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Illusions, Well-Being, and Health

A thesis presented in partial
fulfilment of the requirements
for the degree of Master of
Arts in Psychology, at
Massey University.

Keren Mary Lavell

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ABSTRACT

The present study investigates unrealistically positive biases in human thought, and their relationship with subjective well-being and perceived physical health. Taylor and Brown (1988) refer to these biases as illusions, as most individuals hold more positive perceptions for themselves than they do for most others. Three separate illusions exist - self-perception, control, and expectations for the future - and these are claimed to be an important element of mental health. Traditionally, definitions of mental health have included accurate perception as a criterion. Recent evidence has found that those with accurate perception are instead mildly depressed, while those who have unrealistically positive perceptions are non-depressed. The present study extends the research on illusions and depression, to examine the illusions in relation to well-being and health.

A self-report questionnaire, consisting of five scales, was completed by 300 Psychology students. The Anderson (1968) scale of personality trait adjectives was used to assess self-perception. For control, items were based both on previous experimental measures (Langer & Roth, 1975) and on locus of control measures (Rotter, 1966). Optimism was assessed using the Weinstein (1980) scale. The Mental Health Inventory (Viet & Ware, 1983) was used to measure well-being, and the Cohen Hoberman Inventory of Physical Symptoms (Cohen & Hoberman, 1983) was used to assess perceived physical health.

Three distinct illusions were found. Self-perception was related to positive well-being; control was not related to the outcomes. Optimism was related to positive and negative well-being, and to physical health, and was the strongest predictor of the outcomes. As the measures of self-perception and control were developed for the present study, further research is necessary to confirm their suitability. To the extent that relationships were found, Taylor and Brown (1988) were supported. The present study finds that illusions play a small but significant role in both subjective well-being and physical health.

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INTRODUCTION

Background

The concept of mental health, its definition and structure, has long been a subject of debate. A wide range of theories have been proposed to define mental health, employing such criteria as the absence of mental illness, and adjustment to what is "normal". In a review of the literature, Jahoda (1958) determined six major components of mental health. These were attitudes toward self, self-actualisation, integration, autonomy, perception of reality, and environmental mastery. Of these, accurate perception of reality has traditionally been considered to be important. Human thought and behaviour occurs within the context of the world as it is perceived by the individual. As Jourard & Landsman (1980) concluded, effective action is not possible unless the individual has an accurate perception and valid beliefs about the world. This capacity has been adopted as a criterion by many researchers (Jourard & Landsman, 1980; Snyder, 1989). As Jahoda (1958) stated, "...the perception of reality is called mentally healthy when what the individual sees corresponds to what is actually there..." (p.49).

This view at least partially derives from the fact that the research has been conducted on clinical populations, for whom lack of contact with reality is a distinguishing symptom. Conflicting evidence, however, has found that mildly depressed individuals may be more in contact with reality than "normal" individuals. It has been found that mildly depressed individuals display significantly less cognitive distortion than non-depressed individuals (Abramson & Alloy, 1981; Alloy & Abramson, 1979; Golin, Terrell, & Johnson, 1977; Lewinsohn, Mischel, Chaplin & Barton, 1980). Ruehlman, West and Pasahow (1985) reviewed the evidence, finding that mildly and moderately depressed individuals demonstrated comparatively unbiased responses in the areas of contingency judgements, causal attributions, expectancies, and self reference. They found that severely depressed individuals demonstrated negative response

patterns, while non-depressed individuals showed positively biased response patterns. In their review, Taylor and Brown (1988) supported these findings, concluding that biases occur in three specific areas. These are self-perception, perception of control over the environment, and perception of the future. Taylor and Brown (1988) suggest that, contrary to earlier beliefs, exaggerated perceptions are an adaptive and crucial element of mental health. They suggest that these perceptions rely on a series of social and cognitive filters which make information more positive, and reduce any adverse aspects. Hence, under threatening circumstances these distortions are particularly adaptive. In an earlier paper, Taylor (1983) proposed that the ability to sustain and modify these perceptions is vital for successful adjustment; they buffer against both present threats and future setbacks. Taylor and Brown (1988) describe these perceptions as "illusions", implying, "...a general enduring pattern of error, bias or both that assumes a particular direction or shape..." (p. 194). These illusions consist of overly positive self-evaluation, exaggerated perceptions of control or mastery, and unrealistic optimism; they are proposed to be part of normal human thought, and a necessary element of mental health.

The first of these illusions is an unrealistic view of the self. The premise is that individuals tend to judge themselves as better than most others, even though this is not objectively warranted. People overestimate their management abilities (Larwood & Whittaker, 1977), and overestimate the consensus of others for the opinions and abilities they hold (Campbell, 1986). The traits which individuals rate as most important for themselves form the criteria by which they judge other people (Lewicki, 1983, 1984). After describing themselves using an adjective checklist, individuals remembered best those adjectives which were most self-serving (Brown & Taylor, 1986). Self-ratings of social interaction are considerably higher than ratings of the same subjects by trained observers (Lewinsohn et al., 1980). Alicke (1985) found that ratings of the self, compared with ratings of the "average" college student, were increasingly positive as traits increased in desirability. Individuals judge positive traits as much more like themselves than negative traits (Alicke, 1985; Brown, 1986) and they recall positive personality

information better than negative information (Kuiper & Derry, 1982). This is consistent with findings that individuals judge themselves more positively than others judge them (Lewinsohn et al., 1980). Negative aspects of the self are perceived as being both common to many people, and also as less important (Campbell, 1986). Positive outcomes are attributed to the self rather than to others (Bradley, 1978), and failure is recalled less well than success (Silverman, 1964). This evidence demonstrates the tendency of individuals to perceive themselves in a self-serving manner, and to compare themselves with others in an overly positive way.

The second of the illusions is an unrealistic perception of the control, or mastery, an individual has over the environment. Much of the research has utilised task-outcome scenarios, in which individuals' perceptions of their control over the outcome are measured. This has included gambling scenarios in which individuals participated in a dice game and rated their confidence in obtaining the desired outcome (Golin et al., 1977). Similarly, Langer and Roth (1975) had individuals predict the outcome of coin tosses, then rate their confidence in their ability to make correct predictions (meanwhile ensuring their success rate was random). Alloy and Abramson (1979) also used this format, whereby individuals were required to estimate their control in what was actually a chance situation. Individuals learned to turn on a light by pressing a button, and then predicted the degree of control they had over light onset. In all these situations, individuals overestimated the degree of control they would have, even in situations where the outcome was purely random. Individuals attribute their outcomes (success or failure) on a task according to self-serving biases, so that their perception of control is overly positive (Kuiper, 1978). This is true even for situations in which there is no control at all (Alloy, Abramson & Viscusi, 1981; Langer, 1975). Langer and Roth (1975) found that perceived success resulted in higher perceptions of control because it induced a skill orientation. Where the outcome was perceived to be affected by skill, individuals were more likely to have unrealistic perceptions of control. As most individuals assume they have more control than most other people, evidence is provided for the illusory nature of the perception of control

(Taylor & Brown, 1988).

The third illusion is one of unrealistic optimism regarding future events. Research suggests individuals are optimistic about the future. Most individuals believe that in most situations they will be able to attain desired goals (Fibel & Hale, 1978) and college students reported that negative possibilities for them in the future were outweighed four times over by positive possibilities (Markus & Nurius, 1986). Evidence for the unrealistic nature of optimism is derived from individuals whose predictions reflect what they would like to occur, for example in predicting the next president (Cantril, 1938). They also predict what is socially desirable, for example overestimating the likelihood of their acting in socially desirable ways (Sherman, 1980). This optimism is more in evidence for the self than for others. Individuals rated themselves as more likely than their peers to experience good events, such as liking their first job, or getting a good salary (Weinstein, 1980). They also rated themselves as less likely than their peers to experience negative events, such as becoming depressed (Kuiper, MacDonald & Derry, 1983). Similarly, they believe they are less likely to have a car accident, become a victim of crime, or become ill (Kuiper et al., 1983; Robertson, 1977).

Evidence for the illusory nature of these perceptions is derived from the fact that most people perceive themselves as having more positive qualities, more control, and a better future than most other people will have. This demonstrates a consistent bias in perception, in a positive direction; that is, an illusion.

The Nature of Illusions: The Need for Definition

Taylor and Brown (1988) propose three separate illusions. However, they do not discuss separate outcomes for each of the illusions. Rather, the outcomes are discussed as resulting from illusions in general. This raises two issues. Firstly, while existing as separate entities, the illusions may be occurring concurrently, so that the attribution of specific outcomes to specific illusions has so far not been possible. Secondly, the illusions may not be separable at all, but may instead be part of one general illusory process. Each illusion will be examined in turn to

investigate this.

There is evidence which relates specifically to self-perception. Individuals rated trait adjectives as much more characteristic of themselves when the traits were more desirable (Alicke, 1985). They also recalled positive self-descriptive adjectives more readily than negative adjectives (Kuiper & Derry, 1982). Those traits judged by individuals as most important for themselves were also judged most important for others, demonstrating a self-image bias in person perception (Lewicki, 1983, 1984). This evidence clearly supports an illusion of self-perception which is distinct from the other illusions as proposed by Taylor and Brown (1988).

Other research cited by Taylor and Brown (1988) contradicts this conclusion, however. Miller and Ross (1975) studied self-serving biases in attribution under conditions of success and failure. This work was extended by Zuckerman (1979) who considered the reasons for the biases. Rizley (1978) also examined biases in attributions for success and failure under various conditions. These studies found that when presented with conditions of success or failure, individuals will perceive the outcomes in a manner which is self-enhancing. Thus to a certain extent, an illusion of self-perception is supported. However, the perception that one is responsible for, and has control over, a successful outcome when not objectively warranted, can also be interpreted as an illusion of control. As these findings can be explained by two supposedly distinct illusions, doubt is cast on the structure proposed by Taylor and Brown (1988). The possibility is raised that the illusions either occur concurrently, or exist as aspects of one general illusory process.

