Perceived value threats are related to fear of health impairments

Marina Iosifyan & Galina Arina

View supplementary material ⬈

Published online: 26 Oct 2021.

Submit your article to this journal ⬈

View related articles ⬈

View Crossmark data ⬈

This article has been awarded the Centre for Open Science 'Open Data' badge.

This article has been awarded the Centre for Open Science 'Open Materials' badge.

Routledge
Taylor & Francis Group

Perceived value threats are related to fear of health impairments

Marina Iosifyan[a] and Galina Arina[b]

[a]University of St Andrews; [b]Moscow State University

ABSTRACT

Health impairments are problems in the body and mental functioning, which can be a result of a disease or side effects of treatment. Fear of health impairments plays an important role in decision-making and behavior. People might fear health impairments because of their beliefs about their dangerousness, but also because these impairments threaten important values. However, while the role of cognitive appraisal in the fear of health impairments is investigated, the role of motivation is less clear. To fill this gap, this study analyzed the role of values as motivational constructs in the fear of cognitive, motor, and sensory impairments, as well as impairments of reproductive functions and disfiguring impairments. Participants evaluated these health impairments as frightening or not. They also evaluated how these health impairments may threaten values and reported their value priorities. Health impairments are believed to threaten personally focused values (openness to change and self-enhancement) more than socially focused values (conservation and self-transcendence). Threats to personally focused values are related to higher fear of health impairments.

Introduction

Fear of illnesses and their symptoms is an important emotion that impacts health behaviors, disease management, and mental well-being. Theories of health behavior assume that fear plays an important role in health decision-making. For instance, Protection Motivation Theory assumes that fear activates health-protective behaviors (Maddux & Rogers, 1983; Rogers, 1975). Public health campaigns often use fear appeals to promote health protecting behaviors such as smoking cessation, breast self-checks and safe driving (Cho & Salmon, 2006; Yang, 2018). Fear appeals indeed positively affect intentions and health behaviors (Tannenbaum et al., 2015).

The present study focuses on factors that underlie fear of health impairments. This knowledge can be applied both in psychotherapies, which aim to decrease fear among patients, as well as in health campaigns, which use fear to affect attitudes, intentions, and behaviors related to health.

Fear of health impairments

According to the World Health Organization, health impairments are problems in body and mental functioning (Jette, 2006). In the present research, health impairments include the following: cognitive impairments (e.g., inability to reason, remember), sensory impairments (e.g., blindness and anosmia), communication impairments (e.g., inability to communicate with others), motor impairments (e.g., paraplegia), disfunctions of the reproductive system, and deformations of appearance. Thus, these impairments are not disabilities or diseases, but can be a result of a certain disease or a side effect of treatment.

Fears of these impairments affects disease management and medical decision-making (Halpern & Arnold, 2008; Loewenstein, 2005). For example, a fear of side effects might lead to a patient's decision to discontinue treatment (Citrin et al., 2012; Montbriand, 1998) or avoid medical examinations (Reynolds et al., 2018). Fear of illnesses and health impairments also has a negative impact on mental well-being (Taylor, 1993). For example, fear of disease recurrence causes anxiety, depression, and a lower quality of life among cancer patients (Simard & Savard, 2009; Simard et al., 2013).

Psychological research attempts to detect factors associated with the fear of health impairments. Cognitive appraisal is one of these factors. It is assumed that fear is a result of cognitive appraisal of the illness or health impairment. One of the cognitive appraisal models, Leventhal's illness beliefs model, showed that cognitive appraisal and illness beliefs partly explain the fear of health impairments (Corter et al., 2012; Lee-Jones et al., 1997; Leventhal et al., 1992). For instance, it was found that beliefs about treatment control are associated with a higher level of fear of cancer (Corter et al., 2012). However, while cognitive appraisal in understanding of fear of health impairments has been widely investigated, the role of different motivations underlying this fear is less clear. The motivational approach to emotions is based on the assumption that emotions are derived from motivations:

> Without some version of a motivational principle, emotion makes little sense, inasmuch as what is important or unimportant to us determines what we define as harmful and beneficial, hence emotional

> (Lazarus, 1991, p. 352)

Individual's own values and fears

Health impairments can be frightening because it threatens particular values and motivations. A major theory of values, Schwartz's quasi-circumplex model, defines values as abstract life-guiding motivations that predict attitudes and behaviors (S. H. Schwartz, 2003). Values refer to desirable goals that motivate action. For example, people who value power are motivated to pursue power-related goals (S. Schwartz, 2012). Values are also linked to affect: people who value achievement feel fear when achievement goals are threatened (S. Schwartz, 2012). Theoretical assumptions and empirical findings show that there are 10 value priorities and four higher-order values: openness to change (self-direction, stimulation, and hedonism), self-enhancement (achievement, power), self-transcendence (universalism, benevolence), and conservation (conformity, tradition, and security). These values are organized in a circular structure (see Figure 1).

