inclusion of additional, qualitatively distinct diagnoses could limit the ability to draw concrete conclusions. Readers interested in social comparison applications to chronic pain are referred to Tennen and Affleck (1997).

Fourth, the social comparisons captured in a given study had to use other patients with the same illness or condition as comparison targets. Protocols that inquired about patients' comparisons with other patients and with non-patients (in the same study) were included. Fifth, assessment of social comparison had to be either explicit (i.e., through the use of a self-report technique) or inferred using a face-valid process (e.g., differences between experimental conditions based on the opportunity for social comparison to occur, high inter-rater reliability for coding qualitative data). Studies that relied on objective sociodemographic information (e.g., household income) as a proxy for social comparison were excluded because comparison was neither assessed nor manipulated directly. Such data may be representative of individuals' daily experiences, but they provide sparse information about comparison processes. In any case, few studies that used this methodology with patients were available.

Some related research areas were beyond the scope of the present review. Affiliation can involve social comparison, but affiliation is driven by many other motives (Rofé, 1984). For this reason, only those affiliation studies which explicitly assessed social comparison, or provided a compelling conceptual justification for their occurrence, were included. 'Norm referencing' and 'prototype' studies, which involve evaluation of what is 'typical' for a given situation, were also excluded. Norm

referencing studies address participants' perceptions of typical behaviour (or attitudes towards that behaviour) in a particular social group (e.g., college students; see Blanton, Köblitz, & McCaul, 2008). The comparison dimension in these studies is often a deliberate, voluntary behaviour such as alcohol consumption or cancer screening. These dimensions are distinct from social comparison dimensions relevant to patients with chronic illness (e.g., illness severity, coping), which may be under less conscious control. Also, norm referencing and prototype research tend to focus on adolescent and young adult populations who do not suffer from chronic illnesses. Therefore, this research was not included.

Finally, patient support groups may provide opportunities for comparison and generate potentially useful information for the purpose of social comparison intervention design (e.g., Carmack Taylor et al., 2007; Floyd & Moyer, 2010). But social comparison processes that occur in group interaction (vs. reading about or affiliating with one other patient) allow for multiple, simultaneous comparison opportunities; as a result, selection and reaction (which may occur several times in one session) rely on the synthesis of information from numerous sources. This adds layers of complexity to a literature that is already fraught with heterogeneity. We thus consider social comparison (and other dynamic processes) occurring in support groups as an issue that warrants separate consideration.

### ***Included work***

A total of 37 accessible studies met the inclusion criteria. Seventeen (46%) of these studies used samples of current or past (i.e., in remission) cancer patients. The remainder of the studies reviewed included patients diagnosed with arthritis ( $n = 5$ ), cardiovascular disease ( $n = 7$ ), multiple sclerosis ( $n = 1$ ), Ménière's disease ( $n = 2$ ), HIV ( $n = 1$ ), sickle cell disease ( $n = 1$ ) and diabetes mellitus (types 1, 2, or both;  $n = 4$ ). Several studies used multiple methods to capture social comparisons. Studies were categorised by method (rather than by single publication), and so a few are discussed in multiple sections of this review. Two studies used selection methods to assess participants' observable comparison preferences; 21 studies examined associations between comparison processes and other psychological experiences with narration methods; 23 studies described the results of reaction methods using relative evaluation or manipulated comparison targets.

## **Results**

### ***Selection methods: behavioural demonstrations of comparison preference***

There were only two studies – one with a cancer sample and the other with a rheumatoid arthritis sample – that provided patients with the opportunity to choose between comparison targets. Despite the small number, the selection studies are considered as they provide perspective and potential validation of results based on hypothetical choices and retrospective reports. The results of selection methods also can shed light about whether a specific kind of comparison produces a particular outcome and/or is consistent with the outcomes of multiple instances of that comparison (assessed by narrative methods). Table 1 lists the key findings in selection studies.

The first study used various methods to capture social comparison. The selection method asked patients with rheumatoid arthritis to choose between folders containing information about upward or downward targets (DeVellis, Holt, Renner, & Blalock, 1990). These patients chose downward targets more often than upward. Immediate affective consequences of the comparison choices were not evaluated, but the global 'affect' composite (including trait depressive symptoms and self-esteem) was unrelated to subsequent comparison choice.

In the second selection study, cancer patients had access to multiple computerised descriptions of other patients and were allowed to spend as much time as they liked on each description (Van der Zee et al., 1998b). Patients who rated their social comparison orientation (SCO) as high selected more interviews than did patients

Table 1. Selection studies of social comparison among patients with chronic illness.

Authors	Year	Diagnosis	<i>N</i>	Features assessed	Key findings
DeVellis, Holt, Renner, Blalock, Blanchard, Cook, Klotz, Mikow, and Harring	1990	Rheumatoid Arthritis	71	Direction Overall affect	Folders containing information about downward targets were selected more often than folders containing information about upward targets; folder choice not associated with 'negative affect' composite of depression and self-esteem
Van der Zee, Oldersma, Buunk, and Bos	1998	Cancer (various)	88	Direction Overall affect Affective consequences	Written interviews with upward targets were selected more often than those about downward targets; higher neuroticism related to selecting to read a higher number of interviews, longer time spent reading the interviews, and more post-reading negative affect; neuroticism not related to recall of information; greater proportion of upward interviews related to longer time spent reading, more positive affect (in general and post-reading), and less negative affect (in general and post-reading)

who were low in SCO; patients with greater SCO also spent marginally more time reading about targets. Patients chose more upward targets than downward and spent more time reading about upward targets than about downward targets. Patients who chose more upward targets also reported more general positive affect and more positive affect in direct response to upward targets, relative to patients who chose to read about downward targets. Those patients who chose downward targets more frequently also reported more general negative affect and more negative affect in response to downward targets. Patients who scored higher in neuroticism selected more interviews, spent more time reading the interviews and reported experiencing more negative affect in response to comparison than did patients who scored low in neuroticism. Comparison direction and neuroticism were not related to patients' recall of target information.

### **Selection methods: summary and critique**

In the available selection studies, cancer patients preferred to read about upward targets, whereas arthritis patients preferred to read about downward targets. This disparity might be attributed to aforementioned differences in the nature of cancer versus arthritis (e.g., degree to which the illness is life-threatening or degenerative). Because cancer can (in some cases) be overcome, patients may look for examples of how to survive the illness (i.e., upward targets); as arthritis is progressive, and thus often offers a future of deterioration, patients may look to worse-off others (i.e., downward targets) for examples of possible future selves. Additional research using selection methods is needed to confirm the different patterns for the two diseases, to examine motivations for such choices, and to determine whether other physical ailments with similar features show the same pattern of selections. For example, Menière's disease is not life-threatening but is degenerative and interferes with daily activities. These features of Menière's suggest it shares more with arthritis than with cancer. Therefore, a reasonable hypothesis is that Menière's patients also should select downward targets, rather than upward.

With respect to affect, cancer patients who reported greater global positive affect chose to read about upward targets more often than downward, which led to positive feelings *immediately after* reading (more so than reading about downward targets). Conversely, cancer patients who reported more global negative affect chose to read about downward targets, which led to immediate negative feelings – especially for patients with a neurotic outlook. This negative impact of downward comparisons stands in contrast to Wills' (1981) prediction that downward comparisons increase satisfaction with personal standing (and thereby positive affect). Perhaps, additional features of the comparison context moderate responses to targets that are deliberately selected.

### **Methodological issues**

There were several methodological differences between the two studies discussed above. Most noteworthy was the variation in the number of available comparison targets. Arthritis patients were allowed access to only one target, whereas cancer patients had multiple comparison opportunities. Patients with chronic illness undoubtedly encounter each of these situations in daily life (e.g., meeting another

patient in a doctor's waiting room, reading or hearing about multiple patients from family, friends or media). This variety in assessment captures 'real-world' differences in comparison experiences; as noted, however, each method addresses different research questions.

Providing patients with an explicit choice between two targets generates information about a specific, and limited, decision related to comparison preference. The multiple comparison design also provides a general indication of between-person comparison 'preference' (i.e., what type of target was selected the greatest number of times), but introduces other situational factors. The multiple comparison design taps within-person processes related to initial decision, such as cognitive or affective reactions to targets, which determine the order of selection and the speed of reading comprehension. The differences between the methods of the two available selection experiments permit only tentative conclusions about patients' target selection(s). The role of comparison mode or dimension also cannot be addressed because these variables have not been assessed with selection methods. This significant gap in the literature should be addressed by future researchers.

### **Narration methods: rating scales and associated experiences**

In this section, comparison preferences and affective consequences from studies using narration methods are summarised. With comparison preference and affective consequences as broad headings, we first discuss the ways in which these variables have been measured. Then findings will be reviewed on the use of comparisons as a function of direction, dimension and mode (if available), and about specific experiences associated with comparison preferences and affective consequences (e.g., uncertainty, measures of psychological well-being). This section concludes with a discussion of methodological considerations associated with narration methods.

### **Measurement of social comparisons using narration methods**

The specific comparison features most commonly assessed in narration measures were overall need for comparison (contact or information; Bennenbroek et al., 2002; Van der Zee et al., 1996a, 1996b), frequency of downward and/or upward comparisons (Heidrich, 1996; Hemphill & Lehman, 1991; Van der Zee et al., 1996a; Wilson, Gil, & Raezer, 1997), preferred direction of comparison (including contact or information; Bennenbroek et al., 2002; Helgeson & Taylor, 1993; Molleman et al., 1986; Van der Zee et al., 1996a) and frequency of positive or negative affect experienced as a result of upward and/or downward comparisons (Buunk et al., 1990; Dibb, 2009; Helgeson & Taylor, 1993; Hemphill & Lehman, 1991; Van der Zee et al., 1996a; Van der Zee, Buunk, Sanderman, Botke, & van den Bergh, 1999).

In addition, overall level of discomfort while comparing to others (Hemphill & Lehman, 1991), level of discomfort comparing to specific targets (upward or downward; Helgeson & Taylor, 1993; Molleman et al., 1986) and the perceived utility of specific comparisons (e.g., 'how informative was the comparison with someone doing better than you are?' Helgeson & Taylor, 1993; Molleman et al., 1986) have been assessed, albeit with less frequency. Items have been presented in both forced-choice and open-ended formats; the latter are coded by multiple independent raters (for comparison direction and dimension) to ensure consistency of categorisation.

Other narration methods, including verbal counts of comparisons elicited by research interviewers (coded on various aspects of comparison, e.g., dimension; Buunk et al., 1990; Helgeson & Taylor, 1993; Taylor, Aspinwall, Giuliano, & Dakof, 1993, Study 1) and naturalistic assessment (i.e., daily ratings completed at home; Bogart & Helgeson, 2000) have been used to assess the overall frequency or specific instances of comparisons. Patient responses to verbal elicitation of comparisons have been classified by their predominant comparison direction; categories are then compared to assess differences in other psychological or physical experiences. Despite the absence of fixed-choice responses, comparisons extracted in this way are prompted by the researcher and should be considered as distinct from spontaneous patient comparisons. In particular, 'naturalistic' assessment reduces retrospective self-report recall biases by limiting the time between occurrence and measurement of the experience and may offer enhanced ecological validity (see Bogart & Helgeson, 2000; Smyth & Heron, in press).

Directional preferences and frequency of affective consequences have been assessed in two ways. The first approach asks respondents which category applies to them (e.g., upward vs. downward targets for preferred direction, positive vs. negative affect for affective consequence). In this method, respondents choose one category over the others available (see Tables 2 and 4). In the second approach, respondents rate each option on a Likert-type scale and then the ratings are compared (e.g., 'how often do you experience positive affect as a result of upward comparisons?') (see Tables 3 and 5). This method allows patients to express equal desire for (or response to) different comparisons, which forcing them to choose one category does not, and allows researchers to calculate the magnitude of difference between desire for (or response to) distinct comparison targets. In addition, some studies have respondents reflect on their recent comparisons, believed to have *occurred in the past*; other items ask respondents what types of comparisons they *would want in the future*. It is likely that these approaches may tap two different processes – a patient may report consistently relying on one comparison strategy (past; see Tables 4 and 5), but may report preferring to use a different type of target if given a choice (future; see Tables 2 and 3).

## **Findings for comparison preference**

### ***Need for comparison and comparison preference (direction)***

General need for comparison has been assessed and reported only in cancer patients, who report being moderately interested in comparisons (i.e., close to the midpoint of the rating scale; Bennenbroek et al., 2002; Van der Zee et al., 1996a, 1996b). Greater feelings of uncertainty were associated with a higher need for comparison in one cancer sample (Bennenbroek et al., 2002), but not in another (Molleman et al., 1986). Greater reported need for comparison was associated with depressive symptoms and poorer health (both significant predictors of higher need; Bennenbroek et al., 2002), increased psychological distress (Van der Zee et al., 1996b) and elevated neuroticism (Van der Zee et al., 1996a). In contrast, physical distress (Van der Zee et al., 1996b), perceived control (Bennenbroek et al., 2002), extraversion and psychoticism (Van der Zee et al., 1996a) were unrelated to need for comparison.

Table 2. Narration studies of social comparison among patients with chronic illness (future preference – category).