This also applies to the illusion of control and the evidence cited by Taylor and Brown (1988). Investigations used behavioural tasks in which individuals estimate their control in chance or low control situations (Alloy & Abramson, 1979; Golin, et al., 1977; Langer, 1975; Langer & Roth, 1975). Such studies, however, also examine expectations regarding the future. Taylor and Brown (1988) themselves

state that the belief that one will experience more positive events in the future than the average person is part of the definition of optimism. Golin et al. (1977) Langer and Roth (1975) and Rizley (1978) each examined expectations for future events in some form, therefore the evidence does not conclusively separate control and optimism.

Evidence cited for the illusion of optimism includes individuals' estimates of their own positive behaviour in the future (Sherman, 1980) and predictions of positive aspects of "possible selves" (Markus & Nurius, 1986). Also included are measures of optimism for future positive events (Weinstein, 1980), and affect and recall surrounding potential positive and negative events (Pietromonaco & Markus, 1985). This research exclusively supports an illusion of optimism; it can not be interpreted as support for the other illusions.

However, not all the studies of optimism have found such unequivocal results. Alloy and Ahrens (1987) required respondents to estimate their expectancies for future success and failure in a given hypothetical situation. Expectancies for success and failure on various tasks were also obtained by Irwin (1944, 1953) and Marks (1951). Such studies do examine optimism for future events, supporting the existence of an illusion of optimism. However, perceptions regarding the outcomes of tasks are also influenced by perceptions of control over those tasks. These studies, cited by Taylor and Brown (1988) as supporting an illusion of optimism, have in effect measured an illusion of control. Thus, it is possible that optimism is a distinct illusion but occurs concurrently with control. Alternatively, optimism may be one aspect of a general illusory process.

The way in which the evidence is presented by Taylor and Brown (1988) precludes drawing any conclusions regarding the structure of illusions. There is, however, an alternative means of unravelling the issue. The overlap of illusions may be caused by the way in which Taylor and Brown (1988) organised their discussion of the research, rather than an overlap of illusions per se. Reshuffling the evidence, so that it is being utilised to support the appropriate illusion, would

reduce the blurred boundaries. To enable this, a more precise definition of each illusion would facilitate accurate allocation of evidence.

Evidence for the illusion of self-perception must restrict itself to self-perception, and not include studies examining success/failure (e.g., Miller & Ross, 1975) which belong in the control category. As an example, Taylor and Brown (1988) cited a study on attributions for success and failure (Rizley, 1978) as evidence of self-perception. According to the more precise definition, this study more accurately supports an illusion of control. The misallocation of this evidence resulted in the incorrect conclusion that self-perception and control could not be separated. In fact, they appear as distinct entities when definitions are precise and evidence is correctly cited. In dealing with the illusion of control, only those studies examining control in the present should be included, not expectancies of control in the future (e.g., Golin et al., 1977; Langer & Roth, 1975). This would prevent control from overlapping with optimism. Finally, optimism must be more carefully defined as that which refers to the future, and not as success/failure on a behavioural task in the present, to reduce any overlap with the illusion of control (e.g., Alloy & Ahrens, 1987).

It is likely the illusions do influence each other, and that there will be some overlap, for example, self-perception will most likely affect the way in which control and the future are perceived. The exact nature of this interaction is an area for research. With appropriate definitions and allocation of evidence, however, it can be concluded that the three illusions discussed by Taylor and Brown (1988) are separate entities.

Consequences of Illusions

The evidence for illusions, as drawn together in Taylor and Brown (1988), is based largely on studies which compare depressed and non-depressed individuals. This evidence suggests that people who have illusions are non-depressed. For example, Lewinsohn et al. (1980) found that non-depressed individuals exhibited a higher degree of unrealistic self-perception. Non-

depressed individuals were also found to have unrealistic perceptions of control (Abramson & Alloy, 1981; Golin et al., 1977) and overly positive optimism (Weinstein, 1980). The absence of illusions is associated with mild depression, and illusions are associated with being non-depressed. Taylor and Brown (1988) extended this, proposing that individuals with illusions are mentally healthier.

Reviews of the criteria of mental health have been distilled from the literature by Jourard and Landsman (1980) and Jahoda (1958). Taylor and Brown (1988) draw upon these reviews to define mental health as consisting of happiness, the ability to care for others, and the capacity for creative, productive work. The reviews included accurate self-evaluation which Taylor and Brown (1988) omitted as it is inconsistent with the premise that individuals have unrealistically positive self-perception.

There is some evidence for the relationship between illusions and these criteria of mental health. The first aspect to be considered is the link between illusions and happiness. Most people report being happier than most other people, which is by definition illusory (Freedman, 1978). Those who report high control and optimism for the future, which may have illusory aspects, are more likely to report present happiness (Freedman, 1978). There is also some evidence that illusions may directly influence mood (MacFarland & Ross, 1982) which has implications for happiness.

The second aspect of this evidence is the link between illusions and the ability to care for others. High self-evaluation, associated with an illusion of self-perception, is important for social bonding (Bohrnstedt & Felson, 1983). Illusions are related to positive mood, and those with positive mood are more likely to help others (Batson, Coke, Chard, Smith, & Taliaferro, 1979) and to express their liking for others (Gouaux, 1971).

The third aspect is the capacity for creative, productive work. There is some evidence suggesting illusions affect intellectual functioning. For example, positive

affect, which may result from illusions, helps retrieval of positive information and problem solving (Isen & Means, 1983). Positive conceptions of the self are associated with working harder and longer on tasks (Felson, 1984), and perseverance leads to more effective performance and increased likelihood of goal achievement (Bandura, 1977). Illusions may lead to more positive evaluation of performance, facilitating increased motivation, persistence and performance in a different way (Vasta & Brockner, 1979).

However, as Taylor and Brown (1988) themselves state, conclusions based on this limited evidence are tenuous and inconclusive. There is no evidence that manipulation of success and failure by MacFarland and Ross (1982) actually manipulates illusions. The illusory aspects of the attribution process were not specifically tested. The measures of "the ability to care for others" are peripheral only. The rate of initiating conversations is not necessarily a measure of the ability to care. The two aspects may be related, but one does not imply the other. Finally, it has been claimed that illusions are related to higher persistence and perseverance, and that this in turn is indirectly related to mental health. However, higher persistence has not always been found to be adaptive (see Janoff-Bulman & Brickman, 1982).

While the results of illusions generally remain unclear, there are some exceptions in which specific consequences can be related to specific illusions. Kuiper and Derry (1982) found that positive mood was related to illusions of self-perception. Scheier and Carver (1985) found that optimism is associated with less physical symptom-reporting, supporting the claim that the illusion of optimism is related to physical health. Although this research provides direct evidence of the results of illusions, the studies are few in number, the exception rather than the rule. Research is required not only to determine the relationship between mental health and illusions, but also to determine the contribution of each illusion separately.

Subjective Well-Being

The relationship between illusions and well-being is a central theme in the Taylor

and Brown (1988) argument. They claim that the relationship between illusions and positive affect (or happiness) may be an indirect route by which illusions affect other criteria of mental health. However, they concede this link is theoretically weak and requires further empirical evidence.

There is evidence that self-perception, control and optimism are associated with well-being. For example, self-esteem (Anderson, 1977) and self concept (Drumgoole, 1981) are related to general life satisfaction. Perceived autonomy (control over one's life) is positively associated with life satisfaction for older adults (Eisenberg, 1981). Freedman (1978) found a relationship between optimism and happiness. These studies have not, however, specifically examined the illusory aspects of the relationships, and the findings regarding illusions remain tentative. Within the context of depression, research has been conducted focusing on these illusory aspects (Alloy & Abramson, 1979; Golin et al., 1977). It is from this that Taylor and Brown (1988) proposed that those with illusions would have higher levels of well-being. An absence of depression, however, does not imply the presence of well-being. According to the World Health Organisation definition (1948, in Ware, Johnston, Davies-Avery, & Brook, 1979) "health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity". As yet there has been no systematic examination of illusions and mental health. To determine the relationship between each of the three illusions and positive and negative well-being is, therefore, an area requiring investigation.

Perceived Physical Health

There is evidence which indicates a relationship between illusions and perceived physical health. Kobasa (1979) and Kobasa, Maddi, and Kahn (1982) found an association between hardiness (which includes perceptions of control), and physical health and illness symptoms. Larwood (1978, in Myers & Ridl, 1979) found that Los Angeles residents think that they are healthier than the average individual. When a group of students were given insurance company longevity data they estimated their own age of death as being ten years later than would

be supported by the actuarial data (Snyder, 1978). Evidence suggests that individuals perceive a comparatively reduced chance of illness for self compared with others; that is, they have an illusion of greater vulnerability of illness for others. Kirscht, Haefner, Kegeles and Rosenstock (1966) found that others were rated as more susceptible than self to diseases such as tuberculosis and cancer. Individuals also rate their chances of negative events such as having a heart attack as less than that of the average individual (Weinstein, 1980). This may be because they compare themselves with an unrealistic stereotypic average person who does nothing to decrease the likelihood of these events. Perloff and Fetzer (1986) named this phenomenon an "illusion of unique invulnerability", finding that the chances of experiencing negative life events, such as contracting diabetes or venereal disease, were rated as less than that of the average person.

