Health Information Literacy and Stage of Change in Relation to Physical Activity Information Seeking and Avoidance: A Population-Based Study among Young Men

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ABSTRACT

In this study we investigate young men’s seeking and avoidance of physical activity and exercise information. Stage of exercise behavior change as identified in the Transtheoretical Model and everyday health information literacy are studied in relation to these actions. The data were collected with a questionnaire survey (n=1,040) administered at the Finnish Defence Forces’ call-ups in September-December 2013 in Oulu, Finland. Statistical analyses include analysis of variance and multivariate logistic regression analysis. The results indicate that stage of exercise behavior change is associated with information seeking on physical activity and exercise, but only vaguely with avoidance of information. By contrast, everyday health information literacy was associated with avoidance of information and not with information seeking. Future studies should look more carefully into the relationship between health information behavior and literacy. Moreover, information behavior in stages of behavior change should be studied in the context of other health behaviors and among other populations.

Keywords

Health information seeking, health information avoidance, health information literacy, stage of behavior change, young people, men

INTRODUCTION AND BACKGROUND

Seeking health information can be considered to indicate a proactive attitude towards health (Johnson & Case, 2012, 17). In general, people who attend to health promoting behaviors are active in health information seeking (Pálsdóttir, 2008; Shim, Kelly & Hornik, 2006). In the context of physical activity, the frequency of obtaining information on physical activity from different sources has been positively associated with both aerobic and resistance training behaviors (Plotnikoff, Johnson, Karunamuni, & Boule, 2010).

Avoidance of health information, on the other hand, has often been described as more or less ‘counterproductive behavior’ (Ek & Heinström, 2011; Case, Andrews, Johnson, & Allard, 2005). Sweeny, Melnyk, Miller and Shepperd (2010, 4) define avoidance as behavior ‘designed to prevent or delay the acquisition of available but potentially unwanted information’. In health settings, avoidance has been studied especially in relation to serious health concerns such as cancer (Case et al., 2005) and HIV (Brashers et al., 2000). When encountering health problems people reportedly avoid information to avoid negative emotions such as mental discomfort or dissonance (Case et al., 2005; Sairanen & Savolainen, 2010). People may also avoid information if it necessitates an undesired action such
as behavior change (Sweeny et al., 2010). Further, Sairanen and Savolainen (2010) note that individuals may avoid information inappropriate to their needs due, for example, to its low quality. In the current information environment people often experience feelings of information overload (Bawden & Robinson, 2009; Allen & Wilson, 2003) especially in the basic areas of health, such as exercise and nutrition (Kickbusch, 2008), and avoidance may also be a response to these feelings.

Information seeking and also avoidance have been associated with both rather stable ‘trait’ (e.g. personality trait) and more temporary ‘state’ (e.g. emotional state) characteristics. For example, personality traits (Ek & Heinström, 2011) and current health status (Longo et al., 2010) may underlie the actions to seek for or avoid information. According to Johnson and Case (2012) it remains an ‘unsettled issue’ whether avoidance of information is an inherent trait or triggered by a specific situation.

Seeking and avoidance of information are explained as ways of coping in a stressful situation: people may cope by orientating towards a threat (attention) or turning their attention away from the threat (cognitive avoidance) (Krohne, 1993; Wilson, 1996). The terms monitoring and blunting have also been used to describe these dimensions of coping (Miller & Mangan, 1983). In stressful situations blunting may try to protect themselves from anxiety by avoiding information while monitors use information to reduce it (Ek & Heinström, 2011). The style of coping is suggested to be a rather stable personality trait (see Johnson & Case, 2012, p.152-153 for a discussion). However, beliefs such as perception of risk and self-efficacy may orient a person towards information seeking or ‘counterproductive’ behavior such as avoidance (Ek & Heinström, 2011; 2003; Case, Andrews, Johnson, & Allard, 2005).

