Perceived Severity

General Description and Theoretical Background

Perceived severity (also called perceived seriousness) refers to the **negative consequences an individual associates with an event or outcome**, such as a diagnosis of cancer. These consequences may relate to an anticipated event that may occur in the future, or to a current state such as a pre-existing health problem.

The concept of severity as an important determinant of behaviour has appeared in a number of theories and across different academic disciplines, albeit under a more general name. Within economic theory, the concept of **'utility'** has been used to understand behavioural choice (e.g. consumer decision-making) where utility refers to the value placed on an object or outcome. Within psychology the concept of **'valence'** was developed to explain behavioural motivation (Lewin et al., 1944), the hypothesis being that people would avoid areas of negative valence and move towards areas of positive valence. Although these economic and psychological theories developed independently, the similarity between the concepts of utility and valence has been noted (Edwards 1954).

Severity can be seen as an example of negative utility and negative valence; however, **the specific term appears to have its roots in the Health Belief Model** (HBM). According to Rosenstock (1974) the HBM draws heavily on the psychological literature and the behavioural motivation theory of Lewin (Lewin et al., 1944). Lewin proposed that behaviour depends on two variables: 1) the value an individual places on a particular outcome, and 2) the likelihood that an

individual will be successful in achieving their goal ('expectancy'). Together, these two factors comprise the central components of 'expectancy-value' theories.

As with severity, the concept of expectancies has also appeared across a number of different disciplines and theoretical models (Feather, 1959; Maiman and Becker, 1974), and a number of theories used to understand health behaviour are classified as **expectancy-value theories**, including the Health Belief Model (HBM) (Hochbaum, 1958; Maiman and Becker, 1974), Protection Motivation Theory (PMT) (Rogers, 1975; Rogers, 1983), the Extended Parallel Process Model (EPPM) (Witte, 1992; Witte, 1998), the Theory of Reasoned Action (Fishbein and Ajzen, 1975) and the Theory of Planned Behaviour (Ajzen, 1985). Although these models differ in the types of behaviour they were developed to explain, the variables they include, and how the variables are thought to combine to predict behaviour or behavioural intentions, they all contain concepts that concern the evaluation or value attached to events or behavioural outcomes.

Role of Perceived Severity in Health Behaviour Theories

 Health Belief Model. The Health Belief Model (HBM) (Hochbaum, 1958) was developed to understand the uptake of prevention and early detection behaviours, such as attendance at x-ray screening for tuberculosis. The HBM proposes that **perceived vulnerability to disease and disease severity combine to form 'threat', and that threat perception motivates action**. According to the HBM, threat perception drives behaviour but the particular action taken is determined by beliefs about the behavioural options available to

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counter the threat. A particular behaviour will only be adopted if its perceived

benefits (i.e. potential to reduce the disease threat) outweigh its perceived

barriers (such as cost, inconvenience, embarrassment, discomfort). In addition,

cues to action, such as the presence of symptoms or having a medical

appointment, were seen as necessary to 'set the process in motion' (Rosenstock,

1974).

Protection motivation theory and extended parallel process model.

Perceived severity also forms part of threat perception in both Protection

Motivation Theory (PMT) and the Extended Parallel Process Model (EPPM). In

PMT, severity and vulnerability promote health motivation along with efficacy

beliefs, but this is offset by the intrinsic and extrinsic rewards associated with

'unhealthy' behaviour and the costs associated with performing the

recommended behaviour. In EPPM, however, the focus is solely on the balance

between threat and efficacy beliefs. If efficacy beliefs exceed threat levels then

health protective advice is followed ('danger-control'), whereas if threat beliefs

exceed efficacy levels then efforts are focused on managing fear ('fear-control').

A number of commentators have observed that if the likelihood of

experiencing a particular health problem, its perceived severity, or its perceived

controllability is zero, then an individual's motivation to act should also be zero

(e.g. Feather, 1982; Weinstein, 2000). One conclusion that some researchers

have drawn is that vulnerability, **severity and efficacy should combine**

multiplicatively, so that if any one of these three variables holds a value of zero,

motivation will be nil. In line with this reasoning, Rogers' (1975) original

formulation of PMT held that severity, vulnerability and response efficacy

combined multiplicatively. But the lack of empirical support for the predicted relationships led to a revised model in which severity and vulnerability were summed (Rogers, 1983). Rogers did, however, retain the view that there would be second-order interaction effects between threat appraisal and efficacy appraisal.