Perloff (1983) suggests that this illusion may serve the purpose of increasing feelings of control, thus reducing anxiety and psychological distress. The belief that one's coping abilities are extraordinary in dealing with breast cancer is common, and has been found to be associated with successful adjustment to the cancer (Wood, Taylor & Lichtman, 1985). Taylor, Lichtman and Wood (1984) found that the belief that one can personally prevent cancer from returning is also common. Taylor (1983) suggests that illusions of self-perception, self-efficacy and expectancies for the future can be found in individuals dealing with potentially tragic events such as cardiac illness and rape.

There is a considerable body of evidence which indicates a relationship between illusions and health. Some of this evidence specifically examines one of the three illusions. Weinstein (1980) investigated the illusion of optimism using perceptions of risk regarding health events. Scheier and Carver (1985) examined the relationship between the illusion of optimism and physical symptom-reporting. Taylor et al. (1984) examined perceptions of control regarding cancer, finding evidence of an unrealistically positive bias. However, apart from a limited few, there has been no systematic investigation of each of the illusions. The present investigation will examine the three illusions, hypothesising a positive relationship

with perceived physical health.

Measuring the Illusions

The many studies cited by Taylor and Brown (1988) utilised a wide range of measurements. One of the difficulties in interpreting the research has been that the illusory aspects of self-perception, control, and optimism have not always been examined. As the present study represents the first attempt to systematically measure the three illusions proposed by Taylor and Brown (1988), it is vital the measurements be appropriate, and examine the actual illusions.

When measuring self-perception, an individual may have more positive traits than negative traits. They may also be justified in judging themselves more positively than another person. However, if all individuals judge themselves more positively than they judge others, this is evidence of a positive bias (all individuals cannot be better than all other individuals). Unfortunately, the evidence cited does not necessarily test the illusory aspects. As examples, the self-ratings found by Lewicki (1983, 1984) and the recall of adjectives found by Kuiper and Derry (1982) may have been accurately reflecting individual qualities; evidence of an "illusion" would only be found if the self-ratings were compared with ratings for the average student (a consistent tendency for subjects to judge themselves more positively than the average would be evidence of an illusion).

A frequently used form of measurement of self-perception is one in which individuals rate both themselves and the "average" other person on a variety of personality traits (Alicke, 1985; Brown & Taylor, 1986; Kuiper & Derry, 1982; Lewicki, 1983, 1984). The Anderson (1968) scale is one which has been used for this purpose (Alicke, 1985; Brown & Taylor, 1986). This is a list of personality trait adjectives rated on the dimension of likableness. This measure can be easily adapted to measure the illusion of self-perception by requiring a comparison of self with others on each trait. This scale has a very high reliability (Anderson, 1968) and is appropriate for the measurement of the illusion of self-perception in the present investigation.

There have been a range of experiments examining the illusion of control. Most of these have used gambling formats in which respondents estimate their chances of success in a low - or no - control situation (Golin et al., 1977; Langer, 1975; Langer & Roth, 1975). When aspects suggesting skill, such as competition, are introduced people behave as if the outcome is determined by skill and not chance. Those in whom a negative mood has been induced instead demonstrate more realistic perceptions of personal control (Alloy, Abramson & Viscusi, 1981). Alloy and Abramson (1979) found that when there was some control over the outcome both depressed and non-depressed individuals gave accurate judgements of contingency. However, when the contingency was zero, non-depressed individuals demonstrated an illusion of control. This method assesses perceptions of control in situations where such perceptions are not objectively warranted; that is, the illusory aspects of control. The experimental tasks will be used as the basis for self-report items for the present study.

This adaptation represents the first attempt to use a purely self-report format, without actual tasks, to assess control. As an initial attempt, some potential for improvement might be expected. Additional questions were sought to strengthen the measure.

Locus of control is the extent to which individuals perceive contingency relationships between their actions and the outcomes. An external locus of control is the perception that outcomes are due to factors extrinsic to the individual. Internal locus of control is the perception that the contingency relationship is due to intrinsic factors. According to Taylor and Brown (1988) perceptions of control are subject to self-enhancing biases. By including these biases, the definition of locus of control can be expanded so that it defines the illusion of control.

Preliminary investigations demonstrated that items based on locus of control, and items based on practical tasks, appeared to assess control in the same way. The locus of control items have the advantage of being designed for self-report, a

requirement of the present study, and they can be adapted to assess the illusory aspects by examining the way individuals compare themselves to others on each of the items. Items were taken from the Multidimensional Internal-External Control Scale (Gurin, Gurin, Lao, & Beattie, 1969), and Rotter's Internal-External Locus of Control Scale (Rotter, 1966, in Robinson & Shaver, 1973) selected for their relevance to the illusion of control.

Optimism has previously been assessed using the Weinstein (1980) scale, designed specifically to measure this illusion. This is a list of 18 clearly positive and 24 clearly negative events. Respondents rate the chances of each event occurring to them, compared with the chances for the average student. It is usually difficult to show that optimistic expectations are unrealistic - an individual may have a greater than average chance of experiencing positive events, and a less than average chance of experiencing negative events. A simple comparison of optimistic and pessimistic responses is not enough to show a systematic (consistently positive) bias. On a group basis, however, an optimistic bias can be tested for. If all people claim their chances are greater than those of the average person, this demonstrates an illusion of optimism.

Measuring the Outcomes

There has been debate regarding the structure of mental health. Measurement within general populations initially focused on negative components, such as anxiety and depression (Ware et al., 1979). However, conclusions from recent research are that mental health consists of positive and negative components. Measurements have accordingly been expanding, to cover not only symptoms of illness, but also symptoms of well-being. Bradburn (1969, in Zautra, Guarnaccia, & Reich, 1988) claimed that these positive and negative states are independent. However, subsequent research supports that they are separate, but highly correlated, states (Zautra et al., 1988).

The Mental Health Inventory (MHI) (Viet & Ware, 1983) assesses how often respondents report feeling a variety of affective states. The scale measures

mental health on three levels. The first is general mental health; the second divides mental health into psychological distress and psychological well-being; the third divides well-being into positive affect and emotional ties, and distress into anxiety, depression, and loss of behavioural/emotional control. Items describing positive states cluster to define psychological well-being, and items describing negative states cluster to define psychological distress. The factors are treated as distinct but correlated. Support was found for this hierarchical structure by Tanaka and Huba (1984).

The MHI is an appropriate measure for the current study. It allows examination of the hypothesis that illusions will be related to psychological well-being. It also provides the opportunity for confirmation of past research which has found that illusions are related to non-depression. Included in the MHI is a measure of depression, and it is expected that those individuals with illusions will exhibit lower levels of depression.

Within the research on illusions and physical health various facets have been investigated. One of these is the illusory aspect of perceived risk for negative health events (Perloff & Fetzer, 1986; Weinstein, 1980). Another is the illusory aspect of coping with, and adjustment to, major illnesses and potentially tragic events (Taylor, 1983; Taylor et al., 1984; Wood et al., 1985). These measures are only relevant in a peripheral way, as they do not measure perceptions of physical health itself. Hence, although a relationship is alluded to, perceived physical health has not been specifically measured in relation to illusions. The exception to this is the work by Scheier and Carver (1985). They investigated the relationship between the illusion of optimism and physical symptom-reporting. They successfully used the Cohen Hoberman Inventory of Physical Symptoms (CHIPS) (Cohen & Hoberman, 1983). This is a checklist of 39 common physical symptoms rated on a scale for the degree to which they bother or distress the individual. It represents symptoms commonly found in the population and is an appropriate measure of perceived physical health for the present study.

METHOD

Pilot

As the measures of the illusions of self-perception and control were developed for the present study, and had not previously been combined with the Weinstein (1980) scale, a pilot test was conducted. Twenty students at Massey University completed the pilot questionnaire of measures of the three illusions. Included were the complete version of the Weinstein (1980) measure of optimism, 40 items of the Anderson (1968) scale of self-perception, and 8 items measuring control. Respondents encountered no difficulties completing the items, and it was decided the measures were suitable for the study.

Respondents

Three hundred Psychology students at Massey University completed the questionnaire. Twenty of the respondents returned incomplete questionnaires, and were excluded from further analysis. Demographic data was provided by 268 respondents. The group ranged in age from 16 to 63 years, with a mean age of 20 years (SD = 4.89). There were 174 (62%) females and 94 (34%) males.

Procedure

Sampling was conducted during class time in the winter term. Questionnaires were completed at this time, and took 20 to 30 minutes. Students were informed that the research concerned well-being, and that they would be required to complete a questionnaire examining how students compare themselves with others. They were informed the study was voluntary and anonymous. They were also informed that feedback on the study would be provided once analysis was complete; the researcher would be available to respond to queries in the meantime.

Survey Content

The questionnaire included five self-report scales. These examined self-perception, control, optimism, psychological well-being, and perceived physical health.

The self-perception measure was based on Anderson's (1968) scale, consisting of a list of 555 personality trait adjectives, rated on the dimension of likableness. Correlations of the normative likableness values with similar data from three other universities ranged from .96 to .99 (Anderson, 1968). Forty items, consisting of the 20 items judged most and least likable, were used (Brown & Taylor, 1986). Where a complementary pair of words occurred, for example "sincere" and "insincere", one was omitted and the next item from the list selected. Those items with meaningfulness ratings under 350 and variance greater than 1.0 were also omitted (Brown & Taylor, 1986). Respondents rated themselves, compared with other students, on each adjective. Items were presented in the following format:

"Compared to the average Massey student I am ..."