Achieving goals behind a specific value would contradict or conflict with the value on the opposite side of the circumplex. Openness to change values are antagonistic to conservation values; self-transscendence values are antagonistic to self-enhancement values. This value structure is similar across different cultures and ages (S. Schwartz, 2012).

In line with Schwartz's theory of values, values can be socially focused (conservation and self-transcendence values) and personally focused (openness to change and self-enhancement values). Personally focused values emphasize the pursuit of one's own interests, while socially focused values – interests of others (S. H. Schwartz, 2015). Threats that are perceived as threats to the society and the world (e.g., ecological threats) can be associated with socially focused values. While threats perceived as threats to self (e.g., career threats) can be particularly associated with personally focused values.

Evidence supports the notion that values are related to fears (Boehnke & Schwartz, 1997; S. H. Schwartz et al., 2000). For instance, people who prioritize conservation values (*security, tradition, and conformity*) have greater levels of the fear of war (Boehnke & Schwartz, 1997) and fear of crime (Barni et al., 2015). People who prioritize self-transcendence values (*benevolence, universalism*) experience more worries about society and the world, and fewer worries about themselves. In contrast, people who prefer self-enhancement values (*achievement, power, and hedonism*) experience more worries about themselves and fewer worries about society and the world (S. H. Schwartz et al., 2000). In line with this reasoning, health threats can be perceived as threats to self and be associated with personally
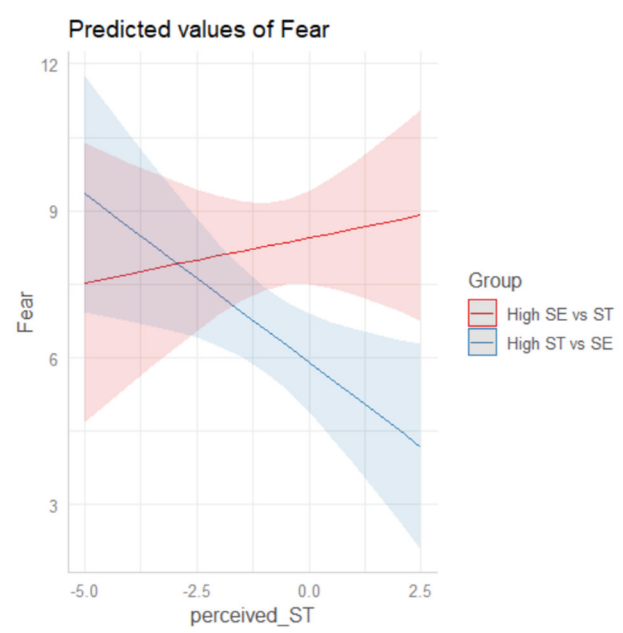
Figure 1. The circumplex model of values (Schwartz, 1992).

focused values: self-enhancement and openness to change values. Health impairments, perceived as threats to these values, can be particularly frightening. It is also possible that people who value openness to change and self-enhancement experience higher levels of fear of health impairments.

However, another type of connection between values and fear of health impairments is possible. According to Schwartz's theory of values, values can be organized based on their relations to anxiety (S. H. Schwartz, 2015). Some values are anxiety-free, express the need for self-expansion, and are related to the feelings of satisfaction (openness to change and self-transcendence values). Other values are anxiety-based, that is – express the need for self-protection and are related to the feelings of anxiety (conservation and self-enhancement values). Thus, it is possible that people who value anxiety-based conservation and self-enhancement also experience higher levels of fear of health impairments.

It should be mentioned that value-fear links can be moderated by value importance. For instance, if a particular health impairment is associated with personally focused value (e.g., self-enhancement), but this value is not personally important, the health impairment might not be frightening. This reasoning is in line with the idea that the implication of core values (personally important values) increases the positive and negative evaluations of social objects (Ostrom & Brock, 1968).