Furthermore, information seeking and avoidance have been studied from the perspective of uncertainty management (Brashers, 2001). This line of research draws attention to the experience of uncertainty and the possible responses to it, for example, by acquiring information, or by avoiding it. People may attempt to achieve and maintain an optimal level of uncertainty in a given situation, which may explain both information avoidance and information seeking (Brashers, 2001; Sairanen & Savolainen, 2010).

Here we study two individual characteristics, stage of behavior change and health information literacy in relation to seeking and avoiding information in a physical activity context. Our investigation focuses on determining whether these connections exist, and if so, on assessing their strength (see Figure 1).

In the Transtheoretical Model of behavior change individuals’ stage of change is suggested to influence the way they interact with information related to that behavior (Prochaska, 2008). The model implies that avoidance of information is stage-related, occurring especially at a stage where an individual is not behaving according to recommendations and is not intending to change his or her behavior (precontemplation). Increased knowledge through information seeking, in turn, reportedly contributes to progressing to further stages (Prochaska, 2008).

High level of health information literacy seems to be associated with more active information seeking (Eriksson-Backa et al. 2012, Eriksson-Backa 2005). Moreover, low level of health information literacy is suggested to increases the experience of information overload in health settings (Kim, Lustria, Burke & Kwon, 2007) and may therefore be associated with information seeking and avoidance. Overall, there is a gap in the research on the relationship between information behavior and information literacy (Longo et al., 2010; Nesset, 2014).

Stage of behavior change and information behavior
Numerous theories and models have attempted to explain why people adopt or do not adopt particular health behaviors, and how they change their behaviors. The role of information and an individual’s relationship with it is embedded in many of these models but is seldom the subject of empirical studies.

The Transtheoretical Model of behavior change (Prochaska & DiClemente, 1983) proposes concrete strategies on how to design interventions for individuals in different stages of change. Moreover, individuals’ information processing is embedded in the descriptions of different stages and processes of change. The central components of the Transtheoretical Model are stages of change, self-efficacy, decisional balance, and processes of change (Prochaska & DiClemente, 1983).
The five stages of change are: precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage individuals are not intending to change their behavior. In the contemplation stage individuals are thinking about making a change in the next few months, but have not made a commitment to do so. In the preparation stage individuals intend to change their behavior within the next 30 days. In the action stage individuals have successfully made the behavior change less than six months ago, and in the maintenance stage individuals have made the behavior change more than six months ago. (Prochaska & DiClemente, 1983; Prochaska et al., 2008).

Individuals’ self-efficacy and perceived benefits of behavior change likely increase with each stage of change while the perceived costs decrease (Hall & Rossi, 2008). Processes of change represent activities initiated or experienced by an individual in their attempt to modify affect, behavior, cognitions or relationships (Prochaska & DiClemente 1983; Prochaska et al., 2008) in order to achieve progress in each stage. These processes include both cognitive and behavioral activities, and different processes of change are emphasized at the five stages of change (Prochaska et al., 2008).

According to Prochaska (2008) individuals may be at the precontemplation stage because they are ‘uninformed or underinformed’ about the consequences of a behavior. Individuals may also be ‘demoralized’ about their ability to change behavior after previous failed attempts. Either way, precontemplators may tend to avoid reading, talking or thinking about the behavior in question. (Prochaska, 2008). However, or because of this, consciousness raising (increasing knowledge) is a process emphasized at the early stages of change, especially in precontemplation (Toscos & Connelly, 2010; Burkholder & Nigg, 2002; Nigg et al., 2011). This process refers to the efforts of an individual to recall and seek information and to gain understanding and feedback in order to increase self-awareness and consciousness about the problem behavior (Velicer, Prochaska, Fava, Norman & Redding, 1998). Consciousness raising may be supported by providing individuals feedback, education, and media campaigns, and encouraging individuals to read the materials provided (Prochaska et al., 2008).

According to Dutta-Bergman (2013) stage of change is likely to influence an individual’s information seeking and processing strategies. He states that an individual in contemplation and preparation stages would be likely to seek out health information related to that behavior. However, empirical studies on information behavior in different stages of a behavior change process are very rare (see Joinson & Banyard, 2003; Bar-Ilan et al., 2006; Hirvonen et al., 2012 for exceptions).