1--------2--------3--------4--------5

much less   average   much more

kind   kind

The original 7-point scale was adapted to a 5-point scale in order to make it consistent with scales used for the other measures of illusions.

The control measure consisted of 17 items drawn from two sources. Firstly, items were drawn from previously used experimental measures assessing perceptions of control (Golin et al., 1977; Langer & Roth, 1975; Rizley, 1978). Respondents assessed the degree of control they would have, compared to other students, in a range of hypothetical situations based on these experimental measures. As the actual degree of possible control was zero, any perceptions of control were illusory. An example item is as follows:

"When playing a board game, would you rather throw
the dice, or let someone else throw for you?"

Secondly, items were modified from two measures of locus of control; the
Multidimensional Internal-External Control Scale (Gurin et al., 1969), and Rotter's
Internal-External Locus of Control Scale (Rotter, 1966, in Robinson & Shaver,
1973). Items were selected for their compatibility with those drawn from the
experimental measures, and were adapted so that subjects were required to
compare themselves with others. In this way the illusory nature of control was
measured. An example is as follows:

"Compared with the average person, how much of your
life is controlled by accidental happenings?"

The illusion of optimism was measured using the Weinstein (1980) scale, which
assesses perceptions of the likelihood of 42 positive and negative events for self
compared with others. In some cases the wording was adapted slightly to make
it appropriate for a New Zealand population. This scale has the advantage of
being specifically designed to measure the illusion of optimism, although
Weinstein (1980) did not cite reliability or validity data. An example is:

"Compared to the average Massey student, what are
the chances that you will have your car stolen?"

The fourth measure was the Mental Health Inventory (Veit & Ware, 1983) which
has 38 items and is scored on a 7 point rating scale. This was developed for use
in general populations, and assesses psychological well-being and distress. It is
based on a hierarchical factor model composed of a general underlying mental
health factor. There is a higher order structure defined by two correlated factors,
Distress and Well-Being, and five correlated lower order factors, Anxiety,
Depression, Emotional Ties, General Positive Affect, and Loss of
Behavioural/Emotional Control. Internal consistency estimates for the two higher
order factors and the MHI range from .92 to .96, indicating high reliability (Veit &
Ware, 1983).

The final measure was of perceived physical health. The scale used was the Cohen Hoberman Inventory of Physical Symptoms (CHIPS) (Cohen & Hoberman, 1983). This is a checklist of 39 common physical symptoms. Although there are some physical symptoms which could be viewed as psychosomatic, items of an obviously psychological nature are excluded. Six items were deleted from this questionnaire, at the suggestion of the original authors (S. Cohen, personal communication, April 8, 1988). The internal reliability of CHIPS is .88, and in two separate college samples CHIPS was found to be significantly correlated with the use of Student Health Facilities (.22 and .29) (Cohen & Hoberman, 1983). This measure enables assessment of physical symptom-reporting which does not overlap with subjective psychological well-being.

RESULTS

Scores for analysis were obtained by calculating total scores for each scale. If there were less than 10% missing data, values were compensated for with the mean of the data. If more than 10% were missing, the scale was eliminated from the analysis. The exception to this was CHIPS where it was assumed that missing data indicated that the item was irrelevant to the respondent.

Internal consistency was examined for each of the measures of illusions, using Cronbach's *alpha*. The internal reliabilities of self-perception and optimism were high, while the reliability of control was moderate. The high reliability (*alpha* = .91) of self-perception was consistent with the high intraindividual reliability found by Anderson (1968). Initial analysis of control revealed a low to moderate reliability (*alpha* = .48). Items 7 and 10 were negatively correlated with the total score and were deleted. The new measure with these items deleted had a slightly improved reliability (*alpha* = .58). All subsequent analyses were based on the modified measure. A high reliability (*alpha* = .82) was found for optimism.

Correlations between each of the measures of illusions were low to moderate (see Table 1). High correlations would have indicated either that the scales were measuring the same construct, or that the illusions were not found to occur separately. However, low to moderate correlations indicated that the three scales were measuring separate illusions.

Table 1

Means, Standard Deviations, Alpha Coefficients, and Intercorrelations of the Illusions (N=278)

| | Illusion | | | | |
Illusion	Self-p.	Control	Optimism	Mean	SD
Self-p.	(.91)	.33*	.44*	147.73	16.33
Control	.33*	(.58)	.42*	53.46	5.45
Optimism	.44*	.42*	(.82)	140.63	14.90

* *p* < .001

Note: alpha coefficients shown on diagonal

Next, correlations were examined for the relationships between the illusions, and well-being and health. The second-order factors of the MHI, MHI well-being and MHI distress, were included (see Table 2). The MHI correlated moderately with optimism (*r* = .388**, *p* < .001); no significant relationships were found with the other illusions. MHI well-being correlated to a low level with self-perception (*r* = .183*, *p* < .01), and to a moderate level with optimism (*r* = .348**, *p* < .001). No relationship was found for MHI well-being and control. For MHI distress, a moderate relationship was found with optimism (*r* = -.378**, *p* < .001); no significant relationships were found with the other illusions. CHIPS correlated at a moderate level with optimism (*r* = -.364**, *p* < .001), in a negative direction as predicted. No relationship was found for CHIPS with the other two illusions. Both the MHI and CHIPS correlated most strongly with the optimism measure. There was some concern that the relationship between optimism and health might be a function of the health-related items of CHIPS. However, when the 16 items related to physical health were deleted the correlation remained significant (*r* = -

.265**, *p* < .001), although somewhat smaller.

Table 2

Correlations Obtained Between the Three Measures of Illusions, MHI, MHI well-being, MHI distress, and CHIPS

	Measures			
Illusion	MHI	MHI well-b.	MHI dist.	CHIPS
Self-p.	.135	.183*	-.096	-.076
Control	.089	.097	-.077	-.084
Optimism	.388**	.348**	-.378**	-.364**

* *p* < .01   ** *p* < .001

Finally, correlations between the third-order factors of the MHI and the measures of illusions were examined (see Table 3). The second-order factors of the MHI, MHI well-being and MHI distress, are composed of five component factors (Viet & Ware, 1983). MHI well-being consists of positive affect and emotional ties. MHI distress consists of anxiety, depression, and loss of behavioural/ emotional control. Of the well-being factors, positive affect correlated to a low degree with self-perception (*r* = .184*, *p* < .01), and to a moderate degree with optimism (*r* = .367**, *p* < .001). Emotional ties correlated to a low degree with self-perception (*r* = .150*, *p* < .01) and optimism (*r* = .175*, *p* < .01). No relationship was found for emotional ties and control. Of the MHI distress factors, anxiety correlated with self-perception to a low degree (*r* = -.151*, *p* < .01), and optimism to a moderate degree (*r* = -.409**, *p* < .001). Low correlations were found for depression with optimism (*r* = -.269**, *p* < .001) and behavioural/emotional control with optimism (*r* = -.363**, *p* < .001).

Table 3

Correlations Obtained Between the Measures of Illusions and the Third-Order Factors of the MHI

Illusion	Third Order Factors of MHI				
	PA	ET	A	D	B/E
Self-p.	.184*	.150*	-.151*	-.024	-.064
Control	.134	.107	-.099	-.038	-.123
Optimism	.367**	.175*	-.409**	-.269**	-.363**

* p < .01   ** p < .001

PA: positive affect
ET: emotional ties
A: anxiety
D: depression
B/E: behavioural/emotional control

Multiple regressions were conducted to examine the ability of the illusions to jointly predict scores on MHI well-being, MHI distress and CHIPS (see Table 4). For each regression, the three illusion measures were forced into the equation on a single step. Jointly, the illusions predicted MHI well-being ($adjR^2$ = .125, df = 3,273, p < .001), MHI distress ($adjR^2$ = .148, df = 3,273, p < .001), and CHIPS ($adjR^2$ = .120, df = 3,269, p < .001). This confirmed the results of the correlational analyses. Of the illusions separately, only optimism was significantly related to the outcomes. Self-perception and control did not increase the predictive ability, demonstrating that optimism is the most important of the three measures of illusions.

Table 4

Multiple Regression Data for MHI well-being, MHI distress, CHIPS, and the Illusions

Dependent Measures Illusions	B	Beta	t
MHI well-being			
self-p.	.033	.040	.629
control	-.057	-.023	-.369
optimism	.321	.357	5.419**
$adjR^2 = .125$, $F(3,273) = 14.120$**			
MHI distress			
self-p.	.115	.082	1.306
control	.226	.053	.857
optimism	-.689	-.443	-6.795**
$adjR^2 = .148$, $F(3,273) = 16.993$**			
CHIPS			
self-p.	.108	.099	1.535
control	.161	.048	.763
optimism	-.491	-.408	-6.141**
$adjR^2 = .120$, $F(3,269) = 13.412$**			

** $p < .001$

DISCUSSION

Theories of the structure of mental health change constantly as criteria are examined, and new definitions proposed. A history of research using clinical populations, for whom lack of contact with reality is commonly a symptom, has resulted in an emphasis on accurate perception as a criterion of mental health (Jahoda, 1958). Recent research using individuals in a nonclinical population has found, however, they do not display such accurate perceptions as have been assumed. Mildly depressed individuals exhibit accurate perceptions (Ruehlman et al., 1985), while non-depressed individuals instead exhibit self-serving biases, or illusions (Taylor & Brown, 1988).

Taylor and Brown (1988) reviewed the associations between illusions and depression, and proposed that individuals with illusions would have higher levels of well-being. The present study examined this relationship in terms of self-perception, control, and optimism. Building on tentative ideas by Taylor and Brown (1988) a relationship was also predicted for illusions and perceived physical health. Results supported the theoretical structure of three distinct illusions, as proposed by Taylor and Brown (1988). Self-perception was related to the positive aspects of subjective well-being, and to anxiety among the negative aspects. It was unrelated to physical health. Control was unrelated to either of the outcomes. Optimism was related to both well-being and physical health.