Authors	Year	Diagnosis	N	Features assessed	Key findings
DeVellis, Holt, Renner, Blalock, Blanchard, Cook, Klotz, Mikow, and Harring	1990	Rheumatoid Arthritis	71	Direction Overall affect	Preference for information about downward targets when items are self-referent (i.e., target is doing better/worse ‘than you’); preference for downward comparison associated with higher composite of depression and low self-esteem (called ‘negative affect’)
Kulik and Mahler	1989	Cardiovascular Disease (preoperative)	70 (male)	Direction Motivation	Preference for postoperative roommates (upward targets), particularly if present roommate was postoperative; most common reasons for postoperative preference were to gain useful information about the experience and to increase confidence in survival/recovery
Helgeson and Taylor	1993	Cardiovascular disease (surgical rehabilitation)	60 (male)	Direction	Highest proportion of sample reported comparisons related to physical health (47%), versus other domains; higher frequency of comparison associated with greater use of upward comparisons; no association between psychological distress and comparison preference; majority of sample (60%) reported preference for upward <i>contact</i> -most preferred a ‘slightly better off’ target (vs. ‘much better off’ target); indirect assessment reflected downward evaluation; greater time since surgery and better (objective) performance related to use of downward evaluation

Table 3. Narration studies of social comparison among patients with chronic illness (future preference – ratings).

Authors	Year	Diagnosis	N	Features assessed	Key findings
Bennenbroek, Buunk, van der Zee, and Grol	2002	Cancer (various)	60	Direction mode	Highest number of patients rated preference (for information and contact) for lateral targets; greater preference for information from (vs. contact with) upward targets; greater preference for upward coping targets (vs. upward illness severity targets); greatest preference for information from upward targets on coping dimension; higher uncertainty positively associated with preference for information from upward coping targets
Molleman, Pruyn, and van Knippenberg	1986	Cancer (various)	418	Direction	High need for comparison associated with increased inaccessibility of objective information; need not associated with level of uncertainty, but higher need related to increased ratings of ‘informativeness’ of comparison; moderate level of anxiety most highly related to need for comparison; higher anxiety negatively associated with desire for upward comparisons; similar others (lateral targets) rated as most informative, downward targets rated as least informative; majority preference for contact with lateral or slightly upward target
Van der Zee, Buunk, and Sanderman	1996	Cancer (various)	475	Direction Dimension Mode Affective consequences	High neuroticism related to greater need for comparison, preference for upward comparison, and higher negative affect in response to upward and downward comparisons; neuroticism unrelated to positive affective consequences

Table 4. Narration studies of social comparison among patients with chronic illness (recalled preference – category).

Authors	Year	Diagnosis	<i>N</i>	Features assessed	Key findings
Blalock, DeVellis, and DeVellis	1989	Rheumatoid Arthritis	76 (female)	Direction	Preference for (downward) comparisons to RA patients with respect to functional difficulties, but preference for non-RA comparison targets with respect to desired performance on everyday tasks; preferences predicted greater satisfaction with functional abilities; assessments of relative ability was not related to perceived ability for those whose targets were RA patients
Blalock, DeVellis, DeVellis, and Sauter	1988	Rheumatoid Arthritis	75 (female)	Direction	Preference for (downward) comparisons to RA patients with respect to functional difficulties, but preference for non-RA comparison targets with respect to desired performance on everyday tasks; preferences predicted greater satisfaction with functional abilities, but was unrelated to psychological well-being
Bogart and Helgelson	2000	Breast cancer	93 (female)	Direction Affective Consequences	Comparisons occurred approximately once per week (daily diaries) and decreased in frequency over 8 weeks; majority of comparisons were downward (53%) and majority had positive affective consequences (57%); highest proportions per individual were downward and positive; more downward comparisons were positive than negative (but affective proportions were equal for lateral and upward comparisons); high self-esteem associated with fewer negative-outcome upward comparisons overall; high self-esteem, less perceived control over illness, and greater uncertainty associated with increased downward comparisons over 8 weeks; higher proportion of negative-outcome upward comparisons associated with decreased perceived control over 8 weeks

Table 4 (Continued)

Authors	Year	Diagnosis	N	Features assessed	Key findings
Buunk, Collins, Taylor, VanYperen, and Dakof (Study 1)	1990	Cancer (various)	55	Direction Affective Consequences	Highest number of participants reported positive-outcome downward comparisons (82%), followed by positive-outcome upward comparisons (78%); least common were negative-outcome downward comparisons; most common dimension was prognosis; positive affective consequences more common than negative; high self-esteem related to less frequent negative-outcome upward comparisons; higher perceived control over illness related to fewer negative-outcome downward comparisons
Dibb and Yardley (Study 2)	2006	Meniere's disease	196	Direction Affective Consequences Identification/ contrast	Positive-outcome upward comparisons most common, followed by negative-outcome upward comparisons and then both types of downward comparisons; negative-outcome comparisons associated with downward identification and upward contrast; positive-outcome comparisons associated with upward identification and downward contrast; reduced performance in multiple domains of physical and emotional functioning associated with negative-outcome upward and downward comparisons; affective consequences of lateral comparisons clustered with upward comparisons (factor analysis); no differential effects based on dimension of comparison (i.e., coping vs. illness severity)
Stanton, Danoff-Burg, Cameron, Snider, and Kirk	1999	Breast cancer	94 (female)	Direction Affective Consequences	Self report of positive affect from previous comparisons: upward rated as related to greater inspiration/comfort than frustration/ depression, and downward related to greater gratitude than anxiety/fear

Table 4 (Continued)

Authors	Year	Diagnosis	N	Features assessed	Key findings
Van der Zee, Buunk, DeRuiter, Tempelaar, and Sanderman	1996	Cancer (various) vs. healthy controls	475. 225 (each 71% female)	Direction	No difference in subjective well-being or overall need for comparison between patient and healthy groups; patients reported more frequent downward comparisons and higher relative evaluations (health of self vs. other patients); greater psychological distress related to greater need for comparison; among patients, path model supported pathway from physical distress to psychological distress, then need for social comparison, frequency of downward comparison, relative evaluation, and subjective well-being; meditational pathway from distress to well-being via social comparison (need, downward, and relative evaluation) also supported
Wood, Taylor, and Lichtman	1985	Breast cancer	78 (female)	Direction Dimension	Downward comparisons more common than upward with respect to both illness severity and coping; some downward illness severity comparisons perceived as threatening; downward comparisons not associated with patient prognosis or degree of perceived social support; increased downward comparison related to more recent surgery (relative to surgery more distant in time)

Table 5. Narration studies of social comparison among patients with chronic illness (recalled preference – ratings).

Authors	Year	Diagnosis	<i>N</i>	Features assessed	Key findings
Dibb	2009	Meniere's disease	370	Direction Perceived similarity	High ratings for positive upward comparison (identification) related to high perceived post-traumatic growth (at Time 1); high negative upward comparison (contrast) related to high 'appreciation for life', 'relating to others', and 'new possibilities'(at Time 1); greater social comparison for information predicted change in perceived personal strength (at 10-month follow-up); high negative downward comparison (identification) associated with decreased perceived personal strength (at 10-month follow-up)
Helgeson and Taylor	1993	Cardiovascular disease (surgical rehabilitation)	60 (male)	Direction Mode Affective consequences	Forty percent (40%) of sample reported 'never' comparing to other patients because doing so is uninformative; most common comparison dimensions were physical condition (severity/progress) and attitudes/feelings; presence of comparison not related to time since surgery, but longer time in surgery associated with more frequent downward comparison; higher reported affiliation with upward targets associated with more frequent comparisons; lateral and downward (explicit) comparisons more common than upward, but upward contact more common than lateral or downward; more frequent downward comparison related to higher self-esteem; both upward and downward comparison associated with positive (e.g., 'inspired') and negative (e.g., 'uncomfortable') affect

Table 5 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Features assessed	Key findings
Heidrich	1996	Breast cancer and Osteoarthritis	102, 86 (female)	Direction Overall Affect Affective Consequences	Somewhat higher ratings for positive (vs. negative) consequences of both upward and downward comparisons; frequency of upward comparisons and positive affect as a result of upward comparison negatively related to depressive symptoms and positively related to well-being; positive affect as a result of upward downward comparison negatively related to depressive symptoms and positively related to well-being
Hemphill and Lehman	1991	Multiple sclerosis	151	Direction Dimension Affective Consequences	Downward comparisons more common than upward; positive affective consequences more common than negative; order of frequency: positive-outcome downward based on illness severity, positive-outcome downward based on coping, positive-outcome upward based on illness severity, positive-outcome upward based on coping; frequency of downward comparison positively associated with frequency of upward comparison; positive affective consequences of downward comparison related to positive affective consequences of upward comparisons (negative affective consequences also related); both positive and negative affect higher after downward illness severity comparison vs. downward coping comparisons; high perceived appropriateness of comparisons related to positive affective consequences of downward comparisons
Molleman, Pruyn, and van Kippenberg	1986	Cancer (various)	418	Direction	Interaction with patients doing much better than the self (upward targets) rated as least negative, relative to lateral or downward targets

Table 5 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Features assessed	Key findings
Van der Zee, Buunk, Sanderman, Botke, and van den Bergh	1999	Cancer (various)	112	Direction Overall affect Identification/ contrast	Neuroticism positively related to downward identification (unrelated to upward identification, upward contrast, or downward contrast); neuroticism and downward identification both positively related to depression and uncertainty, negatively related to physical well-being and mastery; downward identification mediated the relationships between (1) neuroticism and uncertainty and (2) neuroticism and mastery; extraversion related to upward contrast, upward identification, and downward identification
Van der Zee, Buunk, Sanderman, Botke, and van den Bergh	2000	Cancer (various)	112	Direction Overall affect Identification/ Contrast	Greater upward and downward identification, active coping, seeking social support, and venting emotions at the beginning of treatment (vs. end); active coping positively associated with positive-outcome comparisons (upward identification and downward contrast)
Wilson, Gil, and Raezer	1997	Sickle Cell Disease	47	Direction Overall affect	Recalled upward and downward comparison not related to one another (study-specific scale); downward comparison negatively related to depressive symptoms; upward comparison positively related to depressive symptoms, and negative thoughts (in general and in response to pain; comparison composite accounted for 27% of variance in depressive symptoms

Individuals reporting a higher need for comparison did not express a future-oriented *preference* for upward or downward comparison information (Van der Zee et al., 1996a; see Tables 2 and 3), but did rate their *past frequency* of downward comparisons as higher (vs. individuals with a lower need) (across various samples: Van der Zee et al., 1996a, 1996b; see Tables 4 and 5). This is an example of recall of (past) comparison activity as divergent from stated preference – suggesting that actual and desired comparisons may not follow the same pattern. More generally, this demonstrates the need for the careful consideration of measurement items, wording, etc., in these studies.

Reports of typical or preferred direction of comparison also may shed light on what type of comparison opportunities were available or remembered (e.g., encounters with patients who are doing worse) and what comparison strategies patients were motivated to adopt. Patients endorsed the use of both upward and downward comparisons; their global ratings of frequency (Buunk et al., 1990; DeVellis et al., 1990; Heidrich, 1996; Hemphill & Lehman, 1991; Van der Zee et al., 1996b), naturalistic assessments (Bogart & Helgeson, 2000) and indirect evaluations (i.e., separate ratings of the self and the target; Helgeson & Taylor, 1993) indicated that, in general, downward comparisons were more common than upward (see Tables 4 and 5).<sup>3</sup> Patients' explicit statements about preference also exhibited a predominant interest in downward targets (Blalock, DeVellis, & DeVellis, 1989; DeVellis et al., 1990), although patients high in neuroticism preferred upward targets (Van der Zee et al., 1996a; see Tables 2 and 3). Direction of recalled comparisons was unrelated to state-like psychological distress (e.g., depression) or medical status (Helgeson & Taylor, 1993), and was not associated with illness prognosis (Buunk et al., 1990). When asked to endorse comparisons that varied in both direction and perceived similarity, identification was somewhat more common than contrast (for upward and downward comparisons; Van der Zee, Buunk, Sanderman, Botke, & van den Bergh, 2000).

In sum, patients, on average, report a moderate level of interest in comparison. Physical health status appears unrelated to need for comparison or comparison preference. Patients who are in worse psychological health often express a greater need for comparison, but do not differ in their use of upward (vs. downward) comparisons, relative to those in better psychological health. As Festinger (1954) predicted, uncertainty tends to be associated with greater need for comparison. Although patients with a higher need to compare report making more downward comparisons (vs. upward), need for comparison is not related to increased preference for upward or downward comparison when both options are presented. These results about the need for comparison require replication in (extension to) patients with illnesses other than cancer. Retrospective recall of comparison activity by patients with cancer, rheumatoid and osteoarthritis, and cardiovascular disease also suggests that downward (vs. upward) comparisons are made more frequently in everyday life. Among patients with cancer, there is some evidence that individuals who are highly neurotic actually prefer upward targets. The aforementioned effects seem to be moderated by patient attributes or features of the situation, which are considered next.