In the EPPM, Witte also proposes an **additive model**, suggesting that vulnerability and severity should be summed, but she argues that threat should be subtracted from efficacy (no interaction between the two is proposed). However Witte also states that **threat perceptions need to reach a certain threshold level before people become motivated to consider health protective action**, though she does not specify this level in numerical terms (Witte, 1998).

More complex theories. Rogers and Witte opted for additive models following the lack of evidence to support interaction effects between vulnerability and severity, but other researchers have argued that there is a lack of good empirical data to properly test the proposed multiplicative relationships between these two variables. **Weinstein** (2000) observed the expected multiplicative relationship between vulnerability and severity, but he pointed out the difficulty of demonstrating such a relationship in between group analyses with a sample of less than 400. However, Weinstein (2000) also found evidence for a model that was more complex than a multiplicative one, with the latter model only applying when likelihood judgements were less than 50:50. **Maddux and Rogers** (1983) also found evidence for a complex model (which they describe as 'sub-additive') to describe the relationship between vulnerability, response efficacy and self-

efficacy, so the issue of how severity, vulnerability and efficacy combine remains an empirical question.

Evidence for The role of severity in predicting behavioural intentions and behaviour. A number of **systematic reviews** of the predictive utility of severity have been conducted. These have assessed the value of particular theories (e.g. the HBM: **Harrison et al., 1992**; and PMT: **Milne et al., 2000**) or the role of perceived vulnerability and severity perceptions in motivating particular behaviours (e.g. uptake of vaccination: **Brewer et al., 2007**; condom use: **Albarracin et al., 2005**). In the review of research using Protection Motivation Theory to explain the performance of early detection and prevention behaviours, small but significant associations were observed between perceived severity and both intention and concurrent behaviour, but no significant relationship was found between severity and subsequent behaviour (Milne et al., 2000). In Harrison and colleagues' review of Health Belief Model variables in predicting health behaviours, evidence was found for a small but significant relationship between perceived severity and behaviour in prospective studies (Harrison et al., 1992). Although both of these reviews included studies where the relationship between severity and behaviour may have been obscured because of methodological weaknesses, a meta-analysis looking at the relationship between vulnerability, severity and behaviour, which omitted poorer quality studies, found a small to moderate association between severity and uptake of vaccinations in prospective studies (Brewer et al., 2007). Each of these three reviews examined direct associations between severity and intention/behaviour; they **did not assess how severity may interact with other beliefs such as perceived vulnerability**. In

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addition, they all focused on non-experimental studies, thus providing only indirect evidence that severity plays a causal role in behaviour. One **review of experimental studies designed to increase condom use found that perceived severity was related to condom use under certain conditions** (Albarracin et al., 2005). However the mediational analysis, looking at how the interventions actually worked, combined severity together with likelihood under the broader umbrella of 'threat' and did not report the findings specific to severity alone.

Measurement Issues

Measures of severity tend to be associated with a particular theoretical framework. For example, there are measures of severity developed in the context of the Health Belief Model (Maiman et al., 1977; Champion, 1984), the Extended Parallel Process Model (Witte et al., 1996), and Leventhal's Self-regulation Theory operationalized via the Illness Perception Questionnaire (Weinman et al., 1996; Moss-Morris et al., 2002) (see Appendix for severity measures). Although the latter are validated measures, **questions remain about whether they are appropriately worded, suitably specific and fully assess the concept of severity**.

Scope and the role of emotional arousal. There appears to be general consensus among health behaviour theories that **the scope of perceived severity is extremely broad**. For example, Janz and Becker (1984) state: "This dimension **includes evaluations of both medical/ clinical consequences (e.g., death, disability, and pain) and possible social consequences (e.g.,**

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effects of the conditions on work, family life, and social relations)."
Similarly, Weinman and colleagues describe the consequences component of
illness perceptions as encompassing **"physical, social and psychological
functioning"** (Weinman et al., 1996). Other researchers specify that
intrapersonal threats should also be included, such as threat to self-esteem
(Rogers, 1983). However, one key difference between theories is whether the
concept of severity should include measures of emotional response, i.e., fear and
worry.

      Health Belief Model. The Health Belief Model **appears to differ from
other theoretical frameworks by including emotional arousal in its
definition of severity**. Rosenstock (1974) says that: "The degree of seriousness
may be judged both by the degree of emotional arousal created by the thought of
a disease as well as by the kinds of difficulties the individual believes a given
health condition will create for him". Hence in the HBM, fear/worry forms part of
perceived severity and consequently also forms part of the motivation to act.
However, few modern researchers using the HBM include these emotional
elements in their definitions or assessments of severity.