In an earlier study among young men Hirvonen and colleagues (2012) found that stage of behavior change was associated with information needs and practices to obtain information. Generally speaking, the results indicated that the further an individual is in the process of behavior change, the more information needs he experiences and the more information he obtains on physical activity and exercise. Furthermore, different modes of seeking and scanning information were associated with information needs, with each other, as well as with other constructs of the Transtheoretical Model (self-efficacy, behavior change processes, decisional balance). (Hirvonen et al., 2012.) Avoidance of information, however, was not associated with stage of change nor the other variables investigated. (Hirvonen et al., 2012).

**Health information literacy and behavior**

The concept of *health information literacy* was introduced in the early 2000’s ‘to increase health literacy by fostering […] an understanding of the role that health information literacy plays in empowering people to read, understand, and act’ (Medical Library Association, 2003). According to the working definition of the Medical Library Association Task Force on Health Information Literacy, health information literacy includes the abilities to ‘recognize a health information need; identify likely information sources and use them to retrieve relevant information; assess the quality of the information and its applicability to a specific situation; and analyze, understand, and use the information to make good health decisions’ (Medical Library Association, 2003). The definition was framed within two related concepts: *health literacy* and *information literacy*.

Moreover, the concept of *everyday health information literacy* places health information literacy in everyday life contexts, and is meant for studying laypersons’ general and nonprofessional abilities related to health information (Niemelä et al., 2012). This concept especially concerns literate populations.

Although there is an intuitive connection between people’s abilities to access and use information (information literacy) and the actions of information seeking and use, the relationship between information behavior and information literacy has not been well investigated (Longo et al., 2010; Nesset, 2014). Overall, these research fields have been rather disconnected (Julien and Williamson, 2011; Nesset, 2014). Despite this, the research so far gives some clues as to the possible relationships between health information behavior and health information literacy.

Eriksson-Backa’s (2005, Eriksson-Backa et al. 2012) studies on health information literacy include health
information behavior elements such as information seeking activity. Eriksson-Backa et al. (2012) found that, among elderly people, elements of health information literacy such as ability to decide when information is needed, confidence in finding information and evaluation of the trustworthiness of information were associated with active health information seeking. Similarly, among young adults in differing health situations, those who were more active in seeking information were also more health information literate (Eriksson-Backa 2005).

Pálsdóttir’s (2008) studies on information behavior include elements that could be understood as health information literacy such as a critical approach to the selection of information sources (Pálsdóttir, 2008). She conceptualized these as ‘information behavior barriers’ and found that high barriers were associated with passive information acquisition (Pálsdóttir, 2008).

Niedzwiedzka et al. (2014) studied the determinants of information behavior and information literacy related to healthy eating among Internet users in five European countries. They studied, for example, people’s awareness of health information sources, reading nutrition labels, and looking for nutritional information. However, they proposed no clear definition of the concepts of health information literacy and behavior or their connections.

Low level of health information literacy may increase the experience of information overload according to Kim, Lustria, Burke & Kwon (2007). Moreover, studies indicate that perceived lack of knowledge or skills may lead to unwillingness to act (Feufel, & Stahl, 2012) or increase the experience of uncertainty (Brashers, 2001). Overall, extensive research on self-efficacy indicates that beliefs in one’s own capacities are strongly associated with behaviors (Bandura, 1997).

**RESEARCH QUESTIONS**
The study seeks to increase understanding of health information behavior in a physical activity context. The research questions of the study are as follows:

RQ1: How frequently do young men seek for and avoid information on physical activity?

RQ2: Is this frequency of information seeking and avoidance associated with their

RQ2.1: stage of exercise behavior change, or

RQ2.2: everyday health information literacy

(see Figure 1).

**MATERIAL AND METHOD**

**Data collection**
The data were collected with a questionnaire survey administered at the Finnish Defence Forces’ call-ups in the

**The questionnaire**

All questionnaire items were in Finnish. Information seeking on physical activity was elicited with two statements to which the respondents were instructed to select the alternative that best described their behavior during the previous month on a scale of 1 (never) to 5 (regularly): 1) ‘I look for information when I have a problem or a question about exercise or physical activity’, and 2) ‘I look for physical activity or exercise information for example in the Internet or ask questions about it from other people’.