### ***Dimension of comparison and comparison preference***

Blalock and colleagues (Blalock, DeVellis, DeVellis, & Sauter, 1988; Blalock et al., 1989) distinguished between comparisons based on current (or recent) difficulty

performing daily tasks, versus those about desired performance on these tasks, among rheumatoid arthritis patients. These studies captured patients' *future-oriented* or *hypothetical* preferences for desired performance targets (e.g., 'if given the choice, which of the following targets would you prefer?'; see Tables 2 and 3) and their *recalled* comparisons of performance difficulty (e.g., 'When you have difficulty performing X, how often do you think about other people with RA?'; see Tables 4 and 5). Arthritis patients recalled more frequent comparisons with patients (vs. nonpatients) – particularly downward targets – with respect to performance difficulty, and such comparisons toward other patients predicted greater satisfaction with dexterity. In contrast, arthritis patients expressed future-oriented preference for non-patients as targets for comparisons of desired performance, and these comparisons predicted satisfaction with dexterity. Blalock and colleagues explained their findings in terms of implied direction and motives. When considering the severity of their illness, arthritis patients prefer to compare with worse-off individuals (i.e., other patients), which seems compatible with a self-enhancing motive. Patients prefer to compare with better-off individuals (i.e., non-patients), however, when considering their goals, as these comparisons may provide motivation and hope for improvement.

Associations between reports of *prior* comparisons and well-being support this explanation. More frequent comparisons with other arthritis patients regarding performance difficulty were associated with higher positive affect and lower depression (Blalock et al., 1989) than were comparisons with non-patients. Frequency of performance difficulty comparisons with other arthritis patients and desired performance comparisons with non-patients predicted satisfaction with personal level of ability (Blalock et al., 1989), and satisfaction with level of dexterity, beyond the effect of self-ratings of absolute dexterity (Blalock et al., 1988).

Differences between illness severity and adjustment dimensions have been observed in other patient samples. For example, 75% of comparisons by cardiac patients were associated with aspects of their illness (e.g., rate of recovery from surgery); the remaining 25% concerned 'attitudes and feelings' (Helgeson & Taylor, 1993). Among cancer patients, Buunk et al. (1990) found that comparisons about prognosis were most common overall, but that upward comparisons concerning coping also were frequent. Cancer patients also preferred upward targets, rather than downward targets, to assess coping, but preferred downward targets, rather than upward targets, to assess illness severity (Bennebroek et al., 2002).

### ***Mode of comparison and comparison preference***

Self-report methods also have captured distinctions about preferred targets based on mode of comparison, but with mixed findings. In several studies, patients endorsed *future-oriented* preferences for actual contact (i.e., affiliation) with lateral or upward targets (see Tables 2 and 3). Sixty percent of cardiac patients stated a preference to affiliate with an upward target and judged affiliation with a downward target to be more uncomfortable than affiliation with lateral or upward targets (Helgeson & Taylor, 1993). Cancer patients indicated a preference for *interaction with others* who were at the same level of general health or doing slightly better versus with others who were doing worse (Molleman et al., 1986). Pre-operative cardiac patients also expressed a preference for roommates who were post-operative (i.e., contact with

upward targets), as these patients were perceived as more informative and inspirational than roommates who were preoperative (i.e., lateral or downward targets; Kulik & Mahler, 1989). In the preceding studies, interest in either information or contact was assessed, but not both.

Bennenbroek and colleagues (2002), however, inquired about both modes of comparison.<sup>4</sup> In this study, cancer patients showed greater upward preference for information (vs. contact), particularly when asked about coping. The researchers explained the difference in terms of the dynamics of identification versus contrast with comparison targets. Wanting to avoid *actual contact* with someone who is coping better (i.e., upward contrast through contact) may increase preference for *information* about upward targets. Trying to not *think* about suffering a similar fate (i.e., downward identification through contact) may prompt a preference for *interaction* with upward targets (see Helgeson & Taylor, 1993).

It is important to note that the interpretation of such findings in the context of perceived similarity has not yet been tested. The perceived similarity construct needs systematic investigation to understand patients' target preferences and whether the effects of directional comparisons differ by mode (and dimension). Based on the available literature, however, patients tend to report preferences for upward contact more frequently than they do for downward contact. Less is known about *reported* preferences for information; results from studies using selection methods suggest that when patients expect to receive information via case descriptions, preference depends on the type of illness.

### ***Uncertainty and comparison preference***

When comparing physical health status, patients who were high (vs. low) in uncertainty judged comparison targets to be more informative. More specifically, those who are highly uncertain judged lateral comparisons as more informative than upward or downward comparisons (Molleman et al., 1986).<sup>5</sup> These findings support Festinger's original predictions about (1) uncertainty increasing the need for social comparison and (2) the potential influence of lateral comparisons. With the exception of Molleman et al. (1986) and a few other studies, lateral choices rarely have been offered in research with patients. Based on Festinger's initial ideas, level of uncertainty also should interact with dimension to determine directional preference. Only one available study addressed this issue: when asked to consider how other patients were coping, cancer patients high (vs. low) in uncertainty expressed more interest in upward comparison (Bennenbroek et al., 2002).

### ***Time considerations and comparison preference***

Temporal features of illness (e.g., overall duration of illness, length of time in treatment) also may impact comparison preferences. Blalock et al. (1989) and Stanton, Danoff-Burg, Cameron, Snider, and Kirk (1999) found no relationship between illness duration and comparison preference in patients with rheumatoid arthritis or cancer, respectively. Other studies have reported such associations, suggesting that the relationship may depend on the patient's diagnosis. Bogart and Helgeson (2000) noted that cancer patients were more likely to report the use of comparisons (in daily diaries) at the beginning of an 8-week treatment programme,

relative to the end of treatment. (This may also reflect accumulative reporting burden over the course of the study.) More specifically, Wood, Taylor, and Lichtman (1985) showed that downward comparisons were more common right after cancer surgery, relative to later in time. Van der Zee et al. (2000) found that the frequency of upward and downward *identification* decreased from the beginning of cancer treatment to three-month follow-up; upward and downward *contrast* did not change over the same period. In the same study, greater time since diagnosis was also associated with diminished use of coping strategies such as seeking support and venting emotions, suggesting that identification with other cancer patients (irrespective of outcome) may be more useful early in treatment. For cardiac surgery patients, length of time since surgery was positively associated with rating oneself as doing better than others (Helgeson & Taylor, 1993) – implying more use of downward comparison with the passage of time.

### **Findings for affective consequences of comparisons**

#### ***Direction of comparison and affective consequences***

Comparing with a better- versus a worse-off comparison target should influence mood (see Wills, 1981) and possibly psychological and physical health. The responses of cardiac patients reflected inspiration and competitiveness following upward comparisons, feeling fortunate following downward comparisons and feeling comfortable following lateral comparisons (Helgeson & Taylor, 1993). Patients' reports about past comparison experiences referred to positive affect more frequently than negative affect in several medical populations (cancer: Bogart & Helgeson, 2000; Buunk et al., 1990; Stanton et al., 1999, osteoarthritis and cancer: Heidrich, 1996, multiple sclerosis: Hemphill & Lehman, 1991; see Tables 4 and 5), but results for affect as a function of comparison direction were mixed.

Prior to 1990s, most studies provided patients with response options involving discrete descriptive categories (i.e., 'happy'), or continuous ratings of valence (i.e., positive vs. negative) or frequency (i.e., 'often' vs. 'never') to assess affect following directional (upward or downward) comparison. These types of questions and scales, however, did not tap whether directional comparisons led to positive or negative affect (e.g., 'how often did comparisons with better-off others lead to positive feelings?'). Buunk and colleagues' (1990) astute observation that 'either direction (of comparison) has its ups and downs' led to the inclusion of more fine-tuned assessments of comparison-affect consequences. These developments, in turn, led to the I/C Model (Buunk & Ybema, 1997). Accordingly, recent studies have assessed positive and negative consequences as a function of making (or recalling having made) upward and downward comparisons. In studies conducted by Buunk and colleagues, comparisons were categorised as 'positive-outcome' (i.e., associated with positive consequences such as increased positive affect) or 'negative-outcome' (i.e., associated with negative consequences such as increased negative affect). In a study of cancer patients, positive-outcome downward comparisons were most common (made by 82% of the sample), followed closely by positive-outcome upward comparisons (78%; Buunk et al., 1990). Negative-outcome comparisons were made by less than 60% of the sample.

In several studies, positive affect was most frequently associated with downward comparisons (cancer: Bogart & Helgeson, 2000; multiple sclerosis: Hemphill & Lehman, 1991), whereas Dibb and Yardley (2006, Study 2; Ménière's disease) found positive affect most often related to upward comparisons. Cancer patients also judged (hypothetical) interactions with downward targets to be more likely to produce discomfort, while upward comparisons were seen as producing no discomfort (Molleman et al., 1986), lending further support to the purported benefits of upward comparisons. Interestingly, downward comparisons were more strongly associated with both positive and negative affect among multiple sclerosis patients (Hemphill & Lehman, 1991). Patients with Ménière's disease listed both positive- and negative-outcome upward comparisons as somewhat more common than either type of downward comparison (Dibb & Yardley, 2006, Study 2).

### *Affective consequences: individual differences in emotional response*

Some patients tend to respond positively to any type of comparison, whereas others tend to respond negatively. Individual differences are implicated in several studies (see Tables 4 and 5). For patients with multiple sclerosis, positive and negative affect (across upward and downward comparisons) were positively correlated with one another (Hemphill & Lehman, 1991). In addition, upward identification and downward contrast (i.e., 'positive-outcome' comparisons) were strongly correlated in a sample of cancer patients; the correlation between downward identification and upward contrast (i.e., 'negative-outcome' comparisons) was weak (Van der Zee et al., 2000). As expected, neuroticism was positively correlated with downward identification (Van der Zee et al., 1999). Patients who scored high (vs. low) in optimism (Hemphill & Lehman, 1991) and self-esteem (Bogart & Helgeson, 2000; Buunk et al., 1990) were less likely to report negative affective consequences of comparing (upward, downward, or both). Patients who were high in perceived control of their illness (vs. low control) reported less frequent negative-outcome downward comparisons, both cross-sectionally (Bogart & Helgeson, 2000; Buunk et al., 1990) and over time (Bogart & Helgeson, 2000).

### *Affective consequences and psychological well-being*

High self-esteem and low psychological distress were positively related to the use of downward comparisons in cardiac patients (Helgeson & Taylor, 1993). In patients with sickle cell disease, more frequent downward comparison was associated with fewer depressive symptoms, whereas more frequent upward comparison was associated with increased negative thoughts and depressive symptoms (Wilson et al., 1997). Frequency of making upward comparisons also accounted for significantly more variance in depressive symptoms than did downward comparison in the same sample. In patients with cancer, high self-esteem was associated with fewer negative-outcome upward comparisons (prior to treatment) and an increase in positive-outcome downward comparisons over time (Bogart & Helgeson, 2000) (Tables 4 and 5).

Findings in women with cancer and osteoarthritis confirm that the direction of a comparison does not alone relate to well-being (i.e., self-esteem, personal growth, depression and positive relationships). When frequency and consequences were

assessed separately, both increased use of upward comparisons and higher ratings of positive affect (consequent to upward comparisons) were related to greater well-being; for downward comparisons, however, only higher ratings of consequent positive affect were related to greater well-being (Heidrich, 1996).

Similarly, negative-outcome comparisons were related to poorer adjustment (vs. positive-outcome comparisons) – regardless of comparison direction. Negative-outcome comparisons were consistently associated with lower self-ratings of overall health, vitality and social and emotional functioning among patients with Ménière's disease; the frequency of positive-outcome comparisons was unrelated to self-rated physical and psychological health (Dibb & Yardley, 2006, Study 2). Positive-outcome comparisons were also associated with 'action-focused' coping mechanisms (i.e., changing the situation, seeking support and focusing on personal growth), whereas negative-outcome comparisons were associated with more 'emotion-focused' methods (i.e., expressing emotion) in a group of patients with cancer (Van der Zee et al., 2000). Beliefs about the future course of illness (cancer: Hemphill & Lehman, 1991) and overall life satisfaction (rheumatoid arthritis: Blalock et al., 1988) were unrelated to frequency of overall or directional comparisons.

Although optimism and self-esteem seem to predispose patients to experience more positive affect after comparing, traits such as neuroticism tend to have the opposite effect. When asked to recall their recent comparisons, patients high (vs. low) in neuroticism reported greater negative affect in response to both upward and downward comparisons; positive affect was unrelated to neuroticism in this sample (Van der Zee et al., 1996a). In a different sample, high neuroticism was also associated with greater identification with downward targets, but was not related to upward identification, upward contrast or downward contrast (Van der Zee et al., 1999). Both neuroticism and downward identification (assessed prior to cancer treatment) were positively associated with uncertainty and depression, and negatively associated with physical health and general mastery (assessed at the end of treatment). Downward identification also mediated the relationship between neuroticism and uncertainty, and between neuroticism and mastery.