      Other theories. In contrast to the HBM, other theories have treated
anticipated or actual emotional reactions to disease as conceptually distinct from
beliefs about disease severity. For example, the **Parallel Response Model**
(Leventhal, 1970) separated emotional representations from cognitive ones. This
division was considered necessary because emotions (physical
symptoms/arousal in particular) did not appear to be associated with behaviour,
whilst cognitive representations (e.g. beliefs about severity) did.

Consistent with the empirical findings, the revised **Protection Motivation Theory** (Rogers, 1983) also proposed that emotional response was not part of severity and that emotional arousal played an indirect role in protection motivation through its effect on cognitive representations (perceptions of severity and vulnerability). Although Witte also argues that fear does not play a direct role in danger-control responses, she does state that fear plays a direct role in fear-control responses.

Dimensionality. Because the potential consequences of a health threat or hazard can be so diverse, it is not surprising that severity appears to be a multidimensional concept (Milne et al., 2000). For example, Champion's measure of breast cancer severity, based on the HBM, contains 3 factors: **physical symptoms of fear, long-term effects of breast cancer, and financial/career problems**. In addition, Milne and colleagues point out that some researchers have focused on the dimension of **fatality**, whereas others have measured **dimensions relating more to psychosocial severity** such as the effect a disease would have on life goals (Milne et al., 2000). But they also highlight other potential dimensions of severity, such as whether the disease is likely to have a **rapid or gradual onset** and **how visible the symptoms of the disease are likely to be**. These aspects of severity have rarely been explored.

Specificity/ content validity. A number of severity measures are generic, assessing broad judgments about the seriousness of the disease. This means that the same questions have been used to assess the impact of different health threats. For example, **although a variety of disease-specific questionnaires exist for assessing illness perceptions, the severity items are the same** - the

name of the particular disease is just inserted in the appropriate place (see Appendix). However **individual researchers have sometimes chosen to supplement these with additional items.** For example, following interviews with participants about perceptions of breast cancer, Anagnostopoulos and Spanea (2005) added severity items to the IPQ to assess social isolation, physical exhaustion, pain, financial consequences, and family conflicts (although not all of these made it into the final questionnaire).

The decision about whether to use general or specific items depends partly on the aims of the research. If the research aims to assess the impact of health messages that seek to alter particular beliefs about the consequences of a disease, then the measurement of disease-specific consequences may be advisable. Some guidelines for the development of items to assess severity are offered by Witte and are reproduced in the Appendix. Fishbein et al. (2001) also offer guidelines for assessing the perceived consequences associated with a given behaviour, and their suggestions could be applied to the perceived consequences associated with a disease.

The likelihood and valence of different outcomes. Fishbein et al. (2001) distinguish between the likelihood of anticipated outcomes occurring and the value attached to those outcomes (positive or negative), and they state that these constructs need to be assessed separately. This proposal raises two issues: whether each possible outcome (e.g. job loss, impact on social relationships) should be assessed for likelihood of occurrence as well as severity, and the need to pay close attention to valence.

Usually, disease severity items are summed and then combined with the likelihood of getting the disease. But predictive utility may be improved if each possible outcome were weighted according to the likelihood of its occurring. For example, job loss may be viewed as severe but unlikely to occur, whereas the impact on social relationships may be viewed as more likely to occur but less severe, and it may be wrong to assume that the former should contribute more to total perceived severity than the latter. However very little research has examined the performance of different measures of severity and such work would help answer this kind of question.

In terms of **valence**, while there might be universal agreement that certain outcomes tend to be viewed as negative (e.g. death), other consequences, such as the avoidance of pregnancy, will be valued differently by different people. Consequently, one of the problems with **some of the existing measures of severity is that some items are ambiguous with respect to valence**, such as: 'My illness strongly affects the way others see me' (from the revised Illness Perceptions Questionnaire (Moss-Morris et al. 2002).

Self-reference. Another issue that relates to question wording is the use of self-referencing. As Rosenstock (1974) states, the orientation adopted by the social psychologists involved in the development of the HBM held that "it is the world of the perceiver that determines what he will do". Some researchers have explicitly defined severity as concerned with how serious the outcome would be for the individual concerned (Brewer et al., 2007; Champion, 1984), and others have noted that perceptions of severity are likely to vary widely between individuals (Rosenstock 1974; Janz and Becker 1984). However, not all

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measures of severity are phrased accordingly. **The absence of self-referencing is a major weakness in a number of severity measures**. This situation contrasts somewhat with the measures used to assess perceived vulnerability, where the individual is usually asked to give an assessment of their own personal chances of experiencing a particular event, rather than the likelihood of the event happening in general (e.g. Brewer et al., 2004 but deviations from this practice still occur-see Brewer et al., 2007 for a discussion of measure quality in this area).