Similarly, information avoidance was surveyed with two statements: 1) ‘I don’t want to think about exercise’, and 2) ‘I avoid hearing or seeing exercise-related information’.

**The everyday health information literacy (EHL) of the participants was assessed with a screening tool developed by Niemelä and colleagues (2012). The tool was designed mindful of the Medical Library Association’s (2003) definition of health information literacy and developed to identify individuals with problems related to their interest and motivation, finding, understanding, evaluating and using health information although generally literate. It consists of ten statements to which the participants were instructed to respond on a scale from 1 (strongly disagree) to 5 (strongly agree):**

1. It is important to be informed about health issues;
2. I know where to seek health information;
3. I like to get health information from a variety of sources;
4. It is difficult to find health information from printed sources (magazines and books);
5. It is difficult to find health information from the Internet;
6. It is easy to assess the reliability of health information in printed sources (magazines and books);
7. It is easy to assess the reliability of health information on the Internet;
8. Health related terminology and statements are often difficult to understand;
9. I apply health related information to my own life and/or that of people close to me;
10. It is difficult to know who to believe in health issues.

The stage of change scale (modified from Cardinal, 1995) contained a picture of a ladder with four rungs and five descriptors corresponding to each stage of change (0=precontemplation, 1=contemplation, 2=preparation, 3=action, 4=maintenance). The respondents were instructed to select the rung that best described their regular exercise behavior and intentions to exercise. Regular exercise was defined according to the national physical activity recommendations for 13 to 18-year-olds (Tammelin & Karvinen, 2008) as at least 1.5 hours of daily physical activity, half of it at a vigorous pace.

According to recommendations one should engage in physical activity for at least 1.5 hours daily and half of this should be vigorous exercise. Exercise can consist of several sessions of at least 10 minutes. Choose (circle) the alternative that on your opinion best describes you (a-e).

I currently exercise on a regular basis and have been doing so for longer than 6 months
I currently exercise on a regular basis, but I have only begun doing so within the past 6 months
I currently do not exercise, but I have been thinking about starting to exercise within the next month
I currently do not exercise, but I have been thinking about starting to exercise within the next 6 months
I currently do not exercise and do not plan to start exercising in the next 6 months.

Figure 2. Descriptors for the five stages of exercise behavior change (adapted from Cardinal, 1995)

Those not meeting this criterion of exercise were grouped into the first three stages: those not intending to start regular exercise in the future (precontemplation), those intending to start within the next six months (contemplation), and those intending to start within the next month (preparation). Those already meeting this criterion were categorized into the action stage if they had been exercising regularly less than six months and into the maintenance stage if they had been doing so for more than six months.

Statistical analyses were performed using the IBM SPSS Statistics for Windows, Version 19.0 (IBM Corp., 2010). The individual statements on avoidance and information seeking were aggregated to form a sum variable. Similarly, the statements on everyday health information literacy were aggregated (statements 4, 5, 8 and 10 were reversed). Further, we allocated respondents to three somewhat equal sized groups based on the everyday health information literacy scores: low (≤30 points), basic (31–38 points) and high (≥39 points) EHIL.

Mean and standard deviation values were calculated for continuous variables and percentages for categorical variables. Associations between the categorical response and explanatory variables were analyzed using cross-tabulation with Pearson’s chi-square test or its non-parametric alternative, Fisher’s exact test. Correlation analysis was used to examine the relationships between continuous variables.

Nonparametric one-way analysis of variance tests (Kruskal–Wallis) with pairwise multiple comparisons were used to analyze the group differences (based on health information literacy and stage of change) in information seeking and avoidance.

