

Raising awareness of hypertension risk through a web-based framing intervention: Does consideration of future consequences make a difference?

Daryl B. O'Connor^{a*}, Sheryl Warttig^b, Mark Conner^a and Rebecca Lawton^a

^a*Institute of Psychological Sciences, University of Leeds, UK;* ^b*Department of Psychology, University of Bath, UK*

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Approximately, one third of people with hypertension are unaware that they have the condition. However, little research has explored the efficacy of interventions to raise awareness of this serious problem. This study had two main objectives: (1) To explore the efficacy of a web-based intervention aimed at raising awareness of the risks associated with high blood pressure and hypertension; (2) To examine the role of the personality variable, consideration of future consequences (CFC) in influencing the effectiveness of the intervention. A 2 (message framing: loss *vs.* gain) × 2 (function: prevention *vs.* detection) × 2 (CFC: low *vs.* high) between-subjects design was employed. Participants were randomly allocated to read one of four messages on a health website. Time spent reading additional health information was utilised as the dependent variable. A significant message frame by CFC interaction was found indicating a loss frame advantage for participants high in CFC and a gain frame advantage for those low in CFC. After reading the loss frame, participants high in CFC spent almost twice as long as those low in CFC reading the additional health information, whereas after reading the gain frame, participants low in CFC read longer than those high in CFC. This study demonstrates that a simple, theory-driven, web-based intervention has the capacity to increase information seeking about hypertension and highlights the importance of tailoring health communication messages to individual characteristics in order to maximise their effectiveness.

Keywords: intervention; consideration of future consequences; high blood pressure; prospect theory; message framing; health communication

Introduction

Hypertension is the direct cause for half of all strokes and heart attacks in the UK and failure to control blood pressure results in 62,000 unnecessary deaths every year (Blood Pressure Association, 2007). Recent statistics show that 32% of men and 30% of women in the UK adult population have high blood pressure, and almost one third of people with hypertension are unaware that they have the condition (Department of Health, 2003). The Blood Pressure Association's 'Know Your Numbers' campaign highlights the need for people to be aware of the risks of having high blood pressure as well as to have their blood pressure tested. This study explored the efficacy of an intervention to promote information seeking relating to hypertension in order to raise awareness of this serious problem.

*Corresponding author. Email: d.b.o'connor@leeds.ac.uk

Prospect theory and framing of messages

Prospect theory states that presenting the same information about risk in different ways alters people's perspectives, preferences and actions (Kahneman & Tversky, 1979). People tend to *avoid risks* when they are considering *gains* and *prefer risks* when considering *losses*. Rothman and Salovey have built upon prospect theory and have reasoned that within the health domain, the influence of gain and loss framed messages is contingent on the perceived function of a health behaviour and its associated risk (Rothman & Salovey, 1997; Rothman, Martino, Bedell, Detweiler, & Salovey, 1999). Detection behaviours (such as screening) carry the risk that a disease or abnormality will be found and therefore are perceived as risky, whereas prevention behaviours (such as eating healthily) are perceived as being relatively risk free as they are performed to avoid future health problems. They suggest that detection behaviours will be encouraged when health information is framed in terms of losses (i.e. if you do not do X you will not achieve Y), and prevention behaviours will be encouraged when gain framed messages are employed (i.e. if you do X you will achieve Y; see Abhyankar, O'Connor, & Lawton, 2008; Banks et al., 1995; Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; McCall & Ginis, 2004; O'Connor, Ferguson, & O'Connor, 2005).

Within this context, the current study aimed to test whether making the prevention or detection functions of blood pressure screening salient influenced (or moderated) the impact of the framed health messages. We also wanted to address the distinct lack of behavioural measures in previous research, and therefore used the amount of time participants spent reading information concerning hypertension on a health website as a more objective measure of engagement with the message.

Consideration of future consequences

Another variable that may have important implications for health communication is the personality trait, consideration of future consequences (CFC) (Strathman, Gleicher, Boninger, & Edwards, 1994; Orbell, Perugini, & Rakow, 2004). People high in CFC tend to sacrifice immediate benefits in order to achieve a desirable future outcome, whereas people low in CFC do not put as high a priority on long term outcomes and are more concerned with maximising immediate benefits. It is generally found that low CFC individuals prefer options where gains are immediate and losses occur in the future, while high CFC individuals prefer the opposite, where losses are immediate and gains occur in the future. In the present research, we reasoned that individuals high on CFC would be more responsive to loss framed messages as they would be more motivated to confirm their current health status when faced with an uncertain outcome. On the other hand, individuals low in CFC might be expected to spend less time reading additional information irrespective of framing condition.