The Nature of Illusions

From their review, Taylor and Brown (1988) concluded that the three illusions were distinct. However, examination of this evidence revealed that the boundaries overlap. Evidence cited as supporting self-perception was able to be interpreted as evidence for control (Rizley, 1978; Zuckerman, 1979). Evidence supporting control was able to be interpreted as supporting optimism (Golin et al., 1977; Langer & Roth, 1975). Finally, research which provided evidence of

optimism also supported control (e.g., Alloy & Ahrens, 1987; Pruitt & Hoge, 1965). This raised the possibility that the illusions could not be separated, and were instead different aspects of one general illusory process.

In the Taylor and Brown (1988) review, the studies were not always allocated to the discussion of the most relevant illusion. For example, Rizley (1978) examined expectations of control, so this study was included in the discussion of the illusion of control. These expectations concerned the future, and the study would have been more appropriate within the context of optimism. This confusion could have been avoided if definitions of the illusions had been precise. When control is limited to the present, and optimism defined as that which refers to the future, it becomes clear that the study by Rizley (1978) is more relevant to optimism. The definitions overlapped, not the illusions themselves. This was confirmed in the present study, by the low relationships between the illusions, and by the different effects each have on well-being and health. With the appropriate allocation of evidence, the illusions appear to operate separately, rather than as aspects of one general illusory process.

Measurement Issues

By their very nature illusions are difficult to examine. An individual's perceptions may be accurate; they may be kinder than average, or have a less than average chance of becoming ill. The degree to which these perceptions are illusory is hard to assess. However, if **all** individuals perceive more positively for self than others, there is evidence of a consistent bias in perception. In this way, illusions can be examined on a group basis. In the limited previous research, this has proved to be a useful approach (e.g., Weinstein, 1980).

The best available method for the present study was, therefore, to investigate the illusions on a group basis. As the Weinstein (1980) scale was the only direct measure of an illusion available, other measures had to be adapted for the purpose. Measures were used which related as closely as possible to the constructs, and adapted to elicit ratings of items for self compared with others.

By requiring this comparison with others, the illusory aspects were assessed. The measure of self-perception was selected on the basis of its usefulness in previous literature (Alicke, 1985; Brown & Taylor, 1986) and its high internal consistency (Anderson, 1968), adapted so that each item required a comparison with others. The measure of control was adapted from previously used practical tasks (Golin et al., 1977; Rizley, 1978) and locus of control measures (Gurin et al., 1969; Rotter, 1966, in Robinson & Shaver, 1973).

The present study found these measures were useful, although evidence for the illusions was not as strong or consistent as predicted. However, it is not possible to determine whether the findings accurately reflect the relationships, or whether the result was affected by the type of measurement used. The measures represent initial attempts at a new format, and so potential for improvement could be expected. The measure of self-perception had not been used previously to assess illusory aspects, and its validity for this is unknown. The measure of control represented the first attempt to transpose practical tasks into a self-report format, and to combine these with items based on locus of control. It may be that the self-report format does not assess the same elements of control as the tasks used in previous experiments. A further difficulty in interpreting the effects of control in the present study is the moderate reliability of the measure. Therefore, although the results suggest the measures were useful, additional work is required to confirm their validity before conclusions can be drawn.

One means of validation is by examining the predicted relationships between each of the illusions and the outcomes. The literature suggests that the illusion of self-perception will be related to subjective well-being and physical health. To the extent that these relationships were found, there is evidence for this illusion. However, the relationships were not strong, and self-perception was not related to negative well-being or to health. This may be an accurate reflection of the relationships, although some doubt remains because the suitability of the measurement is not known. Further investigation is required to confirm the limited evidence found for this illusion.

From the literature indicating a relationship between control and depression, Taylor and Brown (1988) hypothesised that those with an illusion of control would have higher levels of well-being and health. However, the present study found no significant relationships. Again, although this may be an accurate conclusion, interpretation of the findings is hampered by the lack of evidence for the measure.

Taylor and Brown (1988) also predicted relationships between the illusion of optimism, and well-being and health. Relationships were found, providing support for this illusion.

In the absence of evidence to the contrary, the present study accepts the theoretical structure of illusions as proposed by Taylor and Brown (1988). The three illusions were separated out, and assessed individually using the best available measures. To the extent that relationships with well-being and physical health were found, evidence was provided for the hypotheses. There were low to moderate correlations between the illusions, and as predicted, each illusion affected well-being and health in different ways. The need for further evidence remains, however, as the measures are new, and the findings inconsistent.

Although the illusions are distinct entities, it is likely that they will influence each other to some extent. Self-perception, for example, will affect perception of control and the future. The small relationship found between the illusions, as indicated by the low correlations, confirms that there is some interaction; the nature of this is an area for future research.

Illusions and Perceived Physical Health
Illusions were hypothesised to be associated with higher levels of physical health. As part of an optimistic bias, individuals rate themselves as much less likely than others to experience illness (Weinstein, 1980). Most individuals overestimate their own age of death, even when presented with actual longevity data (Snyder, 1978). This is related to the "illusion of unique invulnerability" whereby individuals rate themselves as much less likely than others to experience negative health

events (Perloff & Fetzer, 1986). Evidence suggests aspects of self-perception, control and optimism are associated with successful adjustment to health problems, such as cancer (Taylor, 1983; Taylor et al., 1984; Wood et al., 1985).

In the present study, the predicted association between illusions and physical health was found for optimism, but not for the other illusions, contradicting previous research. There is an important difference, however, in the way health was measured. The present research examined day to day common physical symptoms, rather than aspects of major health problems which have previously been the focus. It might be that illusions are necessary for dealing with major problems such as cancer, as Taylor and Brown (1988) claim. In contrast, day to day illnesses are not threatening and it may be that illusions are unnecessary. This may explain the absence of relationships between self-perception and control, and health.

Control Theory and Health

The relationship between optimism and health, found in the present study, confirmed evidence by Scheier and Carver (1985) that higher levels of optimism are associated with lower levels of physical symptom-reporting. Control theory, in which goal-directed behaviour is guided by negative feedback systems, has been suggested as the mechanism underlying this relationship (Scheier & Carver, 1985). These feedback systems become more fully engaged when the individual is focusing inward at a time when some goal or standard is salient. The result is an attempt to reduce the perceived discrepancy between the actual state and the goal. If this process is interrupted by any obstacle, expectancies for success are assessed, resulting in either renewed effort or disengagement (Carver, Blaney & Scheier, 1979b). Physical symptoms represent an obstacle to the desired state (Carver & Scheier, 1981, 1982, 1983) and must be eliminated to reduce the discrepancy (Carver & Scheier, 1982).

It would seem likely that if physical health was poor similar discrepancies would be created with the illusions of self-perception and control, given that poor health

is inconsistent with rating self as better than others. The task of completing a self-report questionnaire would again induce self-focus, which serves to exaggerate any discrepancies; this would increase the need of the individual to perceive good health. This would be consistent with Scheier and Carver (1985), and with the findings for optimism. However, such relationships were not found. One means of explaining the disparity concerns self-focus. This occurs when the individual directs their focus to some aspect of the self, and so becomes aware of how they compare to a salient standard (Carver & Scheier, 1983). Previous research used mirrors (Carver, Blaney & Scheier, 1979a) and the sound of the respondents own voice (Carver & Scheier, 1981) to evoke self-focus. It is possible that the health-related items in the optimism measure induced a focus not just on the self, but on health aspects of the self in particular, exaggerating the individual's need to perceive good health. There were no health-related items in the measures of self-perception and control, and so health may not have been as salient a standard for those illusions.

Illusions and Well-Being

Negative Well-Being

Mildly depressed individuals demonstrate comparatively unbiased evaluative responses (Ruehlman et al., 1985). They judge themselves more realistically than non-depressed individuals do (Lewinsohn et al., 1980) more accurately estimate their control over the outcomes of dice-throws (Golin et al., 1977) and accurately estimate their control over other practical tasks (Alloy & Abramson, 1979). In comparison, non-depressed individuals demonstrate positively biased responses. On the basis of this, it was expected that those with illusions would be less depressed, and would also have lower levels of negative well-being. This will be discussed for each illusion in turn.

Self-perception has been associated with negative well-being. Those who are depressed demonstrate more balanced recall of self-referent adjectives (Kuiper & Derry, 1982) and rate their own social competency more realistically (Lewinsohn

et al., 1980). However, apart from a small relationship with anxiety, the illusion of self-perception was not accompanied by reduced negative well-being. While this may be a legitimate conclusion, it contradicts previous literature. It may be that the chosen measure was not the most suitable. Further research is required to determine the most correct explanation.

More accurate judgement of control has been observed in mildly depressed individuals (Alloy & Abramson, 1979; Alloy et al., 1981; Rizley, 1978). It was, therefore, expected that the illusion of control would be associated with reduced negative well-being. This was not found in the present study. Again, the conclusions which can be drawn are limited by the lack of research on the measure, a particularly pertinent issue for the control measure which used a new format.

Non-depressed individuals have been shown to have illusions of optimism (Alloy & Ahrens, 1987). It was, therefore, expected that optimism would be accompanied by lower levels of negative well-being. This was supported by the present study, and confirmed by the relationships between optimism and anxiety, depression, and behavioural/emotional control (the lower level factors). Again, further research on the measure would strengthen these conclusions.