Multivariate analyses were used to simultaneously investigate the relative contributions of everyday health information literacy and stage of behavior change to information seeking and avoidance. Logistic regression analysis with enter method was used and for these analyses statements concerning information seeking and avoidance were analyzed separately and treated as binomial variables (never or rarely vs. sometimes, often, regularly). The results are presented as Odds Ratios (OR) with 95% confidence intervals (95% CI). The Odds Ratio describes the ratio of the probability that a particular event (in this case avoidance and seeking of exercise information) will occur to the probability that it will not occur (Osborne, 2006). The level of significance for all tests was set at p<0.05.

RESULTS

The respondents were all male, most of them 17 (22.2%; n=198) or 18 years old (71.2%; n=635), studying at upper secondary school (92.3%; n=819), and living with one or both parents (82.5%; n=738). Of the young men 6.7% (n=64) were categorized into precontemplation, 13.2% (n=127) into contemplation, 15.6% (n=150) into preparation, 15.9% (n=153) into action and 48.6% (n=468) into maintenance stage of exercise behavior change. The everyday health information literacy scores of the men followed a normal distribution (mean=28.1, SD=4.3). For further analysis, 33.8% (n=277) of the men
were categorized into low, 37.8% (n=310) into basic, and 28.4% (n=233) into high everyday health information literacy category.

Of the men, 58.6% (n=458) reported seeking physical activity information at least sometimes when having a problem or a question about exercise or physical activity, and 62.6% (n=489) reported seeking physical activity or exercise information for example on the Internet or asking other people questions at least sometimes. Of the men, 40.8% (n=319) had at least sometimes avoided asking questions about exercise or physical activity and 62.6% (n=489) reported avoiding other people exercise-related information.

Kruskal-Wallis analysis showed that the men in the maintenance stage were most likely to seek and least likely to avoid information on physical activity and exercise. Men in precontemplation were least likely to report seeking, and men in the contemplation and action stages most likely to report avoiding information. (See Table 1).

Correlation analyses indicated that everyday health information literacy was only weakly associated with active seeking of physical activity information ($r=.089, \text{p}<.01$). A stronger, negative correlation ($r=-.309, \text{p}<.01$) emerged between everyday health information literacy and avoidance of information. Moreover, Kruskal-Wallis analysis with everyday health information literacy in three categories showed that it was associated with avoidance of information, but not with information seeking. Pairwise multiple comparisons indicate that there were significant differences in mean avoidance scores between each EHIL group (low > basic > high). (See Table 2).

When the individual statements on seeking and avoiding exercise information were cross-tabulated with stage of exercise behavior change and everyday health information literacy in three categories, associations emerged between each of these variables. Therefore, logistic regression analyses were conducted with both variables included.

These analyses (see Table 3) showed that responses to both statements on active seeking of information (looking for information when having a problem or a question about exercise or physical activity; looking for physical activity or exercise information on the Internet or asking questions about it from other people) were associated with the stage of exercise behavior change. For example, the odds of a precontemplator never or rarely looking for information on exercise or physical activity were more than eight to one when compared to men in the maintenance stage (OR=8.57, 95% CI=4.31-17.04; $\text{p}<.001$). Moreover, being in the precontemplation, contemplation and action stages of exercise behavior change, in contrast to maintenance,
increased the odds of not wanting to think about exercise. Everyday health information literacy was also associated with avoidance of thinking about exercise: the odds of avoiding thinking about exercise were almost three to one for men categorized into the low everyday health information literacy category in comparison to men who had high EHI-L (OR 2.69, 95% CI=1.82-3.96; p<.001) (Table 3).

Avoidance of hearing or seeing exercise information was associated with everyday health information literacy; being in the low (OR=3.78, CI 95%=2.51-5.70, p<.001) or basic (OR=1.66, CI 95%=1.10-2.51, p=.015) everyday health information literacy category increased the odds of avoidance when compared to being in the high EHI-L category (Table 3).

**DISCUSSION**

Around 60% of the respondents reported having sought physical activity and exercise related information at least sometimes during the preceding month. Some 40% of the men had avoided thinking, and 30% of the men had avoided seeing or hearing information on exercise or physical activity at least sometimes. Information seeking was found to be associated with stage of behavior change, but not with everyday health information literacy. Conversely, avoidance of physical activity information was associated with everyday health information literacy and only vaguely with stage of exercise behavior change. The original conceptual framework (Figure 1) was adapted to represent these results (Figure 2).