### *Affective consequences, direction and dimension of comparison*

The distinction between coping and illness severity (i.e., prognosis) dimensions is potentially important, but only two studies have applied this distinction to assessment of affective consequences (see Tables 4 and 5). Buunk et al. (1990), Study 1) coded cancer patients' interview responses to a prompt depending on which comparison dimension the patient mentioned. Prognosis comparisons were significantly more common (vs. coping/adjustment, environmental resources and current physical aspects of the illness) for all negative-outcome comparisons and downward positive-outcome comparisons. For positive-outcome upward comparisons, however, coping/adjustment comparisons were nearly as common as prognosis comparisons. Also, Buunk and colleagues distinguished between prognosis (i.e., future illness severity) comparisons and comparisons of current 'physical limitations or symptoms'. In this study, future-oriented comparisons were significantly more common. Hemphill and Lehman (1991) had multiple sclerosis patients make separate ratings of upward and downward, positive- and negative-outcome comparisons concerning coping and illness severity (i.e., eight types of comparison).

Illness severity comparisons were related to higher ratings of affect across positive and negative valences. Comparisons of illness severity also were more frequently associated with negative *and* positive affect than were comparisons of coping.

### *Affective consequences and illness-related personal change*

Dibb (2009) examined the role of social comparisons on patients' perceptions of personal growth following illness onset (see Table 5). Patients with Ménière's disease reported increased post-traumatic growth on all subscales of the Post-Traumatic Growth Inventory (Tedeshi & Calhoun, 1996) from baseline to 10-month follow-up. At baseline, higher self-ratings of post-traumatic growth were associated with more frequent positive-outcome upward comparisons. Conversely, greater 'appreciation for life', 'relating to others' and 'new possibilities' were associated with more frequent negative-outcome upward comparisons. Although making more positive downward comparisons had immediate mood-enhancing effects, positive-downward comparisons were surprisingly associated with lower ratings of personal strength 10 months later.

### **Spontaneous patient comparisons**

Unsolicited or spontaneous comments made about comparison in the course of answering other questions, fall into Wood's (1996) narration category. As there was no explicit inquiry, identification of patients' spontaneous mentions about comparison relies on researchers' post hoc definitions of 'comparison'. Several important themes extracted from studies of spontaneous patient comparisons are addressed in studies using other narration methods. Although spontaneous patient comparisons are not extensively described here, a reading of this literature suggests the following observations.

Because patients spontaneously report about comparisons in unstructured or semi-structured interviews, responses have to be categorised according to thematic content and coded by multiple raters versed in quantitative methods. In one instance, researchers evaluated the content of cancer survivors' autobiographies using thematic analysis (Bellizzi, Blank, & Oakes, 2006). The results of these studies are frequently presented in terms of counts of different types of comparisons (e.g., upward vs. downward, illness severity vs. coping) and correlations between types of comparisons and other self-reported health experiences. Such studies have involved patients with cancer, cardiovascular disease, familial hypercholesterolaemia (pre-morbid heart disease), type 2 diabetes mellitus, Ménière's Disease, multiple sclerosis, fibromyalgia, end-stage renal failure (kidney disease) and rheumatoid arthritis.

In descriptive qualitative analyses, many patients mention comparisons involving downward targets, without prompting (Affleck, Tennen, Pfeiffer, & Fifield, 1988; Blalock, Afifi, DeVellis, Holt, & DeVellis; 1990; Gorawara-Bhat, Huang, & Chin, 2008; Huang, Gorawara-Bhat, & Chin, 2005; King, Clark, & Friedman, 1999; Lindqvist, Carlsson, & Sjoden, 2000; Senior, Smith, Michie, & Marteau, 2002; Somerset, Sharp, & Campbell, 2002; Wood et al., 1985). Downward comparisons appear to be more common if the patient is in the early stages of diagnosis or treatment (Affleck, Tennen, Pfeiffer, Fifield, & Rowe, 1987; Wood et al., 1985).

Several studies also mention patients' spontaneous upward comparisons (Bellizzi et al., 2006; Dibb & Yardley, 2006, Study 1; Gorawara-Bhat et al., 2008; Lindqvist et al., 2000) and lateral comparisons (Bellizzi et al., 2006; Blalock et al., 1990; Dibb & Yardley, 2006, Study 1; Somerset et al., 2002). The difference with respect to comparison direction hinges upon comparison dimension. Downward comparisons most frequently mentioned were about an illness dimension, such as symptom severity (e.g., Affleck et al., 1987, 1988; Dibb & Yardley, 2006, Study 1; Wood et al., 1985), whereas upward comparisons most commonly referred to adjustment dimensions, such as coping (e.g., Affleck et al., 1987, 1988; Dibb & Yardley, 2006, Study 1).

Although some negative-outcome comparisons (i.e., upward contrast or downward identification; Dibb & Yardley, 2006, Study 1; Senior et al., 2002; Somerset et al., 2002; Wood et al., 1985) were reported, a majority of comparisons had positive outcomes (i.e., upward identification or downward contrast; Affleck et al., 1987; Bellizzi et al., 2006; Huang et al., 2005; Lindqvist et al., 2000; Senior et al., 2002). Studies that included quantitative analyses reported that a higher frequency of spontaneous downward comparisons was associated with lower severity of illness symptoms, higher self-rated physical functioning and higher physician-rated psychosocial adjustment (Affleck et al., 1987, 1988).

### **Narration methods: summary and critique**

Narration methods can be informative about patients' overall use of comparisons and common affective consequences. Results across different types of self-report are modestly consistent. Patients report making social comparisons fairly often, particularly under conditions of uncertainty, and endorse preferences for downward (vs. upward) targets when offered response alternatives. Patients also report using downward (vs. upward) comparisons somewhat more frequently and making comparisons that result in positive affect more often than in negative affect (independent of direction). Downward comparisons are frequently associated with (short-term) positive affect, but may also be related to lower perceived personal strength over time. The latter finding requires replication, but raises the possibility that the short-term and long-term consequences of comparisons may differ. Longitudinal studies tracking social comparisons and their consequences over time are rare, and should be implemented in the future.

Findings of narration studies are consistent with the idea that comparisons sometimes are driven by self-enhancement (Wills, 1981; Wood et al., 1985). These findings also mirror the behaviourally demonstrated preferences of patients with rheumatoid arthritis, although they conflict with the preferences of cancer patients (who were more likely to select, and experience positive affect following, upward comparisons). The frequent mention of upward comparisons – mainly on the dimension of coping – may reflect patients' motivation to self-improve (Festinger, 1954; Taylor, 1983; Taylor & Lobel, 1989; Wheeler, 1966). Comparisons associated with negative affect (irrespective of direction) were related to poorer psychological health (e.g., low self-esteem, physical functioning, depression, neuroticism). Whether downward or upward comparisons are more helpful for medical patients remains unclear, but there are several situational factors that seem important.

Both comparison dimension and mode are implicated in the process (i.e., preferred direction) and outcome (e.g., affective consequence) of comparison. Patients tend to prefer upward comparison targets on the dimension of coping, but downward comparison targets on the dimension of illness severity. Illness severity comparisons appear more strongly associated with affective consequences than are coping comparisons. Patients tend to prefer contact with upward targets; there also is evidence showing the opposite tendency (i.e., patients endorsing a preference for contact with downward targets), based on whether identification versus contrast is operating.

### *Time considerations*

Patients' use of downward comparisons also is associated with the length of time since diagnosis or treatment, but available data show that the direction of this relationship – when it is present – depends on the illness. For cancer, more recent diagnosis and surgery were related to increased use of downward comparisons, relative to earlier diagnosis. For patients recovering from cardiac bypass surgery, those whose surgeries occurred more recently reported using fewer downward comparisons (relative to those whose surgeries occurred in the distant past).

Although cardiovascular disease can be associated with premature mortality (and co-morbid conditions) it may not produce the level of anxiety that drives the use of downward comparisons during early stages of medical care. It is also possible that patients do not consider cardiovascular disease a large determinant of personal identity; in this case, comparisons based on illness-related experiences would not serve a useful purpose (Festinger, 1954). Indeed, some cardiac patients explicitly stated that they do not find comparisons 'valuable or relevant' (Helgeson & Taylor, 1993, p. 1178). In contrast, cancer may be perceived as more threatening and fraught with uncertainty (and therefore, a greater obstacle to overcome), so downward comparison and identification based on one's diagnosis may represent more active coping (see Molleman et al., 1986; Van der Zee et al., 2000). These admittedly speculative interpretations about differences between illnesses require testing.

### *Individual difference characteristics*

Some proportion of patients is more reliant on comparison information, more prone to comparison-related emotional (positive or negative) reactivity and more prone to downward identification and upward contrast. A high level of neuroticism is associated with both more comparison activity and more negative responses to comparison information (Van der Zee et al., 1996a). As neuroticism has only been studied among cancer patients, however, generalisability of these relationships is unclear.

### *Methodological issues*

Buunk and Gibbons (2007) observed that the concept of social comparison has expanded to the point of necessitating 'theoretical and empirical clarification' of 'what is social comparison and what is not' (p. 16). This problem especially rises in

the literature on social comparisons with medical patients, as there are currently many study-specific operational definitions of comparison (see also Wood, 1996).

### ***Defining social comparison***

Operational definitions differ most with respect to comparisons affecting preferences and consequences. In some research, comparison targets are operationalised in terms of a single dimension or mode (e.g., Molleman et al., 1986). Defining (or focusing on specific types of) comparison narrowly has methodological strengths, but limits ecological validity, as it does not represent the richness of comparisons made in 'real life'. As a consequence, although current evidence suggests that responses to comparisons differ according to dimension and mode, less is known about the types of responses consequent to specific kinds of comparison. This is unfortunate because patients have opportunities to make many different types of comparisons in daily life. In individual studies, however, the comparison 'menu' has tended to be restricted to a single type of comparison, which means that how patients choose and respond to a variety of comparisons is unknown.

Some studies assessed comparisons retrospectively, whereas others asked for immediate (future-oriented) preferences or predicted reactions. Each of these situations involves social comparison, but the comparisons which patients recall and which they prefer or anticipate are distinct. (Furthermore, what patients 'want' at any point should depend on the patient's immediate goals, introducing another layer of complexity.) Those studies utilising self-reports about both preferences and responses (as well as those using selection methods) often do not include information about the conditions under which these experiences were solicited.

### ***Perceived similarity***

Also conspicuously absent from most narration studies is explicit assessment of *perceived similarity* to comparison targets. Available data show that identification is slightly more common than contrast, that identification (across upward and downward comparisons) decreases over time and that neuroticism is related to downward identification. Information about identification and contrast are available only for samples of cancer and Ménière's Disease. For the most part, however, we do not know how similar or dissimilar do patients perceive themselves to be, relative to upward or downward targets, and we do not know whether they focus more on similarities or on differences with targets. Despite these gaps, some researchers have made inferences about perceived similarity on the basis of the affective *outcomes* of the comparisons (e.g., Dibb & Yardley, 2006, Study 2). This is difficult to interpret because, although the degree of perceived similarity should influence the affective responses, upward or downward comparisons are open to various interpretations, as illustrated below.

For example, Van der Zee and colleagues (1999, 2000) assessed 'upward identification' by asking patients to rate the item, 'When I meet others who are experiencing fewer problems than I am, it makes me happy realizing that it is possible for me to improve'. This statement may convey the belief that exposure to an upward target makes personal improvement seem more likely. Such a reminder might lead to more positive feelings (or less negative feelings), but does not necessarily mean the

respondent perceived (or focused on) any similarities between the self and the target, beyond their sharing the same illness. A 'downward contrast' item, such as 'When I see others who experience more difficulties than I do, I am happy that I am doing so well myself' also is potentially ambiguous. Agreeing with this statement might involve the consideration of both similarities and differences, as it is unclear how patients might interpret 'doing so well' in this context.

### ***Process versus outcome***

The examples just described represent working backwards from 'outcome to process', that is, inferring the type of comparison from its consequences (see Wheeler & Suls, 2007; Wood, 1996 for critiques). The approach is consistent with the I/C Model, but inferring antecedents from the consequences can be fraught with difficulties. Only factorial manipulation of direction, perceived similarity (i.e., extent of focus on similarities vs. differences) and affect can provide more definitive evidence about the processes by which social comparisons exert their effects.

There are four candidate pathways to consider: (1) social comparisons lead to poorer psychological functioning (e.g., depression), (2) psychological distress drives the use of maladaptive comparisons (e.g., downward identification), (3) patients in distress or poorer psychological health have fewer opportunities to make positive-outcome comparisons (vs. negative-outcome comparisons) or (4) the relationship between psychological health and comparisons is cyclical or dynamically recursive.<sup>6</sup> Each pathway suggests a distinct mechanism of action and a specific target for intervention to interrupt the negative chain of events.

Experimental methods, which manipulate comparison feedback, should be able to evaluate cause-and-effect relationships, but may be unable to fully approximate the patient's experience. Researchers may need to settle for a quasi-experimental design because certain factors cannot be manipulated in a medical setting for practical, logistic or ethical reasons. Kulik and Mahler (1987) recognised that a hospital roommate, whose assignment typically is based on time of admission and bed availability, can be conceptualised as a potential comparison target. They took advantage of this situation to study the effects of different comparison sources as patients awaited their surgery (see below for summary).

### **Reaction methods: relative evaluation, (quasi)experimental designs and interventions**

In contrast to selection methods, most reaction methods manipulate exposure to comparison opportunities by presenting information or contact (i.e., forced comparisons). Experimental and quasi-experimental studies involving between-subjects designs create conditions in which patients encounter (e.g., hear about, read about, see on videotape) targets whose features are independently manipulated in terms of direction or dimension.