Positive Well-Being
There is evidence that positive well-being and negative well-being are separate states (Zautra et al., 1988). It might, therefore, be expected that illusions would be related to the separate states in different ways. This was supported by the present study, in which only optimism was related to negative well-being, while self-perception and optimism were both related to positive well-being.

Previous evidence suggested a relationship between illusions and positive well-being (Alicke, 1985; Lewicki, 1984). Such a relationship was found for self-perception and optimism as hypothesised, but not for control. The illusions will be discussed in turn to examine this.

Self-perception has been related to the positive components of well-being. For example, both self-esteem and self-concept are related to general life satisfaction (Anderson, 1977; Drumgoole, 1981). This was confirmed in the present study, at the level of general positive well-being, and at the lower level of positive affect and emotional ties, supporting Taylor and Brown (1988). These relationships were not strong, however, and while this may be an appropriate conclusion, further evidence is needed to corroborate the finding.

The illusion of control is related to the absence of depression (Alloy & Abramson, 1979), and control has been related to life satisfaction (Eisenberg, 1981). Taylor and Brown (1988) extended this to predict that control would be related to positive well-being. However, this was not found in the present study. Again, although this conclusion is feasible, reservations must be held regarding the measure which had not been previously used.

Most people are, in general, optimistic (Fibel & Hale, 1978; Markus & Nurius, 1986). Such optimism has been found to have unrealistic, or illusory, aspects (Kuiper et al., 1983; Robertson, 1977; Weinstein, 1980). On the basis of the evidence (Freedman, 1978) Taylor and Brown (1988) hypothesised that optimism would be related to positive well-being. This was supported by the present study, and confirmed by the relationships with positive affect and emotional ties (the lower level factors). This strengthens the argument made by Taylor and Brown (1988) for the role of optimism in well-being.

Illusions and Well-Being: Theoretical Issues
The theory of self-regulation, as proposed by Scheier and Carver (1985), may also be relevant to the relationship between illusions and subjective well-being. The self-report questionnaire would again induce a self-focus, those items pertaining to well-being inducing a focus on the well-being aspects of the self in particular. This would increase the likelihood of well-being becoming the salient standard for comparison. With the increased saliency, any discrepancies between the standard and the individual's subjective well-being would be exaggerated.

This would increase the individual's need to reduce the discrepancy in order to be able to perceive greater well-being. In the present study, those relationships found between illusions and well-being may reflect reduced discrepancies as defined by Scheier and Carver (1985). However, the absence of a relationship between self-perception and negative well-being, and between control and the outcomes, is not consistent with this. The reason for the differences may lie in the content of each measure. It is possible that the measure of optimism, and to some degree self-perception, provided more salient standards for well-being than control did. This would have increased the individual's need to perceive higher well-being in connection with self-perception and optimism, but not for control, explaining the absence of relationships found for control.

A system of negative feedback loops which enable self-regulation (Scheier & Carver, 1985) may explain the relationship found in the present study between optimism and health. This theory states that behaviour is directed towards reducing discrepancies between the self and a salient standard. These discrepancies are exaggerated by self-focus. Expectations for success determine whether efforts will cease or be renewed. It is possible this model might account for the other findings in the present study, and provide a means of explaining the mechanisms underlying illusions.

The associations between the illusions and well-being were small. One means of accounting for this may have been that they were influenced by the context in which they were assessed. According to Taylor and Brown (1988) illusions may be exhibited to a greater degree when the situation is more threatening. The present study measured mental health within the context of normal day to day life, rather than from a specific context threatening to mental health. Further research is required to determine whether this has an effect.

The present study found that illusions are related to subjective well-being, although not as consistently as hypothesised. Many definitions of well-being, or mental health, have been proposed. Some of these were discussed in reviews

by Jourard and Landsman (1980) and Jahoda (1958). Taylor and Brown (1988) chose to use these, from the many sources available, to formulate their definition of mental health. The criteria they chose may have affected the relationships found. It is possible that illusions would be related differently to other criteria, such as the MHI used in the present study, resulting in different findings regarding the role of illusions. While illusions are not by any means the only determinants, the present study found that they account for a small but significant degree of the positive and negative components of subjective well-being.

Illusions: Beneficial or Harmful?

Taylor and Brown (1988) assumed that illusions are by definition advantageous. Very accurate perceptions are associated with mild depression, and large distortions are often harmful. There has, however, been some debate in the literature regarding this beneficial role. In a review of various self-defeating behaviour patterns, it was established that many involved misjudging the self or the social environment in some way (Baumeister & Sher, 1988). Overly optimistic expectations for success can result in futile persistence at unsolvable tasks (Feather, 1962). Illusions may limit opportunities to learn new and adaptive behaviour patterns in response to feedback. In this way, there is evidence that illusions have disadvantages (Janoff-Bulman, 1989). As discussed by Taylor, Collins, Skokan and Aspinwall (1989) there is even a possibility that illusions are a form of denial, a defense mechanism whereby anxiety is masked but not dealt with.

A further examination of the evidence reveals that illusions are probably neither totally helpful nor totally harmful. One possibility is that the adaptiveness of illusions follows a curvilinear function, in which there is an optimal margin of illusion, but beyond which illusions become maladaptive (Baumeister, 1989). A level of illusion which is too small results in mild depression; a level which is too high may result in judgement errors, and leave the individual vulnerable to information which disconfirms the perception. In this way, small illusions such as mildly exaggerating one's self-perception may be the most advantageous. It is

unlikely that at this level illusions represent denial, as they promote rather than undermine mental health (Taylor et al., 1989). Such a curvilinear relationship is supported by Snyder (1989) who claims there is a continuum of illusions, and that a moderate - neither low nor high - degree of reality negotiation is the most adaptive.

Conclusion

Accurate perception as a criterion of mental health is not always appropriate. Instead, realistic perceptions are the hallmark of mild depression (Ruehlman et al., 1980), while mentally healthy individuals have exaggeratedly positive self-perceptions, perceptions of control, and expectations for the future. These illusions operate as distinct entities, with separate effects on well-being and health. The illusion of self-perception is related chiefly to the positive components of subjective well-being. The illusion of control, as measured by a self-report format, is not related to well-being or health. Optimism is related to all components of both well-being and health, and of the illusions it is the strongest predictor of the outcomes. The present study confirmed the relationship found by Scheier and Carver (1985) for optimism and health. One explanation for this relationship is a model of self-regulation, in which behaviour is aimed at reducing discrepancies between actual and desired states. Physical symptoms represent one possible impediment to the desired state and so must be reduced (Carver & Scheier, 1981). It is possible this model could be extended to account for the relationships between the three illusions, and well-being and health. Although speculative, to a limited degree the relationships were consistent with those which would be predicted by this model. There is evidence that illusions are not always adaptive, and may even be associated with self-defeating behaviour patterns (Baumeister & Sher, 1988). However, other evidence suggests a curvilinear relationship in which there is an optimal level of illusion. Beyond this the individual is vulnerable to depression at one end, and judgement errors at the other (Snyder, 1989).

There are several areas which require further research. Additional evidence is

needed for each of the measures, particularly self-perception and control. Self-perception was related to well-being and health in a limited way, and control was not related at all. It was not possible to determine whether these are accurate conclusions, or whether they are the result of unsuitable measurements. It is of primary importance that further research be conducted on the measures, focusing particularly on their validity.

The illusions are not completely independent, and knowledge of the way in which they interact would increase understanding about their structure. Future studies could attempt to define the nature of this interaction.

The present study used a self-report format to measure perceived physical health. While symptom-reporting does reflect the underlying physiological state, it is also affected by other elements such as cognitive, cultural and psychological factors (Pennebaker, 1982). Investigation of the role of illusions and physical health using other measures of health would add to the data base.

So far, research on illusions has concentrated on correlational relationships. It would be useful to investigate causal relationships, such as those between realistic perceptions and depression, and illusions and mental health (Baumeister, 1989). Longitudinal studies examining changing relationships over time may give some insight into the causal connections between illusions, well-being and health.

The present investigation used university students as respondents. The environment, attitudes and expectancies of students often differ from that of the general population, and the influences these have on illusions is unknown. Therefore, these findings should be generalised to other populations with caution.

It is clear that, although there is much potential for further research, illusions do operate, playing a small but significant role in both subjective well-being and perceived physical health.

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APPENDIX

MASSEY UNIVERSITY

WELLBEING PROJECT

1. This questionnaire looks at how you compare yourself with other people in lots of different ways. It will take about 30 minutes to complete.

2. Remember all responses are anonymous.

3. It is important that you give your own answers to the questions; there are no right or wrong answers.

4. Please answer all the questions, and be careful not to skip any pages.

5. Read each question and circle the appropriate number below it; please do not circle halfway between the numbers.

For each of the following items, circle the number which best reflects your expectations.

Example:

Compared to the <u>average Massey student</u> what are the chances that the following will happen to you?

needing stitches

```
        1--------2--------3--------4--------5
     much less           average          much more
     likely than                          likely than
        average                              average
```

If you are much less likely than the average student to need stitches at some stage, circle "1"; if you are much more likely than the average student, circle "5".

Compared to the <u>average Massey student</u> what are the chances that the following events will happen to you?

Circle the appropriate number, where:

```
        1--------2--------3--------4--------5
     much less           average          much more
     likely than                          likely than
     average                                 average
```

owning your own home

```
        1--------2--------3--------4--------5
```

not finding a job for 6 months after graduating

```
        1--------2--------3--------4--------5
```

getting divorced a few years after being married

```
        1--------2--------3--------4--------5
```

Compared to the <u>average Massey student</u> what are the chances
that the following events will happen to you?