The results suggest that frequent health information seeking is not necessarily associated with high level of health information literacy. The study lends further support to the findings that information seeking may be associated with stage of behavior change in a physical activity and exercise context (see Hirvonen et al., 2012; Enwald et al., 2015). Moreover, the results indicate that information seeking and avoidance may be influenced by different factors.

The Transtheoretical Model suggests that the use of behavioral processes (such as rewarding or reminding oneself) exceeds the use of cognitive processes (such as consciousness raising) in the later stages of change (Nigg et al., 2011). This seems to apply in the context of smoking cessation, for example, but with physical activity and dietary behavior, both cognitive and behavioral processes of change have been found to increase together (Rosen, 2000). In other words, people seem to use cognitive processes not only when adopting a behavior but also in the maintenance stage. Similarly, active seeking of information seems to occur not only when people attempt to change their behavior, but also, and in particular, when maintaining earlier adopted behaviors.

### Table 3. Factors associated with information seeking and avoidance in multivariate logistic regression analysis

<table>
<thead>
<tr>
<th>Variable (reference category)</th>
<th>Category</th>
<th>OR</th>
<th>95 % CI</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristics associated with information seeking</strong></td>
<td>‘I look for information when I have a problem or a question about exercise or physical activity’ (never or rarely)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage of change (maintenance)</td>
<td>Preparation</td>
<td>2.72</td>
<td>1.80-4.13</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Contemplation</td>
<td>3.54</td>
<td>2.23-5.61</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Precontempl.</td>
<td>8.57</td>
<td>4.31-17.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Characteristics associated with information seeking</strong></td>
<td>‘I look for information on exercise or physical activity for example in the Internet or ask questions about it from other people’ (never or rarely)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage of change (maintenance)</td>
<td>Action</td>
<td>1.61</td>
<td>1.04-2.48</td>
<td>.032</td>
</tr>
<tr>
<td></td>
<td>Preparation</td>
<td>3.19</td>
<td>2.09-4.86</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Contemplation</td>
<td>3.14</td>
<td>1.98-4.99</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Precontempl.</td>
<td>9.58</td>
<td>4.88-18.80</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Characteristics associated with information avoidance</strong></td>
<td>‘I don’t want to think about exercise’ (at least sometimes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHI-L (high)</td>
<td>Low Basic</td>
<td>2.69</td>
<td>1.82-3.96</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>1.58</td>
<td>1.08-2.31</td>
<td>&lt;.019</td>
</tr>
<tr>
<td>Stage of change (maintenance)</td>
<td>Action</td>
<td>1.85</td>
<td>1.22-2.80</td>
<td>&lt;.004</td>
</tr>
<tr>
<td></td>
<td>Contemplation</td>
<td>3.38</td>
<td>2.11-5.41</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Precontempl.</td>
<td>1.83</td>
<td>1.01-3.31</td>
<td>&lt;.047</td>
</tr>
<tr>
<td><strong>Characteristics associated with information avoidance</strong></td>
<td>‘I avoid hearing or seeing exercise-related information’ (at least sometimes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHI-L (high)</td>
<td>Low Basic</td>
<td>3.78</td>
<td>2.51-5.70</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>1.66</td>
<td>1.10-2.51</td>
<td>&lt;.015</td>
</tr>
</tbody>
</table>

* Enter-method was used by inserting everyday health information literacy and change of change into each model.
Avoidance of information was only vaguely associated with stage of change although, according to the Transtheoretical model (Prochaska, 2008), avoidance would be expected especially among precontemplators. This replicates the results of a study by Hirvonen et al. (2012) on young men’s information behavior in stages of exercise behavior change although in that study the criterion for adequate level of exercise was set in a different way. In the present study men categorized into precontemplation were more likely to avoid thinking about exercise, but avoidance of hearing or seeing exercise or physical activity information was not associated with stage of change.