The most basic reaction method involves self-evaluation relative to a comparison target, represented by a specific individual or class of individuals (see Table 6). Comparisons of illness severity and coping are typically assessed using explicit questions (e.g., 'how well are you doing *compared to this person/group?*' Blalock et al., 1989; Derlega, Robinett, Winstead, & Saadeh, 2005; DeVellis, Blalock, Holt, & Renner, 1991; Hagedoorn, Sneeuw, & Aaronson, 2002; Helgeson & Taylor, 1993;

Table 6. Reaction studies of social comparison among patients with chronic illness (relative evaluation).

Authors	Year	Diagnosis	<i>N</i>	Features assessed	Key findings
Blalock, DeVellis, and DeVellis	1989	Rheumatoid Arthritis	76 (female)	Direction	Average relative evaluation (vs. desired comparison target, patient or non-patient) showed downward comparisons of task performance
Derlega, Robinett, Winstead, and Saadeh	2005	Diabetes	108	Direction	Average relative evaluation (vs. 'other people diagnosed with diabetes') showed downward comparisons based on current physical health (52% downward) and adjustment (61% downward)
Dijkstra, Buunk, Toth, and Jager	2008	Type I diabetes	149	Direction	Self- and prototype ratings positively correlated; stronger association for negative ( $r = .50$ ) vs. positive characteristics ( $r = .33$ ); both ratings predicted patient acceptance of illness (self = greater proportion of variance); prototype ratings accounted for 14.7% (positive attributes) and 21.6% (negative attributes) of the variance in self-ratings
Hagedoorn, Sneeuw, and Aaronson	2002	Cancer (various)	240	Direction	Average relative evaluation showed downward comparisons; higher relative evaluation associated with increased quality of life over 3 months; patients with high relative evaluations showed no association between changes in physical and emotional functioning over 3 months; patients with low relative evaluations (i.e., upward comparison) showed positive associations between changes in physical and emotional functioning over 3 months
Helgeson and Taylor	1993	Cardiovascular Disease (surgical rehabilitation)	60 (male)	Direction Mode Affective consequences	Separate ratings for self vs. other patients (indirect assessment) revealed high frequency of downward comparisons based on physical health, emotional health, and personal resources; higher self-rating via indirect comparison related to lower psychological distress

Table 6 (Continued)

Authors	Year	Diagnosis	N	Features assessed	Key findings
Stanton, Danoff-Burg, Cameron, Snider, and Kirk	1999	Breast cancer	94 (female)	Direction Dimension	Self-evaluation relative to 'other women with breast cancer' reflected downward comparisons on both prognosis and coping dimensions (69% and 73% of sample, respectively)
Taylor, Aspinwall, Giuliano, Dakof, and Reardon	1993	Cancer	55	Direction	Stories about other patients were 'rarely' sought out, but often helpful; majority (68%) rated self as 'better off' than target patient in stories sought out; 85% rated self as 'better off' than the target in unsolicited stories; positive stories (patients doing well) were rated as more helpful than negative stories (patients doing poorly)
Van der Zee, Buunk, DeRuiter, Tempelaar, and Sanderman	1996	Cancer (various) vs. healthy controls	475. 225 (each 71% female)	Direction	Patients' relative evaluations (to 'other cancer patients') reflected global downward comparison; relative evaluation significantly higher (i.e., more likely downward) for patients than healthy controls; higher relative evaluation (i.e., downward comparison) associated with greater subjective well-being
Wood, Taylor, and Lichtman	1985	Breast cancer	78 (female)	Direction Dimension	Downward evaluations more common than upward with respect to both illness severity and coping; some downward illness severity comparisons perceived as threatening; downward comparisons not associated with patient prognosis or degree of perceived social support; increased downward evaluation related to more recent surgery (relative to surgery more distant in time)

Stanton et al., 1999; Taylor et al., 1993, Study 1; Van der Zee et al., 1996a, 1996b; Wood, Taylor, & Lichtman, 1985). Comparisons also can be assessed indirectly (e.g., contrasting self-ratings to ratings of another individual or group; DeVellis et al., 1991; Dijkstra et al., 2008; Helgeson & Taylor, 1993).

Some experiments have exposed patients to comparison opportunities (vs. none) (Stiegelis et al., 2004), or to better- versus worse-off targets (Bennenbroek et al., 2003; Mahler & Kulik, 1998; Mahler, Kulik, & Hill, 1995; Mahler, Kulik, & Tarazi, 1999; Van der Zee et al., 1998a). More complex designs involve the factorial manipulation of direction and dimension (Derlega et al., 2005; Derlega, Greene, Henson, & Winstead, 2008; DeVellis et al., 1991; Stanton et al., 1999). In these experiments, patients rated their affect, illness severity, adjustment (coping) and desire for information and contact with comparison targets. Some studies have also assessed uncertainty or well-being, considered as moderators or outcome variables, or included objective medical outcomes. Summaries of each relative evaluation and (quasi)experimental design and key findings are presented in Table 6 and 7, respectively.

### Relative evaluation

Ratings or statements of relative standing made in response to an ‘average’ comparison target indicate that patients tend to view themselves as doing better in coping and health than other patients with the same illness (Blalock et al., 1989; Derlega et al., 2005; Helgeson & Taylor, 1993; Stanton et al., 1999; Taylor et al., 1993, Study 1; Van der Zee et al., 1996b; Wood et al., 1985). These findings reflect the use of global downward comparisons by patients (see Table 6). Cancer patients who rated themselves as better-off than other patients (i.e., downward comparison) reported less physical and psychological distress and higher subjective well-being (Van der Zee et al., 1996b). In a longitudinal study, cancer patients whose well-being was higher relative to other patients (i.e., downward comparison) at baseline tended to exhibit better self-reported quality of life over time (Hagedoorn et al., 2002).

A variation on this approach assesses chronic illness patients’ perceptions of the ‘prototypical’ individual with the same illness. In Dijkstra et al. (2008, Study 1), Type 1 diabetics made self-evaluations and rated their prototype of the ‘typical diabetic’, which were then correlated with patients’ acceptance of their illness. The self- and prototype means were not reported, precluding a direct comparison of (or inference about) upward versus downward social comparison with the ‘typical patient’. Self- and prototype ratings, however, were positively correlated, with a somewhat stronger association for negative ( $r=0.50$ ) than for positive characteristics ( $r = 0.33$ ). Patients’ self- and prototype ratings predicted cognitive and emotional acceptance of their illness, but self-ratings accounted for a greater proportion of the variance. Prototype ratings also significantly predicted self-evaluations, accounting for 14.7% and 21.6% of the variance in ratings for positive and negative attributes, respectively.

To summarise, patients judged the average patient to be worse off, in terms of relative evaluations, and these downward comparisons were associated with (concurrent and future) well-being. Even if patients were not explicitly asked to compare, evaluations of the target were meaningfully related to self-ratings.<sup>7</sup> As affective consequences and objective markers of health status have not been examined as a function of relative evaluations, more research is needed.

Table 7. Reaction studies of social comparison among patients with chronic illness (Quasi-experiments and experiments).

Authors	Year	Diagnosis	<i>N</i>	Intervention	Features manipulated	Conditions	Key findings
Bennenbroek, Buunk, Stiegelis, Hagedoorn, Sanderman, van den Bergh, and Botke	2003	Cancer (various)	209	Audiotape	Dimension	Procedural Coping Emotional Control (no tape)	Greater understanding of radiation therapy in procedural (vs. emotion) condition (marginally higher for coping vs. emotional); no difference between tape conditions for validation of emotions; higher SE in coping condition (vs. emotional); higher NA in emotional condition (vs. other tapes and control)
Buunk, Brakel, Bennenbroek, Stiegelis, Sanderman, Van den Bergh, and Hagedoorn	2009	Cancer (various)	226	Audiotape	Dimension	Procedural Coping Emotional Control (no tape)	Overall positive correlation between degree of neuroticism and negative affect (in response to tapes); relationship stronger for emotional tape (vs. coping tape), weaker for coping tape (vs. no tape) and procedural tape (vs. no tape)
Derlega, Greene, Henson, and Winstead	2008	HIV	182	Written Descriptions	Dimension Direction (3 × 3)	Good, poor, unspecified prognosis Good, poor, unspecified coping	Greater desire for emotional support and liking for upward prognosis target (vs. unspecified); greater desire for emotional support and information from upward coping target (vs. downward); higher prognosis self-ratings in downward (vs. upward and unspecified) conditions; no effect of coping target on self-ratings
Derlega, Robinett, Winstead, and Saadeh	2005	Diabetes	108	Written Descriptions	Dimension Direction (3 × 3)	Good, poor, unspecified prognosis Good, poor, unspecified coping	No effect of prognosis on affiliation, likability, or desire for information; desire for emotional support and likability lower in downward coping (vs. upward and unspecified); desire for information lower in unspecified coping (vs. downward); marginally higher self-ratings in downward prognosis (vs. upward and unspecified)

Table 7 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Intervention	Features manipulated	Conditions	Key findings
DeVellis, Blalock, Holt, Renner, Blanchard, and Klotz	1991	Rheumatoid Arthritis	72	Slides plus Audiotape	Presence of comparison target	Good vs. poor coping Good vs. poor illness Severity	No effects of condition on absolute self-ratings; for direct assessment, coping rated as better than both good and poor targets (but not for indirect or both severity assessments); interaction between coping and assessment—marginally higher self-rating with indirect assessment in poor condition, but significantly higher self-rating with direct assessment in good condition
Dijkstra, Buunk, Toth, and Jager	2008	Type I Diabetes	255	Written descriptions	Presence of comparison target	Positive prototype description Self-enhancement Research statistics (control)	<i>Low SCO</i> : Negative prototype evaluation at baseline led to highest CA in prototype condition (no differences for positive prototype evaluation at baseline); self-enhancement condition led to higher CA for positive prototype evaluation (vs. negative) at baseline; contrasts for EA were not significant; <i>High SCO</i> : Negative prototype evaluation led to lowest CA in prototype condition; prototype condition led to higher CA for positive prototype evaluation (vs. negative) at baseline; pattern similar for EA

Table 7 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Intervention	Features manipulated	Conditions	Key findings
Kulik and Mahler	1987	Cardiovascular Disease (surgical recovery)	27	Hospital Roommate	Direction Similarity	Pre-operative (lateral or downward) roommate Post-operative (upward) roommate Same-surgery roommate Different-surgery roommate	Roommates before surgery: lower subjective pre-surgery anxiety, increased ambulation, shorter overall hospital stays with post-operative roommates (vs. pre-operative); Roommates after surgery: greater intake of strong pain medications with greater number of post-operative roommates; no effect of surgery similarity
Kulik, Mahler, and Moore	1996	Cardiovascular Disease (surgical recovery)	84	Hospital Roommate	Direction Similarity	Pre-operative (lateral or downward) roommate Post-operative (upward) roommate	More time spent on gaining 'cognitive clarity' about the surgery in discussions with post-operative (vs. preoperative) and cardiac (vs. noncardiac) roommates; more time spent on emotional support in discussions with cardiac (vs. noncardiac) roommates; lower objective pre-surgery anxiety with post-operative roommates (vs. pre-operative), but no effect of surgery similarity; increased ambulation and shorter overall hospital stays with post-operative (vs. pre-operative) and with cardiac (vs. noncardiac) roommates, and these effects were mediated by increased cognitive clarity about surgery

Table 7 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Intervention	Features manipulated	Conditions	Key findings
Mahler and Kulik	1998	Cardiovascular Disease (surgical recovery)	258 (male)	Videotape	Direction	Coping Mastery Information-only No-tape control	Any tape resulted in higher SE for recovery behaviours, shorter surgical care unit and overall hospital stays, higher lung function (relative to no-tape); no differences between tape conditions
Mahler, Kulik, and Hill	1995	Cardiovascular Disease (surgical recovery)	30 (female)	Videotape	Direction	Coping Mastery No-tape control	Any tape resulted in higher SE for recovery behaviours, shorter surgical care unit and overall hospital stays, increased ambulation, fewer complications (relative to no-tape); no differences between tape conditions
Mahler, Kulik, and Tarazi	1999	Cardiovascular Disease (surgical recovery)	216	Videotape	Direction	Coping Mastery No-tape control	Any tape resulted in higher SE for recovery behaviours, greater self-reported diet adherence (vs. no tape); effects on diet adherence mediated by higher self-efficacy; moderate exercise highest for coping tape at 1-month follow-up; strenuous exercise highest for coping tape at 3-month follow-up
Schokker, Keers, Bouma, Links, Sanderman, Wolffenbuttel, and Hagedoorn	2010	Insulin-dependent Diabetes	234	Written Descriptions	Direction	Upward illness/coping Downward illness/coping	No main effect of direction; greater promotion focus associated with higher motivation for self-care in the upward condition only; greater prevention focus associated with higher motivation for self-care in the downward condition only, qualified by an interaction with SE (relationship only holds for patients with high SE)

Table 7 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Intervention	Features manipulated	Conditions	Key findings
Stanton, Danoff-Burg, Cameron, Snider, and Kirk	1999	Breast cancer	94 (female)	Audiotape	Dimension Direction (3 × 3)	Good, poor, unspecified prognosis Good, poor, unspecified adjustment	Increase in NA from pre-post target exposure (across conditions); decrease in PA from pre-post target exposure, attenuated in the downward prognosis (vs. upward); higher ratings of 'feel much better about my adjustment' (vs. prior to exposure) in downward (vs. upward and unspecified); greater desire for emotional support and information from target, greater desire to hear interview again, and greater likeability of target in upward (vs. downward) adjustment; better self-ratings of adjustment and prognosis in downward adjustment (vs. upward and unspecified); better self-ratings of prognosis in downward prognosis (vs. upward and unspecified)
Stiegelis, Hagedoorn, Sanderman, Bennenbroek, Buunk, van den Bergh, Botke, and Ranchor	2004	Cancer (various)	209	Booklet	Presence of comparison target	Upward illness/coping (Booklet) No-booklet control	No-booklet condition: more tension, depression, and anger for individuals low in perceived control (vs. high) and high in illness uncertainty (vs. low); differences not significant for booklet condition

Table 7 (Continued)

Authors	Year	Diagnosis	<i>N</i>	Intervention	Features manipulated	Conditions	Key findings
Van der Zee, Buunk, and Sanderman	1998	Breast Cancer	57 (female)	Written Descriptions	Direction	Upward illness/support network Downward illness/support network	Higher PA in upward condition; higher NA and lower PA in high (vs. low) neuroticism across conditions; higher neuroticism associated with lower PA in upward condition; greater identification associated with higher positive affect for upward; high (vs. low) neuroticism positively related to identification for downward, negatively related for upward (marginal)

Note: CA, Cognitive Acceptance; EA, Emotional Acceptance; NA, Negative Affect; PA, Positive Affect; SCO, Social Comparison Orientation; SE, Self-Efficacy.