Circle the appropriate number, where:

1--------2--------3--------4--------5
much less   average   much more
likely than   chance   likely than
average   average

marrying someone wealthy

1--------2--------3--------4--------5

liking your first job after graduation

1--------2--------3--------4--------5

tripping and breaking a bone

1-------2--------3---------4--------5

being fired from a job

1--------2--------3--------4--------5

not being ill all winter

1--------2--------3--------4--------5

your weight being constant for 10 years

1--------2--------3--------4--------5

not having a night in hospital for 5 years

1--------2--------3--------4--------5

Compared to the average Massey student what are the chances
that the following events will happen to you?

Circle the appropriate number, where:

```
     1--------2---------3---------4--------5
    much less         average         much more
    likely than       chance          likely than
    average                           average
```

dropping out of university

```
1--------2--------3--------4--------5
```

developing cancer

```
1--------2--------3--------4--------5
```

earning more than $40,000 a year, by the year 2000

```
1--------2--------3--------4--------5
```

finding out you are sterile

```
1--------2--------3--------4--------5
```

having to take an unattractive job

```
1--------2--------3--------4--------5
```

having a starting salary of more than $20,000

```
1--------2--------3--------4--------5
```

Compared to the <u>average Massey student</u> what are the chances
that the following events will happen to you?

Circle the appropriate number, where:

1---------2---------3---------4---------5
much less   average   much more
likely than   chance   likely than
average   average

receiving an award for your work

1--------2--------3--------4--------5

contracting venereal disease

1--------2--------3--------4--------5

being in bed ill for 2 or more days

1--------2--------3--------4--------5

having gum problems

1--------2--------3--------4--------5

having a heart attack before age 40

1--------2--------3--------4--------5

graduating in the top third of your class

1--------2--------3--------4--------5

Compared to the <u>average Massey student</u> what are the chances
that the following events will happen to you?

Circle the appropriate number, where:

```
1--------2---------3---------4--------5
much less            average           much more
likely than          chance            likely than
average                                average
```

being injured in a car accident

```
1--------2---------3--------4--------5
```

travelling to Europe

```
1--------2---------3--------4--------5
```

having your car stolen

```
1--------2---------3--------4--------5
```

having a decayed tooth removed

```
1--------2---------3--------4--------5
```

having a mentally gifted child

```
1--------2---------3--------4--------5
```

developing a drinking problem

```
1--------2---------3--------4--------5
```

Compared to the <u>average Massey student</u> what are the
chances
that the following events will happen to you?

Circle the appropriate number, where:

1--------2--------3--------4--------5
much less   average   much more
likely than   chance   likely than
average   average

being sued by someone

1--------2--------3--------4--------5

gaining nationwide recognition in your profession

1--------2--------3--------4--------5

your car turning out to be a lemon

1--------2--------3--------4--------5

getting lung cancer

1--------2--------3--------4--------5

living to be over 80 years old

1--------2--------3--------4--------5

attempting suicide

1--------2--------3--------4--------5

Compared to the <u>average Massey student</u> what are the
chances
that the following events will happen to you?

Circle the appropriate number, where:

1--------2--------3--------4--------5
much less   average   much more
likely than   chance   likely than
average   average

your home being broken into

1--------2--------3--------4--------5

your achievements being in the newspaper

1--------2--------3--------4--------5

realising you chose the wrong career

1--------2--------3--------4--------5

the value of your home doubling in 5 years

1--------2--------3--------4--------5

having a heart attack

1--------2--------3--------4--------5

getting mugged

1--------2--------3--------4--------5

Compared to the <u>average Massey student</u> what are the chances
that the following events will happen to you?

Circle the appropriate number, where:

1--------2--------3--------4--------5
much less   average   much more
likely than   chance   likely than
average   average

getting a good job offer before graduation

1--------2--------3--------4--------5

your starting salary after graduation being
more than $25,000

1--------2--------3--------4--------5

Please read the following questions and circle the number
which best reflects your answer.

When buying a lotto ticket, would you rather choose
your own number, or let the computer decide for you?

1--------2--------3--------4--------5
much prefer   don't   much prefer
to choose own   care   to let the
number   computer decide

Compared to most people how much influence do you
have over the things that happen to you?

1--------2--------3--------4--------5
much more   average   much less
than average   than average

Please read the following questions and circle the number which best reflects your answer.

When playing a board game, would you rather throw the dice, or let someone else throw for you?

```
        1--------2--------3--------4--------5
 much prefer          don't           much prefer
 to throw             care             to let someone
 my own dice                         else throw the dice
```

Compared to the average person, how much of your success is due to getting good breaks?

```
        1--------2--------3--------4--------5
 much less            average          much more
 than average                         than average
```

What are your chances of winning the cardgame "Fish" against a very nervous opponent?

```
        1--------2--------3--------4--------5
 very low            average          very high
```

Compared with the average person, how much of your life is controlled by accidental happenings?

```
        1--------2--------3--------4--------5
 much less           average          much more
 than average                         than average
```

Please read the following questions and circle the number which best reflects your answer.

What are your chances of winning a prize in the
<u>first</u> round of a game of "Pass the Parcel"?

```
    1--------2--------3--------4--------5
  very low          average          very high
```

If you and your friend are placing bets on the outcomes
of coin tosses, who would you rather tossed the coin?

```
    1--------2--------3--------4--------5
  much prefer     don't care        much prefer
 to toss the                       to let my friend
  coin myself                        toss the coin
```

"What happens to me is my own doing."
Compared with most people, this is true of me...

```
    1--------2--------3--------4--------5
  a lot less         average          a lot more
 than average                        than average
```

If you are playing the cardgame "Last Card", what
are your chances of winning if you are very tired?

```
    1--------2--------3--------4--------5
  very low          average          very high
```

To be a successful leader, how much would you
rely on getting the right breaks...

```
    1--------2--------3--------4--------5
  less often       as often         more often
 than others       as others       than others
    would                              would
```

Please read the following questions and circle the number which best reflects your answer.

Luck determines what happens to you...

```
    1--------2--------3--------4--------5
much more        the same        much less
than for most                   than for most
   people                          people
```

What would your chances of winning "Housie" be after several practice sessions?

```
    1--------2--------3--------4--------5
much higher      average         much lower
```

How certain are you that you can make your plans work out?

```
    1--------2--------3--------4--------5
much less        average         much more
certain than                    certain than
the average                     the average
   person                          person
```

How much are the unhappy things in your life due to bad luck?

```
    1--------2--------3--------4--------5
much less        the same        much more
than for most                   than for most
   people                          people
```

Would you be happy to take the next consecutive ticket in a raffle, or would you rather select your own ticket?

```
    1--------2--------3--------4--------5
take next        don't care       choose
  ticket                         own ticket
```

Please read the following questions and circle the number
which best reflects your answer.

If you try hard, what are your chances of getting
other people to like you?

1--------2--------3--------4--------5
better than   average   worse than
for most people   for most people

Please answer the following questions, which ask you to
compare yourself to the average Massey student on a variety
of
personality dimensions.

Compared to the average Massey student I am...

1--------2--------3--------4--------5
much less   average   much more
 sincere   sincere

1--------2--------3--------4--------5
much less   average   much more
humorous   humorous

1--------2--------3--------4--------5
a lot less   average   a lot more
  mean   mean

1--------2--------3--------4--------5
much less   average   much more
 insulting   insulting

Compared to the <u>average Massey student</u> I am...

```
    1--------2--------3--------4--------5
much less            average         much more
 of a brag                           of a brag
```

```
    1--------2--------3--------4--------5
 much less           average         much more
  unfair                              unfair
```

```
    1--------2--------3--------4--------5
much less            average         much more
truthful                             truthful
```

```
    1--------2--------3--------4--------5
 much less           average         much more
 reliable                            reliable
```

```
    1--------2--------3--------4--------5
a lot less           average         a lot more
  rude                                 rude
```

```
    1--------2--------3--------4--------5
much less            average         much more
thoughtless                          thoughtless
```

```
    1--------2--------3--------4--------5
much less            average         much more
interesting                          interesting
```

Compared to the <u>average Massey student</u> I am...

```
     1--------2--------3--------4--------5
much less           average          much more
obnoxious                            obnoxious
```

```
     1--------2--------3--------4--------5
much less           average          much more
   kind                                 kind
```

```
     1--------2--------3--------4--------5
much less           average          much more
  loyal                                loyal
```

```
     1--------2--------3--------4--------5
a lot less          average          a lot more
  phony                                phony
```

```
     1--------2--------3--------4--------5
a lot less          average          a lot more
  greedy                               greedy
```

```
     1--------2--------3--------4--------5
much less           average          much more
considerate                         considerate
```

```
     1--------2--------3--------4--------5
much less           average          much more
of a liar                           of a liar
```

```
     1--------2--------3--------4--------5
much less           average          much more
dependable                          dependable
```

Compared to the <u>average Massey student</u> I am...

```
     1--------2--------3--------4--------5
much less          average         much more
  happy                              happy
```

```
     1--------2--------3--------4--------5
a lot less         average         a lot more
prejudiced                         prejudiced
```

```
     1--------2--------3--------4--------5
 a lot less        average         a lot more
 heartless                          heartless
```

```
     1--------2--------3--------4--------5
 a lot less        average         a lot more
understanding                     understanding
```

```
     1--------2--------3--------4--------5
much less          average         much more
  wise                                wise
```

```
     1--------2--------3--------4--------5
a lot less         average         a lot more
  cruel                              cruel
```

```
     1--------2--------3--------4--------5
a lot less         average         a lot more
loudmouthed                       loudmouthed
```

```
     1--------2--------3--------4--------5
much less          average         much more
intelligent                       intelligent
```