      Conditioned perceived severity. As with perceived vulnerability, the question of obtaining a rating that takes into account behavioral plans deserves consideration. In theories such as the HBM and PMT, vulnerability and severity relate to a threat that would arise if there were no change in behaviour (e.g. no preventive action were taken). However, measures assessing severity rarely make this explicit. **Perceptions of disease severity can depend on whether people intend, or already engage in, actions that are likely to reduce the severity of the target disease.** For example, adhering to colorectal cancer screening can reduce disease severity because it can result in the detection of the cancer at an earlier stage when it has a much better prognosis. As a result, people who adhere to colorectal cancer screening, or intend to do so, may reasonably perceive colorectal cancer as being less severe than someone who does not intend to adhere to screening. Ideally, questions about the severity of a condition should therefore specify 'a behavioural context' (see Brewer et al., 2004), particularly if disease severity is expected to vary with the relevant behavior.

Similar Constructs

Fear and worry about illness. These emotions are closely linked to the concept of severity and have been included in some measures of severity, but usually only in the context of the Health Belief Model (e.g. Champion, 1984; Maiman et al., 1977). Other theories and models see emotional response to health threats and disease severity as separate constructs.

Vulnerability. A number of theories promote the view that disease threat is a combination of vulnerability and severity. Threat reduction can occur because the likelihood of a threatening event occurring, or its perceived negative consequences, decrease. However, as noted earlier, there is little consensus about how to combine these two constructs to produce a measure of threat.

Perceived response efficacy. This is the belief that a particular action can reduce a health threat, either by reducing the likelihood of experiencing the threat, reducing its severity, or both. Response efficacy could therefore be measured as the difference in threat perception associated with performing a particular behaviour vs. not performing it. In practice, though, it would be difficult to measure response efficacy this way because of the difficulty in knowing how vulnerability and severity measures should be combined.   Perceived response efficacy would therefore usually be measured directly, rather than via the indirect route of reduced threat.

Fatalism. This concept refers to the belief that there is nothing the individual can do to control an outcome. In the context of disease this could relate to beliefs about controlling the likelihood of an outcome occurring in the first place and beliefs about control over its severity. For example, the Powe Fatalism

Inventory (PFI; Powe, 1995) assesses beliefs that the individual cannot prevent

colorectal cancer from occurring (vulnerability) or cure it once it develops

(severity – in this case whether the disease is likely to be fatal or not) .

Appendices: Severity Measures

Although there are reliability indices for the following measures, researchers need to consider their individual research questions before selecting a measure. The strengths and weakness of the various measures listed below are noted to help direct people to make an appropriate choice.

Health Belief Model

Champion (1984) developed measures of the HBM constructs in the context of breast self-examination. The strengths of the scale developed to measure severity (called 'seriousness' in the paper) are firstly that the items are largely self-referenced, and hence measure the impact the illness would have on the individual, and secondly that a number of factors have been measured, such as financial security and personal relationships as well as the severity of the disease itself. However, the scale also contains items that measure emotional response to the disease, and as noted earlier, these are not usually included in measures of severity. The items with an '*' are the items more commonly understood to measure severity (the remainder measure fear).

One potential limitation with this measure is that the questions do not specify a behavioural context. Although breast self-examination has not been associated with an improvement in prognosis, if this measure were applied to other behaviours, such as mammography uptake, this issue might be worth considering (e.g. by rephrasing the items as follows: 'If I had a mammogram and was found to have breast cancer, it would be more serious than other diseases').

1) The thought of breast cancer scares me.

2) When I think about breast cancer I feel nauseous.

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3) If I had breast cancer my career would be endangered. *

4) When I think about breast cancer my heart beats faster.

5) Breast cancer would endanger my marriage (or a significant

relationship).*

6) Breast cancer is a hopeless disease.*

7) My feelings about myself would change if I got breast cancer. *

8) I am afraid to even think about breast cancer.

9) My financial security would be endangered if I got breast cancer.*

10) Problems I would experience from breast cancer would last a long

time.*

11) If I got breast cancer, it would be more serious than other diseases. *

12) If I had breast cancer, my whole life would change.*

Five item response scale: strongly disagree to strongly agree.

Cronbach's alpha = 0.78; test-retest reliability across an interval of 2

weeks = 0.76. These values were observed using a convenience sample of 301

women, aged 17 to 82. The majority were white, married and had a high school

education and were of higher SES than the average for the general population.

Test-retest reliability was performed on a sub-sample of 57 women.