**Experimental designs: target versus no target**

Summaries of the following studies can be found in Table 7. Cancer patients scheduled for radiation therapy (RT) were randomly assigned to a booklet presenting information about the illness or no booklet (Stiegelis et al., 2004). The booklet included descriptions of other cancer patients who were in good health and coping well (i.e., upward targets). Among the controls, those who reported low perceived control and high uncertainty prior to RT experienced poorer affect three months post-RT (relative to patients with high perceived control and low uncertainty). In contrast, for patients who received the booklet presenting upward targets comparison information, perceived control and uncertainty were unrelated (or only weakly related) to negative affect at three months post-RT.

In their second study, Dijkstra et al. (2008) tested for differences in illness acceptance as a function of (1) exposure to a comparison target (positive prototype) description, (2) a self-enhancement-focused description or (3) health information only. A complex interaction revealed that low-SCO patients who rated the typical diabetes patient negatively tended (marginally significant) to be more cognitively accepting of their illness if they read a positive prototype description (vs. the self-enhancing and information-only manipulations). In contrast, low-SCO patients who had rated the typical diabetes patient positively and read the prototype description showed no improvement in acceptance. In response to self-enhancing information, low SCOs who had rated the prototype positively showed more cognitive acceptance (vs. those with negative baseline evaluations), whereas high SCOs who rated the prototype negatively were less cognitively accepting than those who received health information. High SCOs were also less emotionally accepting of their illness in the prototype condition (vs. self-enhancing and control). Condition did not differentially impact high SCOs who rated the prototype positively at baseline. Together, these findings suggest that the impact of a positive comparison target depends on a patient's SCO and existing perception of the 'typical patient'.

**Experimental designs: different comparison targets versus no target**

Summaries of the following studies can be found in Table 7. Bennenbroek et al. (2003) attempted to assess the effects of manipulating dimension. Cancer patients about to undergo RT listened to audiotapes of other patients describing: (1) the procedural and sensory aspects of RT; (2) emotional responses to treatment (both positive and negative emotions); (3) positive coping with treatment (upward comparison, i.e., patients mentioned staying positive and facing the treatment optimistically); and (4) a control group received no tape.

Patients reported an improvement in their understanding of RT in all of the tape conditions, with the procedures tape creating the most improvement. There were no effects on emotional validation. Higher self-efficacy was associated with listening to the (upward) coping tape (vs. emotional); the coping and procedure tapes had equivalent effects on self-efficacy. Because of the way the dependent measures were phrased (e.g., 'I now know more...' 'I have more confidence...'), testing for differences with the control group was not feasible. Mood, however, could be compared across the four conditions, with the emotional tape producing greater negative affect (i.e., depression and anger) than the other conditions. Notably, the

coping tape, which presented positive (and presumably *upward*) targets, had the *same* effect as the control (no comparison) tape. This suggests that upward comparison did not enhance cancer patients' subjective well-being.

Additional statistical analysis of this sample's data focused on emotional reactions to the audiotapes as a function of neuroticism (Buunk et al., 2009). Those patients who scored higher (vs. lower) in neuroticism reported more negative reactions to the tapes. They also responded less negatively to the procedures and (upward) coping tapes (vs. no-tape controls) and to the (upward) coping tape (vs. emotional tape). In short, a distinctive benefit was found for upward comparison, but only among the highly neurotic patients.

### *The impact of educational videotapes*

Mahler and colleagues randomly assigned pre-operative coronary bypass patients to comparison targets that varied in their level of functioning, or to no target (Mahler et al., 1995; Mahler & Kulik, 1998; Mahler et al. 1999). In one condition, the tape contained a nurse delivering health care information. In two comparison tape conditions, excerpts were presented from interviews with two patients who described their post-operative recovery as 'a rather easy forward progression' (upward, 'mastery' condition), or as a series of 'ups and downs' requiring considerable effort (lateral, 'coping' condition). An additional group of patients served as no-videotape controls.<sup>8</sup>

For a male sample, (Mahler & Kulik, 1998), a female sample (Mahler et al., 1995) and a mixed gender sample (Mahler et al., 1999), assignment to any tape (vs. control) was associated with higher self-efficacy (e.g., for diet adherence) post-surgery. Viewing any tape (vs. control) also led to shorter intensive care and in-hospital stays (Mahler et al., 1995; Mahler & Kulik, 1998), and male patients also had better lung function in the tape conditions (vs. no-tape), and males' shorter times in intensive care and in-hospital were partially mediated by higher self-efficacy in the tape conditions (Mahler & Kulik, 1998). Female patients experienced additional benefits in terms of fewer post-operative complications and increased ambulation post-surgery (tapes vs. no tape), which was partially mediated by higher self-efficacy (Mahler et al., 1995). These results are encouraging about the general benefits of psychoeducational interventions for cardiac surgery patients, but the failure to find more benefits for the mastery tape, which depicted the patients as easily overcoming difficulties with the surgery (i.e., upward comparison) (vs. no comparison) suggests identification with very high-functioning patients may be difficult to accomplish.

For the mixed gender sample (Mahler et al., 1999), greater diet adherence – an important outcome for several chronic illness populations (DiMatteo, Haskard-Zolnierok, & Martin, 2011) – at one month post-discharge in the tape conditions (vs. the no-tape control) was mediated by higher diet self-efficacy. There also were improvements as a function of tape condition. At one month post-discharge, patients assigned to the coping (i.e., lateral comparison) tape reported more moderate exercise than patients who viewed the mastery (i.e., upward comparison) or no tape. At three months post-discharge, patients who viewed the coping tape engaged in more strenuous exercise than patients who viewed the mastery or no tape. One important implication is that lateral comparison (vs. upward comparison) may provide more benefits to patients. An interpretational complexity is that the patients

on the coping tape may have seemed more realistic and easier to identify with than the patients heard on the mastery tapes.

### **Experimental manipulations of direction**

More complex experimental designs have manipulated comparison direction, dimension or both. Van der Zee and colleagues (1998a) demonstrated the impact of direction on cancer patients, who were exposed to written descriptions of illness severity and social support about upward or downward targets. Exposure to upward (vs. downward) targets led to more positive affect, but had no differential effect on negative affect. Overall, patients who scored high (vs. low) in neuroticism experienced less positive affect and more negative affect after reading about another patient; in particular, the upward comparison condition was associated with lower positive affect for patients high in neuroticism.

To our knowledge, Van der Zee and colleagues (1998a) is the only reaction study that explicitly asked patients about the extent to which they identified with the target. The authors do not report a direct contrast for identification between upward and downward conditions. Level of identification and degree of 'thinking about oneself' while reading about the target, however, were somewhat more strongly correlated in the upward (vs. downward) condition. Greater identification also was associated with higher positive affect in the upward condition, whereas identification was unrelated to affect in the downward condition. Patients high (vs. low) in neuroticism reported greater identification with downward targets and somewhat less identification with upward targets. This study demonstrates that patients are able to attend to and report their perceived similarity to a target, and that the magnitude of similarity (and affect) may depend on comparison direction and patient neuroticism.

For patients with rheumatoid arthritis, explicit instruction to evaluate the self relative to a target can affect self-ratings (DeVellis et al, 1991). When instructed to make self-ratings of coping relative to a target (i.e., direct assessment) patients rated their coping better than both downward *and* upward targets. When comparison was operationalised as a difference score (ratings of the self minus the target; i.e., indirect comparison), patients rated their coping as superior to the downward target but worse than an upward target. This pattern was not observed for the illness severity dimension; in both methods, patients rated themselves as falling between upward and downward targets. Thus, direct assessments on the coping dimension were associated with more favourable self-perceptions than were indirect assessments. Also, after comparison with an upward target, ratings of coping were higher in direct versus indirect assessments.

### **Experimental manipulations of direction and dimension**

Factorial manipulations of both comparison dimension and direction have focused mainly on desire for affiliation and self-evaluations. The three next studies involved 3x3 factorial designs to test for effects as a function of exposure to targets who were doing well (upward), poorly (downward), or were unspecified in medical prognosis (illness severity) and psychological adjustment (coping). Two of the articles reported cross-dimensional effects (e.g., the impact of target coping on prognosis ratings), but only one made reference to a trend for interaction between the two dimensions.

Although the authors of these studies did not assess or discuss perceived similarity, their data allow for some interpretation of identification and contrast, which is included below.

Breast cancer patients who listened to audiotaped interviews featuring upward coping targets subsequently expressed a stronger desire for emotional support and information from the target, relative to patients who listened to downward coping targets. Responses to upward targets, however, did not significantly differ from responses to targets whose coping was 'unspecified' (Stanton et al., 1999). This suggests that the evidence is ambiguous about whether patients identified with the upward target. In the same study, exposure to downward coping targets (vs. upward coping) led to higher ratings of coping *and* prognosis. Downward (vs. upward) prognosis targets produced higher ratings of patients' own prognosis, but had no impact on patients' coping ratings. Self-ratings in the 'unspecified' prognosis condition fell between the upward and downward conditions, but only unspecified and downward conditions significantly differed. Although the pattern of means was consistent with identification and contrast, the only definitive evidence was for contrast from the downward target. There also was a general tendency for patients to feel worse after being exposed to any target (pre- vs. post-exposure). Negative affect increased and did not differ by group assignment; positive affect decreased in all groups, but patients exposed to downward prognosis targets reported a smaller decrease, relative to those exposed to upward prognosis targets.

Findings for affiliation and self-evaluation were partially replicated in patients with diabetes mellitus (Derlega et al., 2005) and HIV (Derlega et al., 2008). In both studies, manipulation checks differentiated between the upward and downward targets, and between the unspecified and downward targets on prognosis and coping. Ratings of the upward and unspecified targets, however, did not differ – suggesting participants in the unspecified conditions perceived the target as doing fairly well in the absence of any explicit information. The patients also rated the unspecified prognosis target as adjusting (i.e., coping) better than the target with the worse (downward) prognosis. This finding shows that standing on one comparison dimension may affect perceived standing on another.

There was no effect of comparison targets on diabetic patients' affiliation, desire for information, or likability of the target (Derlega et al., 2005). Exposure to downward coping targets (vs. upward) led to more desire for emotional support from and more liking of the target, but there were no significant differences from the unspecified target. The downward coping target was associated with more desire for information than the unspecified target, but was no more effective than the upward coping target. When asked to compare themselves explicitly to the targets, patients exposed to a downward target rated themselves as somewhat better off, relative to patients in the upward prognosis condition, but the statistical contrast was not significant. As in Stanton and colleagues (1999), it appears that there was only a *trend* for identification with an upward target; contrast with the downward target was also a non-significant trend.

In Derlega and colleagues' (2008) study of patients with HIV, those assigned to a downward coping target showed less desire for emotional support and information from the target (vs. upward or unspecified), but coping ratings did not differ. Upward prognosis targets resulted in greater desire for emotional support from, and greater likability of, the target relative to the 'unspecified' prognosis condition, but

did not differ from the downward prognosis condition. Patients' self-ratings of prognosis were better in the downward prognosis condition than in the upward or unspecified conditions, suggesting a positive contrast effect for exposure to a downward target versus an unspecified (control) target. Responses to the upward target versus the unspecified target, however, did not differ. In sum, an improvement in self-appraisal after exposure to a better-off patient (i.e., identification) was not obtained.