Everyday health information literacy, in turn, was associated with avoidance of physical activity information: men with low health information literacy were most likely, and men with high health information literacy least likely to avoid information on physical activity and exercise. According to Brashers (2001, 478) ‘uncertainty exists when details of situations are ambiguous, complex, unpredictable, or probabilistic; when information is unavailable or inconsistent; and when people feel insecure in their own state of knowledge or the state of knowledge in general.’ Confidence in one’s own state of knowledge, but also in the skills needed to acquire and use new information, might help people to reduce, or cope with, the feeling of uncertainty in health settings.

The results of this study point in the same direction as the findings of an earlier study on young men’s perceptions of fear appeals (Enwald et al., 2015). Fear appeals, that is, persuasive communication that attempt to arouse fear in order to promote self-protective action (Rogers & Deckner, 1975), are widely used in health promotion to motivate behavior change, although their efficacy has been questioned (Ruitter et al., 2014). Enwald et al. (2015) found that men with low everyday health information literacy were unlikely to select a fear appeal message alternative from a message pair concerning physical inactivity. This finding indicates that those assuming that their skills may be inadequate may be less open to threatening information.

The study participants represent a population of young Finnish men, and the results are not generalizable beyond this population. Further, the limitations of this study include reliance on self-reported measures of health information literacy, health information seeking and avoidance, as well as stage of exercise behavior change. Avoidance of information, in particular, may be difficult to study with survey methods (Sairanen & Savolainen, 2010). Moreover, in this study we focused on a limited set of variables. The everyday health information literacy screening tool may indicate individuals’ confidence in their capabilities to find, evaluate, and use health information rather than actual competency. In future studies this self-estimated capability could be studied together with more directly measurable skills (Ivanitskaya et al., 2006). Furthermore, future studies should look more deeply into the relationship between health information behavior and literacy. In health settings both concepts are valuable, since they are demonstrably associated with health behaviors and health (Pálsdóttir, 2008; Eriksson-Backa et al., 2012). Moreover, information behavior in stages of behavior change should be studied in the context of other health behaviors and among different populations.

Health information literacy and stage of behavior change are characteristics suitably for inclusion in health promotion. The potential need for health information literacy instruction could be addressed in health counselling. Increased health information literacy could help people to become more receptive towards health information. Information tailoring (Enwald, 2013; Hirvonen et al., 2015a) is another approach to take account of the variation in individuals’ health information literacy levels and stage of behavior change.

**CONCLUSION**

The findings of this study suggest that the stage of exercise behavior change as conceptualized in the Transtheoretical Model (Prochaska & DiClemente, 1983) is associated with information seeking on physical activity and exercise. Men in the maintenance stage of exercise behavior change were most likely, and men in the precontemplation stage least likely to seek physical activity information. Everyday health information literacy, in turn, was found to be associated with avoidance of physical activity and exercise information. Avoidance was most likely among men categorized as having low level of everyday health information literacy.

The study contributes to the existing research on health information behavior and health information literacy by studying these in relation to each other. Moreover, it lends further support to findings suggesting that information behavior varies with stage of behavior change (Hirvonen et al., 2012; Bar-Ilan et al., 2006).

Future studies should look more carefully into the relationship between health information behavior and
literacy both at the conceptual and empirical levels. Moreover, information behavior in stages of behavior change could be studied in the context of other health behaviors and among different populations. The results of this study may be taken into account in the design of health promotion efforts.

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REFERENCES


Hallows, K.M. (2013). Health information literacy and the elderly: has the Internet had an impact? The Serials Librarian: From the Printed Page to the Digital Age 65(1), 39-55.

of exercise behavior change. *Journal of the American Society for Information Science and Technology* 63(9), 1804–1819.


Nesset, V. (2014) Depicting the intersection between information-seeking behavior and information literacy in the research process: a model. In Bilal, Dania & Beheshti, Jamshid (Eds.). *New Directions in Children’s and Adolescents’ Information Behavior Research*. []