The present research

In the present study, we investigate the effects of our own values and perceived value threats on fear of health impairments. Previous studies, which investigated links between values and fears (Barni et al., 2015; Boehnke & Schwartz, 1997; S. H. Schwartz et al., 2000) explored only the effects of their own values. However, the effects of their own and perceived values threats can be different. For instance, a person might value self-enhancement, but at the same time be not afraid of a certain health impairment because she believes that this impairment does not threaten her self-enhancement goals. Previous studies have shown that our own and perceived values (values attributed to one another) differ from each other and have differential effects on attitudes (e.g., prejudice toward migrants, Wolf et al., 2019).

To explore the role of both own and threatened values, in the present study we asked participants to report their values, but also to evaluate how values can be threatened by different health impairments. Participants were asked to imagine a person with a particular health impairment and evaluate how this person's valued goals can be threatened because of this impairment.

Understanding how different health impairments are believed to threaten values can be useful in understanding health decision-making. For instance, patients may discontinue prescribed medication against medical advice, and fear of side effects plays a role in this decision-making (e.g., reduced sexual functioning in males as a side effect of treatment predicts antihypertensive medication non-adherence; Van der Laan et al., 2017). Perceived value threats may partly explain this fear. For example, disfiguring impairments as side effects may elicit fear because they can be perceived as threatening self-enhancement values (e.g., social status and prestige); cognitive impairments as side effects can be perceived as threatening openness to change values (e.g., independent though and action, choosing, creating, and exploring). If perceived value threats underlay fear of health impairments, this information can be used in psychotherapy of fear in patients. Relations between values and fear of health impairments can also be important in understanding the appeal of fear in health care. If fear of certain health impairments is related to perceived value threats, using these threats in fear-based messages can increase persuasiveness of these messages.

In the present study, we investigated health impairments in cognitive, sensory, social, and physical domains, which might develop because of a severe illness or trauma, but can also be a side effect of treatment. These include cognitive impairments (e.g., inability to reason, remember), sensory impairments (e.g., blindness, deafness), communication impairments (e.g., inability to communicate with others), motor impairments (e.g., paraplegia), disfunctions of reproductive systems and deformations of appearance.

Study 1

Study 1 investigated associations between personal values, perceived value threats, and fear of health impairments. Participants evaluated their health impairments as frightening or not. They also evaluated how different values might be threatened by these impairments and reported their value priorities. Short Schwartz's Value Survey was used to measure own values and perceived value threats. The list of health impairments was based on WHO international classification of impairments. The second aim of Study 1 was to test a hypothesis that interactions between own values and perceived value threats are related to fear of health impairments. That is, both perceived value threat and personal importance of the value account for the fear of health impairments.

Method

Participants

A pilot study (N = 131) with a similar design (participants evaluating health impairments as frightening and reporting how they might threaten values) found that their own values and perceived value threats are related to fear of health impairments with a small-to-medium effect size (see Supplementary materials for details). Power analysis conducted in G*Power (Faul et al., 2007) indicated that a minimal sample size of 112 participants was necessary to test a regression model with medium effect size, alpha level = .05, and power = .80. This study was conducted online via snowball sampling. The survey was distributed on different social media platforms, involving Facebook.com and Vkontakte.ru among Russian-speaking participants. Eighteen participants who did not complete all study questionnaires were excluded from data analysis. The final sample included one hundred and twenty-two participants aged from 18 to 48 years (M_{age} 27.04 years, SD = 6.59 years; 40 males). Data were collected in March 2020 in Russia. It should be mentioned that by this time,

Covid-19 cases were already reported in Russia, and restrictions were put in place (e.g., restrictions for social gatherings; Sobyanin.ru, 2020a).

All studies reported in this manuscript were carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) and were approved by the ethics committee of the Higher School of Economics University (Russia).

Materials

Participants were asked to evaluate seven different health impairments on a scale from 1 to 10 (1 – not at all frightening, 10 – very frightening). A list of health impairments was based on an international classification of impairments (World Health Organization, 1980) and included cognitive impairment, language, and communication impairment, disfiguring impairment, sensory impairment (blindness and deafness), motor impairment, and impairment of reproductive function. To ensure that participants completely understood the meaning of these health impairments, the medical terms were explained.