Extended Parallel Process Model

   General measure. Witte and colleagues developed the Risk Behaviour

Diagnosis Scale (Witte et al., 1996) which was designed to measure the

components of the EPPM. The perceived severity scale has three items which

can be used to measure the severity associated with any health threat. One

limitation with this measure is that the items do not assess how severe the health

threat would be for the individual. Another potential limitation is that the items are

generic rather than disease-specific, and the lack of content specificity may

reduce the predictive utility of the scale. As with all the other measures listed

here, no behavioural context is specified.

   1) 'I believe that [health threat] is severe'

   2) 'I believe that [health threat] is serious'

   3) 'I believe that [health threat] is significant'

   Five item response scale: strongly disagree to strongly agree.

   Cronbach's alpha= 0.90. This value was observed using a random sample

of 179 women at a large university in the Midwestern United States. The majority

were aged 17 to 22 (91%) and white (78.5%).

Witte's guidelines as to how to develop a measure of severity using the example of HIV.

Question 1. What happens when you get infected with HIV?

    Probe 1. Are you concerned about getting HIV? Why or why not?

    Probe 2. Is there anything about your getting HIV that would scare you?

    (dying, children as orphans, pain, etc.)

Question 2. Do you think HIV eventually leads to AIDS? Why or why not?
(People in the country seem to think that no one dies from AIDS and/or it's not a
serious threat.)

    Probe 1. What do your friends or family think?

Question 3. What happens when you get the disease AIDS?

    Probe 1. Are you concerned about getting AIDS? Why or why not?

    Probe 2. Is there anything about your getting AIDS that would scare you?

    (dying, children as orphans, pain, etc.)

Self-Regulation Model – The Illness Perceptions Questionnaire

Revised Illness Perceptions Questionnaire (IPQ-R) (Moss-Morris et al., 2002). The Illness Perceptions Questionnaire was developed to measure patients' representations of their illness. A strength of this measure is the use of self-referencing. Although there are a number of disease-specific versions of the Illness Perceptions Questionnaire (e.g. for asthma, diabetes, chronic pain) the section on severity (labelled 'consequences' in the IPQ-R) is actually the same across all the different disease-specific measures. What varies is simply the insertion of the specific illness in the question. Hence the items are generic and may lack the content specificity researchers may desire.

Another limitation with some of the items in the IPQ-R is that they are ambiguous with respect to valence. Items such as 'My illness strongly affects the ways others see me' does not make it clear whether these changes are positive (e.g. causes people to be sympathetic or view the individual as strong) or negative.

In addition, no behavioural context is specified and this may be important in situations where this scale is used to understand adherence to treatment. In other words, beliefs about how severe the illness would be if individuals did not adhere to their treatment may be more informative than general severity items.

1) My [name of illness] is a serious condition

2) My [name of illness] has major consequences on my life

3) My [name of illness] does not have much effect on my life (reverse scored)

4) My [name of illness] strongly affects the way others see me

5) My [name of illness] has serious financial consequences

6) My [name of illness] causes difficulties for those who are close to me

Five item response scale: strongly disagree, disagree, neither agree nor disagree, agree, strongly agree.

Cronbach's alpha= 0.84. This value was observed using a total of 711 people from one of eight different illness groups (e.g. asthma and diabetes sufferers). The majority were recruited from hospital clinics.

Brief illness perceptions questionnaire (Broadbent et al., 2006):

1) How much does your illness affect your life?

Eleven point response scale: 0-10 anchored 'no affect at all' and 'severely affects my life'.

Revised Illness Perceptions Questionnaire for healthy people (IPQ-RH) (Figueiras and Alves, 2007). The IPQ was initially designed to assess the illness perceptions of patients rather than healthy individuals but recently a version of the IPQ has been developed to assess illness perceptions in healthy individuals.

Unlike the IPQ-R, however, the items are not self-referenced and it may be that this measure assesses illness stereotypes rather than individual severity perceptions. In addition, item 2) is ambiguous with respect to valence.

1) This illness has serious financial consequences

2) This illness strongly affects the way the patient sees himself as a person

3) This illness causes difficulties to those close to the patient

4) This illness is very serious

Five item response scale: strongly disagree, disagree, neither agree nor disagree, agree, strongly agree.

Cronbach's alpha = 0.66. This value was observed on a sample of 1113 members of the general population recruited from different working environments. They were aged 18-65 and the majority were female (64%).

Test-retest reliability across an interval of 3 weeks = 0.54 and this value was observed using a convenience sample of 157 undergraduate students as part of the initial pilot phase of developing the questionnaire.

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