Few studies of patients' comparisons have assessed effects on motivation to engage in self-care behaviour. One exception is Schokker and colleagues (2010) in a sample of patients with insulin-dependent diabetes. Besides manipulating comparison information, the researchers examined the effects of self-efficacy and 'regulatory focus', (i.e., the extent to which patients wanted to achieve desirable outcomes [promotion focus] or to avoid undesirable outcomes [prevention focus]). Patients with a high promotion focus were more motivated to engage in self-care than patients with a low promotion focus when exposed to the upward target. In contrast, patients with a high prevention focus were more motivated to engage in self-care than patients with a low prevention focus when exposed to the downward target. Self-efficacy qualified this latter finding, as it only applied to patients with high self-efficacy.

### **Quasi-experimental designs**

Kulik, Mahler and colleagues examined the effect of roommate assignment on psychosocial and physical outcomes for male patients about to have cardiac surgery (Kulik & Mahler, 1987; Kulik, Mahler, & Moore, 1996; see Table 7). A post-operative patient who shared the participant's room may be considered an upward comparison target, as the roommate successfully completed the surgery and can provide information about self-care and coping (e.g., through conversation or observation). Assignment to a pre-operative roommate can be considered a downward or lateral comparison, depending on medical status, because both the patient participant and patient target are pre-surgery.

Cardiac patients whose roommates were post-operative (vs. also pre-operative) were less anxious the night before surgery, ambulated more post-surgery and had shorter hospital stays. Although one study showed no effects of roommate medical condition (i.e., same vs. different surgical procedure; Kulik & Mahler, 1987), the other study found that post-operative ambulation was sooner, and hospital stay was shorter, among cardiac patients whose roommates were also cardiac patients, as opposed to non-cardiac (Kulik et al., 1996); there were no interactions between surgical status (pre vs. post) and surgery type (same vs. different). Kulik and colleagues (1996) also found that patients' time spent interacting with their roommates did not differ by roommate status or medical condition. Patients with roommates who also were cardiac cases or post-operative (vs. noncardiac or pre-operative), however, spent more time observing or discussing what to expect from surgery, coping techniques, etc., with their roommates. In fact, the associations between roommate's status and medical condition with length of hospital stay were mediated by ratings of the cognitive clarity obtained from roommates.

**Reaction methods: summary and critique**

Responses to the provision of a comparison target tend to be positive, but the ambiguity and inconsistency of results suggest caution in drawing firm conclusions about what type of comparison is most beneficial. When patients are instructed to compare with their idea of the 'average' patient, they perceive the average to be worse-off, a tendency also associated with greater well-being. A handful of experiments, however, have found no additional benefits of exposure to a comparison target plus information about medical procedures or health education (e.g., Mahler & Kulik, 1998). A greater proportion of available research finds effects that depend on the direction of the comparison provided.

In response to other patients who are doing poorly, patients make more positive ratings of their own prognosis, coping and (in some cases) motivation for self-care. With inconsistent results for upward and downward comparisons, however, what remains unclear is the impact of comparisons on positive affect. Patients report liking, and preferring to affiliate with, upward rather than downward targets. Exposure to upward targets (i.e., post surgery patients) in-hospital is associated with emotional and physical benefits, such as lower depression, greater post-operative ambulation and shorter hospital stays (Kulik & Mahler, 1987; Kulik et al., 1996). These benefits may be attributable to patients spending more time gaining clarity about their illness and procedures from upward (i.e., more experienced) targets. There is an interpretational problem, however, as Kulik and colleagues' quasi-experiments did not include a no-comparison control. Furthermore, upward comparison, operationalised as someone who is successfully coping with a prior surgery, is qualitatively different from someone who is coping better and who is at the same exact stage in the medical procedure as the patient.<sup>9</sup>

As noted, some experimental studies show differential effects of downward versus upward comparisons, with downward targets associated with better self-appraisals of psychological and physical status (Derlega et al., 2005, 2008; Stanton et al., 1999). However, statistical contrasts between upward comparison and no-comparison/ unspecified standing tend to be non-significant. Downward comparison exposure had a more positive impact than did no-comparison or unspecified controls, but the evidence is not consistent. Similarly, upward (mastery) and lateral/downward (coping) manipulations yielded benefits, but the benefits did not exceed those produced by health information alone (Mahler et al., 1995, 1999; Mahler & Kulik, 1998). Only significant contrasts between upward comparison (or downward comparison) versus no-comparison controls would constitute compelling evidence of comparison elevating or decreasing self-appraisals. Thus, findings to date can only be considered suggestive and require additional replication and extension.

Making explicit reference to an upward target (i.e., 'rate yourself in comparison to X') was associated with better perceived coping, but not better perceived illness severity, than was indirect assessment. This difference is potentially important because it highlights the distinction between coping and illness severity. Among some patients, physical features of an illness may be less subject to interpretation than are aspects of coping (such as emotional responses to symptoms or self-management). The methods used to capture self-evaluations also may affect the comparison process. For example, explicitly asking patients to compare themselves to a target may activate self-enhancement motives while prompting an implicit comparison (i.e.,

asking patients to assess self and other patients separately) may not elicit self-protective needs.

### *Additional methodological issues*

One method falling in the reaction category, relative evaluation, has particular interpretational limitations. This method requires respondents to imagine the 'average' target (patient); this 'constructed' comparison might include aspects of symptom severity and/or coping, and the patient might focus on perceived similarities and/or differences. Furthermore, researchers are unable to determine whether patients truly generated information about the 'average' target or imagined contact with a real or fictional (i.e., media-generated) exemplar, whose standing may not be close to the 'real' average. In response to this method, patients consistently report the 'average' patient is worse off than themselves.

This finding may reflect the well-documented tendency to see oneself as better off than most other people (Alicke, 1985; Chambers & Windschilt, 2004; Moore & Kim, 2003; Taylor, 1983), which is multi-determined by cognitive and motivational factors (Suls et al., 2010). (In fact, people show the better-than-average [BTA] bias independent of salient self-esteem threat.) The BTA bias has a kinship with a generic (global) downward comparison (and assumed contrast), which may be self-enhancing (Taylor & Lobel, 1989; Wills, 1981), as the BTA bias is associated with concurrent and future feelings of positive well-being for patients. In light of the consistent evidence for the short- and long-term benefits of global downward comparisons (in contrast to the effects of comparisons with specific downward targets), a fuller understanding about how patients construct the image of the 'average' patient is needed. For example, do patients imagine someone with severe symptoms and/or coping poorly? Do patients construct an 'average patient' prototype or do they imagine what actual contact would be like?

Experimental reaction methods have been used most commonly in between-subjects designs to assess outcomes of direction or type of comparison; thus, little is known about the magnitude of change from pre- to post-comparison. In everyday life, patients tend to be exposed to a range of upward, downward and lateral targets, so it would be helpful to know more about how patients respond across multiple comparison situations (see Tennen & Affleck, 1997). More extensive use of mixed or within-subjects (quasi)experimental designs to study the effects of specific kinds of comparisons would provide two kinds of information. First, they would help elucidate the short- and long-term effects of different types of comparisons. Researchers still do not know whether the some types of comparisons have more longer-lasting positive or negative effects, or are associated with certain situations (e.g., times of high uncertainty) or to more serious outcomes (e.g., longer recovery from treatment).

An additional area of opportunity is the use of naturalistic data collection or methods to capture comparisons in daily life (including ecological momentary assessment [EMA]; see Smyth & Heron, in press). Such designs would allow patients to report recent comparisons at the end of each collection day, or even multiple times per day, and could help provide a more detailed picture of comparisons as they occur in the 'real world' and in real time. Naturalistic methods could be used in both descriptive and experimental work. Descriptive EMA studies could map patterns of

comparison activity (e.g., between-person comparison ‘strategies’), situational predictors of comparisons (e.g., within-person states such as mood, anxiety, uncertainty, illness symptom severity, as well as dynamic contextual/environmental features) and real-time responses to comparisons (e.g., affect change, motivation for self-care). This type of research would lead to insights about the kinds of people, comparisons and contexts for which interventions should be targeted. An example of such a study is Affleck, Tennen, Urrows, Higgins, and Abeles (2000) examination of downward comparisons in the daily lives of women with chronic pain, which showed that days with more instances of downward comparison were associated with increases in positive mood across the day. Naturalistic assessments also could be used in experimental or intervention trials to capture the real-world changes induced by the protocol (e.g., patients report less negative affect in response to daily downward comparisons after X intervention or manipulation, not observed in a control group). With more knowledge about the kinds of comparisons that are beneficial or harmful for patients, both in the laboratory and in the natural environment, the use of comparison targets in interventions or standard medical care could be improved.

### *Individual difference characteristics*

More research is needed on the role of perceived similarity, regulatory focus and self-efficacy for positive health behaviours, as these constructs have not been studied extensively in medical populations. Greater identification with upward targets was associated with more positive affect, but the role of identification (vs. contrast) in negative affect or in response to downward comparison has been understudied. Likewise, there is some evidence to suggest that regulatory focus and perceived efficacy for self-care influence the effects of comparisons. Neuroticism has also been implicated as a potential moderating variable, but has only been included in a single reaction experiment. In light of its significant role in studies using narration methods, the tendency for persons scoring higher in neuroticism to report less positive and more negative affect in response to comparison merits additional study.

To date, comparisons of cardiac and cancer patients have been the most frequently studied in this area. Although medical treatments for these conditions differ in significant ways, cardiac surgery is more similar to radiotherapy, chemotherapy or surgery for cancer than to treatments for a degenerative illness such as rheumatoid arthritis. In addition to treatment differences, the number of naturally occurring opportunities to observe, interact with, or obtain information about the relative prognosis and coping of other patients likely varies with type of illness and treatment. The distinction between actual contact and information modes of comparison also is relevant; in some studies information (e.g., Bennenbroek et al., 2003) had less impact than contact (Kulik & Mahler, 1987), perhaps as a function of degree of proximity and/or the complexity of the information – another issue ripe for future study.

## **Discussion**

### *Converging trends across selection, narration and reaction methods*

Despite some ambiguous results, some consistent trends emerge from all three methods of capturing social comparison. Identifying or having actual contact with

someone who is *coping* better tends to be beneficial for patients, while contrasting or being exposed to information about someone with *more severe illness* tends to be beneficial. In contrast, downward comparisons about coping and upward comparisons about illness severity seem to be unhelpful. The descriptive-correlational research, based on narration and selection methods, provides the most consistent evidence for these summary statements. However, to make strong claims from these trends is premature as experimental studies have not found consistent and statistically significantly greater benefits for upward comparisons versus no-comparison controls, and the evidence for downward comparison is also mixed. Scant attention has been paid to the effects of comparison on patient self-care, whether comparisons with acute effects on mood also have long-term effects and how the negative effects of comparison can be avoided. Thus far, research suggests that patients who are neurotic engage in frequent comparison, but obtain few positive benefits. If anything, comparisons seem to reinforce negative perceptions of the self for these individuals.

The literature concerning social comparisons among patients with chronic illness suffers from several limitations. A majority of the existing work has been conducted in cancer patients, with little consideration of the potential differences between cancer and other illnesses. (One exception showed that breast cancer and osteoarthritis carry distinct illness perceptions and disease burdens, but showed no differences in recalled comparison consequences; Heidrich, 1996). Moreover, the broad category of ‘cancer’ includes several forms of illness with a wide range of treatment options and likely clinical prognoses/outcomes. The specific type and location of cancer, as well as the nature and duration of treatment, may impact patients’ desire for and/or response to social comparisons. Several studies have included patients with varying types of cancer and/or treatment regimens in a single sample. Bennenbroek and colleagues (2002, 2003; Buunk, et al., 2009) have found some evidence that type of cancer is not related to social comparison; otherwise, type of cancer has not been examined in relation to social comparison.

Neuroticism is consistently associated with comparison preferences and responses, but this personality feature has only been examined in cancer samples. For different illnesses, the type and effect of social comparison may vary with the passage of time since diagnosis or treatment. Temporal considerations show an intriguing pattern. Patients with cancer tend to report using downward comparisons *early* (vs. later) in the illness process, whereas patients who undergo cardiac surgery tend to report using downward comparisons *later* (vs. early) in their recovery.

It is possible that patients from distinct illness populations use social comparisons in different ways and/or for different goals, and that outcomes of interest may differ based on diagnosis. For example, researchers and clinicians interested in cancer or arthritis might be primarily concerned about the direct effects of social comparisons on physical or emotional state, which can impact illness progression. Those interested in diabetes or heart disease might do well to attend to the indirect effects of social comparisons on self-care (or motivation for self-care; e.g., Schokker et al., 2010), as well as effects on physical or emotional state. Research on health behaviour (e.g., Azjen’s Theory of Planned Behavior) suggests that the effects of social comparison on motivation for self-care may be a fruitful area of study, as motivation (or intention) to perform an action is a predictor of actual action (Falomir-Pichastor, Berent, & Pereira, 2011; Godin & Kok, 1996). Further research

is necessary to determine whether (and which) certain diagnoses are more likely to facilitate comparisons, and whether specific diagnoses are associated with certain types of comparisons or health-relevant outcomes.

A final empirical gap concerns the dearth of studies that have assessed preference for, and effects of, lateral comparisons. This gap probably occurred because the initial impetus for study of comparisons in patients was Downward Comparison theory, which emphasises self-enhancement elicited by threat (Wills, 1981; Wood et al., 1985). Classic comparison theory considered lateral (i.e., similar-other) comparisons to only be useful for self-evaluation. Also, the use of lateral comparisons in experimental work presents the practical difficulty of constructing a patient-target who is at the 'same level' (of illness severity or coping) as various patient participants. What evidence is available, however, suggests patients do make lateral comparisons (Bennenbroek et al., 2002; Molleman et al., 1986), and that such comparisons have affective consequences (Bogart & Helgeson, 2000; Dibb & Yardley, 2006, Study 2).