Method

Participants

One hundred and seventy participants were recruited to the study via an email invitation (see Table 1 for demographic characteristics). Two hundred and twenty-three participants received an email, thereby yielding a response rate of 76%.

Table 1. Characteristics of the sample ($n = 170$).

	Mean (SD)
Age (years)	30.16 (11.34)
CFC score	57.21 (9.94)
	Percent (number)
Gender (female)	70 (119)
Education	
No formal qualifications	6 (1)
GCSE/O-Level or equivalent	2.9 (5)
A-Level or equivalent	18.2 (31)
Degree or equivalent (e.g. PhD, BSc, MSc etc.)	78.3 (133)
Familial history of hypertension/high blood pressure (Yes)	37.6 (64)
Personal history of hypertension/high blood pressure (Yes)	5.3 (9)
Are you currently taking medication for hypertension? (Yes)	2.4 (4)

Note: CFC = Consideration of Future Consequences.

Design

The study employed a 2 (Framing: loss *vs.* gain) \times 2 (Function: prevention *vs.* detection) \times 2 (CFC: low *vs.* high) between subjects experimental design. Each participant was randomly assigned to one of the four message frames by an automated device embedded in the website: Detection/Loss, Detection/Gain, Prevention/Loss and Prevention/Gain.

Procedure

An email was circulated to two local white-collar organisations and two university departments which invited recipients to visit a website to take part in a psychological study. The first page asked respondents to provide demographic information, to complete the CFC measure and to read the framed message.

Message frame manipulation

Objectively equivalent information about hypertension was presented in each message but was framed in semantically different ways (i.e. loss prevention, loss detection, gain prevention, gain detection; see Table 2). After reading the manipulation, participants were provided with the contact details of two hypertension support organisations and a link where they could access more information about hypertension. Respondents who clicked the link to obtain further information were timed on how long they spent reading the information. This provided the objective measure of behaviour.

Measures

Prior to reading the message frame the following demographic information was collected (age, gender, personal and family history of hypertension).

Consideration of future consequences

Strathman et al.'s (1994) 12-item CFC scale was used to measure participant's propensity to consider future consequences. Participants were classified as being high

Table 2. Four types of framed message.

Prevention Loss	Prevention Gain	Detection Loss	Detection Gain
High blood pressure (hypertension) is one of the most common causes of cardiovascular disease and can cause damage to the eyes, heart, brain and kidneys. High blood pressure usually has no symptoms. Many people have high blood pressure and do not know it, therefore it is important to get your blood pressure checked regularly.			
If you do not get regular blood pressure checks you will not be able to take advantage of a safe procedure to help prevent cardiovascular disease such as hypertension, angina and stroke.	If you get regular blood pressure checks you can take advantage of a safe procedure to help prevent cardiovascular disease such as hypertension, angina and stroke.	If you do not get regular blood pressure tests you will not be able to take advantage of a safe procedure to help detect cardiovascular disease such as hypertension, angina and stroke.	If you get regular blood pressure tests you can take advantage of a safe procedure to help detect cardiovascular disease such as hypertension, angina and stroke.
If hypertension is not prevented now it may mean you have to take medication or be admitted to hospital for treatment later on.	If hypertension is prevented now it may mean you avoid taking medication or avoid being admitted to hospital for treatment later on.	If hypertension is not detected now it may mean you have to take medication or be admitted to hospital for treatment later on.	If hypertension is detected now it may mean you avoid taking medication or avoid being admitted to hospital for treatment later on.
You may also find that not getting your blood pressure checked causes you to worry, as not preventing hypertension can cost your health and your life.	You may also find that getting your blood pressure checked gives you peace of mind, as preventing hypertension can protect your health and save your life.	You may also find that not getting your blood pressure tested causes you to worry, as not detecting hypertension can cost your health and your life	You may also find that getting your blood pressure tested gives you peace of mind, as detecting hypertension can protect your health and save your life.

or low in CFC based upon a median split (median score = 58.0) following similar procedures used by Orbell and Hagger (2006). The CFC scale has been found to have good reliability and validity (Strathman et al., 1994; $\alpha = .86$ in current sample).