Compared to the <u>average Massey student</u> I am...

```
      1--------2--------3--------4--------5
  much less        average        much more
    selfish                        selfish
```

```
      1--------2--------3--------4--------5
  much less        average        much more
 goodhumoured                   goodhumoured
```

```
      1--------2--------3--------4--------5
  much less        average        much more
    friendly                      friendly
```

```
      1--------2--------3--------4--------5
  much less        average        much more
  kindhearted                    kindhearted
```

```
      1--------2--------3--------4--------5
  much less        average        much more
  dishonest                      dishonest
```

```
      1--------2--------3--------4--------5
 a lot less        average         lot more
 irresponsible                  irresponsible
```

```
      1--------2--------3--------4--------5
  much less        average        much more
  conceited                      conceited
```

```
      1--------2--------3--------4--------5
 a lot less        average       a lot more
 goodnatured                    goodnatured
```

Compared to the <u>average Massey student</u> I am...

```
     1--------2---------3--------4--------5
much less           average        much more
untrustworthy                      untrustworthy
```

```
     1--------2---------3--------4--------5
a lot less          average        a lot more
    warm                              warm
```

```
     1--------2---------3--------4--------5
much less           average        much more
clean                              clean
```

```
     1--------2---------3--------4-------5
much less           average        much  more
deceitful                          deceitful
```

```
     1--------2---------3--------4--------5
much less           average        much more
openminded                         openminded
```

These questions are about how you feel, and how things have been with you over the last three weeks. For each question, please circle a number for the one answer that comes closest to the way you have been feeling.

How happy, satisfied, or pleased have you been with your personal life during the past three weeks?

```
1---------2---------3---------4---------5---------6---------7
extremely                                         extremely
happy                                             unhappy
```

How much of the time have you felt lonely during the past three weeks?

```
1---------2---------3---------4---------5---------6---------7
all of                                            none of
the time                                          the time
```

How often did you become nervous or jumpy when faced with excitement or unexpected situations during the past three weeks?

```
1---------2---------3---------4---------5---------6---------7
always                                                  never
```

During the past three weeks, how much of the time have you felt that the future looks hopeful and promising?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

How much of the time, during the past three weeks, has your daily life been full of things that were interesting to you?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

How much of the time, during the past three weeks, did you feel relaxed and free of tension?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

During the past three weeks, how much of the time have you generally enjoyed the things you do?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

During the past three weeks, have you had any reason to wonder if you were losing your mind, or losing control over the way you act, talk, think, feel, or of your memory?

```
1---------2---------3---------4---------5---------6---------7
not at all                                          very much
```

Did you feel depressed during the past three weeks?

```
1---------2---------3---------4---------5---------6---------7
very much                                           not at all
```

During the past three weeks, how much of the time have you felt loved and wanted?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

How much of the time, during the past three weeks, have you been a very nervous person?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

When you got up in the morning, these last three weeks, about how often did you expect to have an interesting day?

```
1---------2---------3---------4---------5---------6---------7
always                                              never
```

During the past three weeks, how much of the time have you felt tense or "high-strung"?

```
1---------2---------3---------4---------5---------6---------7
all of                                              none of
the time                                            the time
```

During the past three weeks, have you been in firm control of your behaviour, thoughts, emotions, feelings?

```
1---------2---------3---------4---------5---------6---------7
yes, very                                        no, and I am
definitely                                       very disturbed
```

During the past three weeks, how often did your hands shake when you tried to do something?

```
1---------2---------3---------4---------5---------6---------7
always                                              never
```

During the past three weeks, how often did you feel that you had nothing to look forward to?

```
1---------2---------3---------4---------5---------6---------7
always                                              never
```

How much of the time, during the past three weeks, have you felt calm and peaceful?

```
1---------2---------3---------4---------5---------6---------7
all of                                            none of
the time                                          the time
```

How much of the time during the past three weeks, have you felt emotionally stable?

```
1---------2---------3---------4---------5---------6---------7
all of                                            none of
the time                                          the time
```

How much of the time, during the past three weeks, have you felt downhearted and blue?

```
1---------2---------3---------4---------5---------6---------7
all of                                            none of
the time                                          the time
```

How often have you felt like crying, during the past three weeks?

```
1---------2---------3---------4---------5---------6---------7
always                                            never
```

During the past three weeks, how often did you feel that others would be better off if you were dead?

```
1---------2---------3---------4---------5---------6---------7
always                                            never
```

How much of the time, during the past three weeks, were you able to relax without difficulty?

```
1---------2---------3---------4---------5---------6---------7
all of                                            none of
the time                                          the time
```

During the past three weeks, how much of the time did you feel that your love relationships, loving and being loved, were full and complete?

```
1---------2---------3---------4---------5---------6---------7
all of                                            none of
the time                                          the time
```

How often, during the past three weeks, did you feel that nothing turned out for you the way you wanted it to?

```
1---------2---------3---------4---------5---------6---------7
always                                                    never
```

How much have you been bothered by nervousness, or your "nerves", during the past three weeks?

```
1---------2---------3---------4---------5---------6---------7
extremely                                              not at all
```

During the past three weeks, how much of the time has living been a wonderful adventure for you?

```
1---------2---------3---------4---------5---------6---------7
all of                                                 none of
the time                                               the time
```

How often, during the past three weeks, have you felt so down in the dumps that nothing could cheer you up?

```
1---------2---------3---------4---------5---------6---------7
always                                                    never
```

During the past three weeks, did you ever think about taking your own life?

```
1---------2---------3---------4---------5---------6---------7
very often                                                never
```

During the past three weeks, how much of the time have you felt restless, fidgety, or impatient?

```
1---------2---------3---------4---------5---------6---------7
all of                                                 none of
the time                                               the time
```

During the past three weeks, how much of the time have you been moody or brooded about things?

```
1---------2---------3---------4---------5---------6---------7
all of                                                 none of
the time                                               the time
```

How much of the time, during the past three weeks, have you felt cheerful, or lighthearted?

```
1---------2---------3---------4---------5---------6---------7
all of                                                 none of
the time                                               the time
```

During the past three weeks, how often did you get rattled, upset, or flustered?

```
1---------2---------3---------4---------5---------6---------7
always                                               never
```

During the past three weeks, have you been anxious or worried?

```
1---------2---------3---------4---------5---------6---------7
extremely so                                    not at all
```

During the past three weeks, how much of the time were you a happy person?

```
1---------2---------3---------4---------5---------6---------7
all of                                          none of
the time                                        the time
```

How often during the past three weeks did you find yourself having difficulty trying to calm down?

```
1---------2---------3---------4---------5---------6---------7
always                                               never
```

During the past three weeks, how much of the time have you been in low or very low spirits?

```
1---------2---------3---------4---------5---------6---------7
all of                                          none of
the time                                        the time
```

How often, during the past three weeks, have you been waking up feeling fresh and rested?

```
1---------2---------3---------4---------5---------6---------7
always                                               never
```

During the past three weeks, have you been under or felt you were under any strain, stress, or pressure?

```
1---------2---------3---------4---------5---------6---------7
yes, more                                       no, not
than I                                          at all
could bear
```

Next, please indicate how much each of the following problems have bothered or disturbed you during the last month. Circle only one number for each item. If you haven't been bothered by the problem circle 0. If the problem has been an extreme bother then circle 4 and so on.

```
Not at all.......... 0
A little bit........ 1
Moderately.......... 2
Quite a bit......... 3
Extremely........... 4
```

Sleep problems (can't fall asleep, wake up in the

middle of the night or early in the morning)...... 0 1 2 3 4

Weight change (gain or loss of 5 lbs or more)..... 0 1 2 3 4

Back pain... 0 1 2 3 4

Constipation...................................... 0 1 2 3 4

Dizziness... 0 1 2 3 4

Diarrhoea... 0 1 2 3 4

Faintness... 0 1 2 3 4

Constant fatigue.................................. 0 1 2 3 4

Headache.. 0 1 2 3 4

Migraine headache................................. 0 1 2 3 4

```
Not at all.......... 0
A little bit........ 1
Moderately.......... 2
Quite a bit......... 3
Extremely........... 4
```

Nausea and/or vomiting............................. 0 1 2 3 4

Acid stomach or indigestion........................ 0 1 2 3 4

Stomach pain (e.g. cramp).......................... 0 1 2 3 4

Hot or cold spells................................. 0 1 2 3 4

Hands trembling.................................... 0 1 2 3 4

Heart pounding or racing........................... 0 1 2 3 4

Poor appetite...................................... 0 1 2 3 4

Shortness of breath when not exercising

or working hard.................................... 0 1 2 3 4

Numbness or tingling in parts of your body........ 0 1 2 3 4

Felt weak all over................................ 0 1 2 3 4

Pains in heart or chest........................... 0 1 2 3 4

Feeling low in energy............................. 0 1 2 3 4

Stuffy nose or head............................... 0 1 2 3 4

Blurred vision.................................... 0 1 2 3 4

Not at all.......... 0
                    A little bit........ 1
                    Moderately.......... 2
                    Quite a bit......... 3
                    Extremely........... 4

Muscle tension or soreness......................... 0 1 2 3 4

Muscle cramps...................................... 0 1 2 3 4

Severe aches and pains............................. 0 1 2 3 4

Acne... 0 1 2 3 4

Bruises.. 0 1 2 3 4

Nosebleed.. 0 1 2 3 4

Pulled (strained) muscle(s)........................ 0 1 2 3 4

Pulled (strained) ligament(s)...................... 0 1 2 3 4

Cold or cough...................................... 0 1 2 3 4