In sum, progression of the literature on patients' comparisons requires attention to several patient and methodological characteristics. There is the need to study a greater variety of physical conditions, to conduct more descriptive and experimental studies with short-term and long-term outcomes (including objective markers of health status), and to expand work on potentially important individual difference factors. Personality constructs such as neuroticism and SCO represent two promising avenues for further delineation of who may benefit from opportunities for social comparison.

### **Social comparisons among patients with chronic illness: theoretical considerations and recommendations for future work**

Selection and especially narration approaches, based mainly on descriptive-correlational methodologies, offer a relatively cohesive picture of patients' social comparisons. A notable limitation, however, is the failure to find robust effects of upward and downward comparison (vs. no comparison controls) in experimental and quasi-experimental social comparison studies, particularly as such methods should offer the most rigor. Rather than assume these ambiguities merely are the result of small samples, low statistical power or insensitive measures, it may be appropriate to extend the basic conceptual frameworks (Buunk & Ybema, 1997; Festinger, 1954; Taylor & Lobel, 1985; Wills, 1981) that inspired the original research. Two models proposed since then may explain why upward or downward comparisons often do not produce significant reactions.

#### ***Proxy model***

This model (Wheeler et al., 1997) is concerned with self-evaluation of personal action capability, or 'Can I do X?' Short of trying 'X' and failing, which potentially may have serious costs, comparing with a proxy who already has attempted to perform behaviour X can be informative about our likelihood of success. But not any proxy will do; the proxy must be similar to us in underlying ability. As we cannot directly observe ability (only performance is observable), we require some way of knowing if the proxy's performance is truly indicative of his/her ability. According to the model,

a proxy's prior success on a novel task ('X') should be a good index of one's likely future performance on X, if both proxy and self performed similarly on a prior related task and the proxy is known to have exerted maximal effort on that occasion. If it is unclear whether the proxy made a maximum effort, then the proxy may be an inappropriate comparison; if the proxy was fatigued or ill on the first performance, it may be an underestimate of what the proxy is capable of, and a poor prognosticator for one's future success at X. There are occasions when information about a proxy's maximum effort may be unavailable, but a proxy's success/failure can still be potentially informative if the individual and proxy share related attribute standing (i.e., attributes presumed to be related to performance).

Although the proxy model was developed to clarify and refine Festinger's original ideas about self-evaluation via comparison, it is relevant to patients who actively make or are exposed to comparisons with patients who are better-off. An important question for the chronically ill is 'Will I get better or worse?' Someone who is coping better or who has a better prognosis (i.e., upward target) can serve as an inspiration and a role model, but according to the proxy model, not just any model will do – the model must share related attributes, or we must know something about previous performance (and 'maximum') to presume we share 'their abilities'. In all of the experimental studies manipulating information about upward and downward comparison targets, patients know very little about them *beyond their current standing with the target* (see Locke & Nekich, 2000). Hence, patients may have difficulty accepting these targets as appropriate proxies to assess their success in the future. In this light, the failure to find significant benefits associated with upward targets (vs. controls) may be less surprising.

Fortunately, however, the proxy model suggests a remedy: describe or present patient proxies who share underlying attributes with the patients. This might take a form very similar to tailoring of health communications to the person's age, socioeconomic status (SES) and life circumstances. Some existing work circumvents the practical difficulty of tailoring to individual patients by using patient vignettes described in the first person, so that gender and ethnicity cannot be inferred from the patient's name (Derlega et al., 2005, 2008; Stanton et al., 1999). This is a simple way to prevent the automatic discounting of the target due to dissimilarity on underlying attributes, but it also carries limitations. Most problematic is that we currently do not know whether it 'works' as recommended by the proxy model – do patients project their own attributes onto the target, or do they assume a target's attributes based on their own motivations? An interesting avenue for future research would be the assessment of patient assumptions about the unknown qualities of a target. At present, however, tailoring to a patient's characteristics seems the most feasible strategy to apply the principles of the proxy model.

### ***Selective accessibility model (SAM)***

This approach (Mussweiler, 2003) concerns how comparison induces shifts in self-evaluation or behaviour either toward (i.e., assimilation/identification) or away from (i.e., contrast) upward or downward targets. SAM shares features with the I/C Model, but emphasises the information made cognitively accessible by the target. The idea is that exposure to a comparison target prompts an initial holistic or 'gist' (implicit or unconscious) assessment of similarity to the target. (People appear to

rapidly consider a small number of salient features, such as gender and age, to assess whether an object and a target are generally similar or different). Then, the holistic impression automatically instigates information retrieval, which focuses on hypothesis-consistent evidence (Klayman & Ha, 1987). Thus, a general impression of similarity with the target sets in motion a process of ‘similarity testing’. As the self has many facets, people can construe self-knowledge in such a way that accessible knowledge is consistent with the initial holistic impression, with the consequence that self-evaluations are drawn closer to the comparison target (that is, identification/assimilation) after selective search on similarity. Conversely, the initial impression may be of dissimilarity, which should prompt selective retrieval of target-inconsistent information about the self, or construal consistent with the initial impression of difference. After dissimilarity, self-evaluations should be displaced from the comparison target, leading to contrast.

As with the I/C Model, factors such as attainability, perceived control and psychological closeness are relevant because they contribute to the initial holistic impression of similarity versus difference. However, the SAM provides additional insights about how to induce assimilation or contrast. For example, Mussweiler (2003) reported several experiments in which implicitly or explicitly priming similarity or dissimilarity prior to exposure to a comparison target leads to subsequent assimilation or contrast, respectively. Adapting these priming procedures (Bargh & Ferguson, 2000; Srull & Wyer, 1979) to medical patients should help the development of upward or downward patient targets designed to elicit assimilation or contrast, and facilitate the implementation of interventions to produce desired patient responses.

### ***Remaining issues***

The preceding suggestions largely apply to experimental manipulation of comparison targets, which might be incorporated into interventions to facilitate patient adjustment. Many patients, however, will not seek such treatment and will maintain their implicit conceptions of other patients. We lack a full understanding about how people remember or construct comparison targets beyond the general role of heuristics (e.g., availability and representativeness; Tversky & Kahneman, 1974). As the ‘average patient’ is most commonly viewed by patients as worse-off, something other than ‘cold, cognitive’ factors seems to be operating. The self-enhancement motive is logically implicated, but whether it is a satisfactory and sufficient explanation, and whether having a ‘worse-off’ patient prototype it is beneficial in the long term, remains unclear. Related research on the BTA effect and unrealistic optimism (Weinstein, 1979) emphasise self-enhancement motivation as the source of these positive biases, but several purely cognitive explanations, such as egocentrism, focalism and unique attributes also have been identified as sufficient causes (Chambers & Windschilt, 2004; Moore & Kim, 2003; Suls et al., 2010). Future research on the recall and construction of the average patient needs to be conducted with recognition of these newer developments in social cognition.

No available experiment of which we are aware has *simultaneously* included direction (i.e., upward vs. downward), dimension (i.e., coping vs. illness severity), and mode (i.e., contact vs. information) as factors. As a result, their relative strengths are unknown, and potential interactions and mediating factors have not been adequately evaluated. Incorporation in multi-factorial designs of traditional factors and those

included in newer comparison models, such as self-mutability, self-clarity, explicit versus implicit comparison and similarity versus differences priming, might offer many insights about the potential application of comparison interventions for the chronically ill patient (see Collins, Murphy, Nair, & Strecher, 2005; Collins, Murphy, & Strecher, 2007).

As a concern, 20% of one sample of cancer patients reported having difficulty finding other patients with whom to compare (Hagedoorn et al., 2002); comparable difficulties were reported in other samples, but to a lesser extent (Buunk et al., 1990). In fact, several patients have stated that they did not want to evaluate themselves in relation to others. In other research, a proportion of patients felt that comparing with other people is socially inappropriate (Helgeson & Taylor, 1993; Hemphill & Lehman, 1991). It is possible that the use of forced-choice categories as response options excludes the responses of patients who prefer not to compare. Future studies conducted to investigate the efficacy of social comparison interventions will need to consider patients' attitudes about social comparison; because comparison is not desired or perceived to have benefit by all patients, comparison-based interventions may be ineffective for a subset of this population.

### *Limitations of the present review*

Our approach to reviewing the existing studies was one of many available to us. As previously discussed, we restricted the scope of this review in an attempt to limit confusion and complexity, as the literature was already rife with heterogeneity in assessment methods, item wording, potential moderators and outcomes assessed. Although such restriction was necessary, it prevents us from directly relating our conclusions to a wider range of associated literatures. Perhaps most important among the excluded topics is the function of comparisons in patient education or support groups. It is currently unclear whether the conclusions drawn from this review – based on the *intrapsychic* process of comparison – reflect the *interactive* and *dynamic* processes at work in a patient group. Answering this question is a logical next step for future work in this area. Also noteworthy is our exclusion of chronic pain samples. Along with studies of education and support groups, we believe that this topic deserves unique attention.

### **Conclusion**

This review was conducted to synthesise research on social comparison in patients with chronic illness, and to assess whether the evidence leads to concrete recommendations concerning interventions that include social comparison as a component. Comparison is common among medical patients, although not all comparisons produce positive consequences. There are trends for positive-outcome comparisons arising from identification and contact with a person exhibiting better coping, or contrast with someone more ill. Negative outcomes tend to occur from identification and contact with other patients who are very ill or coping poorly. Individual comparison features, specific nature of an illness, time since diagnosis and several personality characteristics (e.g., neuroticism, SCO) are the critical features to be considered by interventionists, but optimal conditions remain to be determined.

Future research would benefit from three main strategies: (1) additional examination of the comparison target selection process, (2) systematic testing of each comparison feature to identify benefits (both within and across illnesses) and (3) more rigorous testing of effects of exposure to upward and downward comparison targets versus no-comparison control groups, with attention to variables such as related attribute similarity, information about target's maximum effort, priming of similarity versus difference, patient self-mutability – as suggested by the proxy and SAM models. Pursuit of these strategies has considerable promise for the future development, testing and implementation of behavioural interventions that incorporate social comparison components, to facilitate adaptation to chronic illness.

## Notes

1. Although no peer-reviewed, published review has addressed these issues, a book chapter by Tennen, McKee, and Affleck (2000) covered related literature. This previous review had a broader scope, incorporating both studies on medical conditions that are not chronic (e.g., traumatic injury) and health risk perceptions among physically healthy individuals. Only a limited number of studies of chronic illness samples ( $N = 14$ ) were included, and the review did not focus on implications for psychosocial interventions. Thus, the present review is more focused on chronic illness patients, and is more up-to-date in its coverage ( $N = 37$ ).
2. An additional criterion required that specific illnesses and proportion of sample with each illness were identifiable; two studies were excluded because this information was not reported (Dewar, 2003; Leach & Shoenberg, 2008).
3. Helgeson and Taylor (1993) and Bennenbroek et al. (2002) found that when patients were explicitly asked about preferences for various comparison targets, lateral comparisons were most common. These studies are unique in their inclusion of lateral targets in a list of potential comparisons, as most studies offer only upward and downward options. The preponderance of lateral comparisons may have resulted from this methodological difference. Whether this finding would generalise to other samples is currently unclear.
4. Van der Zee, Buunk, and Sanderman (1996b) also differentiated by mode (and by dimension) in their assessment of comparison preferences. Detailed information on preferences was then reduced using factor analysis, and means of ratings for distinct preferences were not reported. As a result, only information about the direction of comparison preferences is interpretable.
5. Patients who rated health care providers as less accessible also rated comparison targets as more informative; inaccessibility of health care providers (i.e., absence of objective information) may contribute to uncertainty and, in turn, increase the perceived informativeness of comparisons, although this proposition was not tested.
6. Van der Zee et al. (1996b) presented a path model suggesting the following causal chain: increased physical and psychological distress  $\Rightarrow$  increased the need for comparison  $\Rightarrow$  increased frequency of downward comparisons  $\Rightarrow$  increased subjective well-being. Although this model had adequate statistical fit, it requires replication in both cancer and other illness samples. Several alternative models are also plausible.
7. We do not entirely agree with the claim that these results are consistent, '...with the idea that prototype images are a source of information for self-evaluation' (Dijkstra et al., 2008, p. 126), because the self-evaluations were made prior to the invocation of a prototype. A different interpretation is that self-appraisals affected the evaluation of prototype images. The need to self-enhance may have prompted patients, who have already made self-assessments, to rate the prototypes as similar, but slightly worse-off than the self.
8. Mahler and Kulik (1998) also included an information-only condition, in which a cardiac nurse presented information about the surgery but no comparison patient was shown.
9. Kulik and colleagues present hospital roommates as comparison targets in the context of affiliation, but do not label targets according to direction (e.g., 'lateral' and 'upward'). Targets are discussed according to direction in the present review in order to facilitate

integration with the broader literature, which typically differentiates targets by direction (or dimension, etc.).

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