Time spent reading additional health information was recorded in seconds and was utilised as the dependent variable. Respondents who decided not to access the additional information were allocated a score of zero seconds. After careful data screening, 16 respondents' times were removed from the analysis as they were considered to be outliers.

Results

The results of a 2 (Frame: loss vs. gain) \times 2 (Function: detection vs. prevention) \times 2 (CFC: low vs. high) analysis of covariance, controlling for age, gender, personal and family history of hypertension, revealed only one significant effect. As predicted, a significant interaction was found between message frame and CFC ($F[1, 153] = 3.91$, $p < .05$) such that there was evidence of a loss frame advantage for participants high in CFC and a gain frame advantage for those low in CFC (see Figure 1).

In the loss frame condition, participants high in CFC ($M = 63.94$, $SD = 11.73$) spent almost twice as long as those low in CFC reading the additional information ($M = 36.29$, $SD = 11.21$), whereas in the gain frame condition, participants low in CFC read longer ($M = 54.47$, $SD = 10.19$) than those high in CFC ($M = 37.52$, $SD = 11.57$).

Discussion

This study highlighted the importance of tailoring health communication messages to individual characteristics in order to maximise their effectiveness. In particular, we found that participants who tend to sacrifice immediate benefits in order to achieve

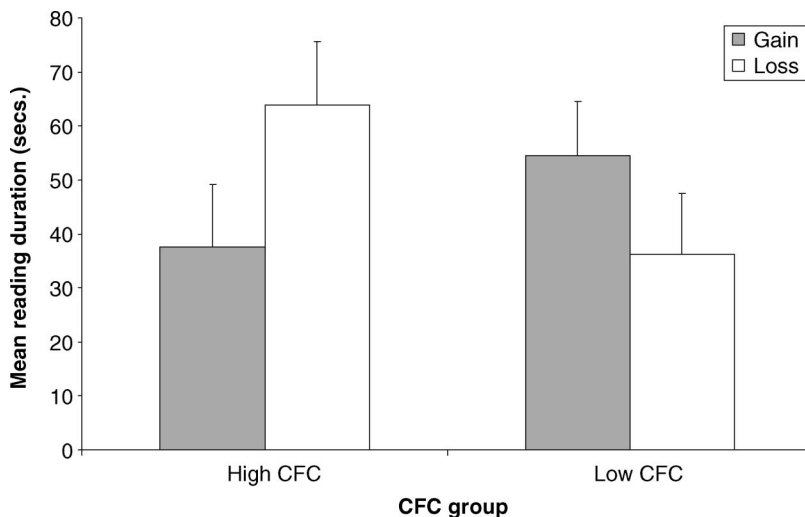


Figure 1. Impact of message frame and CFC on time spent reading additional hypertension information.

desirable future outcomes (high CFC) spent almost twice as long reading the additional hypertension information after reading the loss framed message compared with those who generally do not prioritise long term outcomes (low CFC). Conversely, low CFC individuals spent substantially longer reading the additional material after exposure to the gain framed message compared with their high CFC counterparts.

Within the context of prospect theory, the psychological processes that may underpin these effects are unknown. One possibility remains that individuals high in CFC are more responsive to loss framed messages compared to gain framed messages because they are motivated to confirm their current health status when faced with an uncertain outcome. On the other hand, low CFC individuals may perceive themselves as being at low risk (unrealistically optimistic) of developing hypertension and therefore, consistent with Rothman and Salovey (1997), they are more responsive to the gain framed message. Further research ought to examine these possibilities and examine the potential mechanisms that may mediate these effects (cf., Abhyankar et al., 2008; O'Connor et al., 2005).

This is the first study to test the efficacy of a simple, theory-driven, web-based intervention aimed at raising awareness of hypertension risk in the general population. It also represents a substantial improvement on many previous behaviour change studies because it utilises a non self-report measure of behaviour as the central outcome measure. Therefore, the results of the study are not contaminated or confounded by self-report or recall bias. Nonetheless, we acknowledge a potential limitation of the study relates to the relatively small sample size.

These results have two clear implications for practice. First, they provide evidence for the efficacy of a brief and relatively inexpensive health intervention that could be employed in primary care settings or in work settings in order to help raise awareness of the risks associated with having high blood pressure or hypertension. The intervention might also usefully be applied to treatment adherence in patients already with hypertension. Second, these findings highlight the need to tailor health communication messages to individual characteristics such as the extent to which patients consider the long- and short-term consequences of their behaviours.

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