Participants completed the Short Schwartz's Value Survey (SSVS; Lindeman & Verkasalo, 2005). They were asked to rate the importance of 10 items as life-guiding principles (e.g., "*Achievement, that is, success, capability, ambition, and influence on people and events*") on 7-point scale (0 – opposed to my principles, 6 – value of supreme importance). The ten values were collapsed into four higher-order values: openness to change (self-direction, stimulation, hedonism; Cronbach's Alpha = .68), self-enhancement (achievement, power, $r(122) = .504$, $p < .0001$), self-transcendence (universalism, benevolence, $r(122) = .234$, $p = .007$) and conservation (conformity, tradition, security, Cronbach's Alpha = .75). These scores were further collapsed into two dimensions: self-transcendence (vs self-enhancement) and openness to change (vs conservation). Self-enhancement scores were subtracted from self-transcendence scores; openness to change scores were subtracted from conservation scores. In line with studies, which showed that centering reduces reliabilities, values were not centered (Borg & Bardi, 2016; He et al., 2015). To ensure that the data conformed to the hypothesized value structure of Schwartz's model, enabling us to compute value dimension scores, the Tucker's congruence coefficient was calculated. It was derived from multidimensional scaling analysis using the theory-based starting configurations provided by Schwartz's model (Bilsky, Janik, & Schwartz, 2011). The data indicated an excellent fit to the hypothesized structure (the Tucker's congruence coefficient = .996).

Participants also completed the SSVS for each of the seven health impairments. They were asked to rate how likely values could be threatened because of each of these seven impairments: "*Imagine a person who has a mobility impairment because of some disease or trauma. As per your view, what values can be threatened as a result of his/her current health impairment?*" Participants evaluated each item on a scale from 0 (*definitely will not be threatened*) to 5 (*definitely will be threatened*). Data were next analyzed similarly as described above.

Finally, participants were asked to report if they have any health impairments or chronic diseases, since this might have an effect on fear of health impairments. Only 8 participants reported they had chronic conditions (e.g., asthma) and none reported having health impairments listed in the study.

Procedure

The order of questionnaires was the following: participants evaluated seven health impairments as frightening or not. They next reported their value priorities, completing the Short Schwartz's Value Survey. Finally, they completed the SSVS for each of the seven health impairments. The order on health impairments was not counterbalanced.

Statistical analysis

The assumption that own values, perceived value threats, and their interactions explain the fear of health impairments was tested. A linear mixed-effects model was built to estimate the degree of fear of health impairments as a function of (1) own value priorities, (2) perceived value threats, and (3) their interactions. The analysis was conducted in R (R Development Core Team, 2013) using the *lme4* package for mixed-effect regression models (Bates et al., 2014). Own values, perceived value threats, and their interactions were nested within the fear evaluation of seven health impairments. Fear of health impairments and perceived value threats were not averaged across different health impairments. Participants' ID and health impairments were entered as factors. Results are reported for all health impairments combined at a superordinate level above the individual univariate results for each health impairment. Separate regression models for each health impairment are reported in Supplementary Materials. Variance inflation factors of the independent variables were analyzed, and no multicollinearity issues were detected (VIF<3).

Results

Descriptive statistics

Means and standard deviations of their own values, perceived value threats and fear were calculated for each of the seven health impairments (see Table 1). Repeated measured ANOVA with Greenhouse–Geisser correction indicated that some health impairments were feared more than others, $F(4.50, 544.79) = 24.95$, $p < .0001$, $\eta^2 = .171$. Paired sample t-tests indicated that motor impairments, cognitive impairments, and blindness were feared more than other impairments, ps<.001, Cohen's d (averaged) = 0.58. One sample t-tests (test value = 0) indicated that all health impairments were evaluated as threatening openness to change rather than conservation values (ps<.001, Cohen's d (averaged) = 0.80) and self-enhancement values more than self-transcendence values (ps<.035, Cohen's d (averaged) = −0.53).

Correlations between own values, perceived value threats, and fear were calculated for all health impairments based on full-scale analysis and unaveraged data (see Table 2). Participants who valued self-transcendence over self-enhancement expressed less fear of health impairments. Beliefs that self-transcendence values are threatened more than self-enhancement values were negatively related to fear of health impairments. Beliefs that openness to changing values is threatened more than conservation values were positively related to fear of health impairments.

Table 1. Means and standard deviations (in round brackets) of all variables in study 1.

	Motor impairments	Cognitive impairments	Sensory impairments (blindness)	Language and communication impairments	Sensory impairments (deafness)	Disfiguring impairments	Impairments of reproductive function	Total
Fear	9.15 (1.46)	8.89 (1.70)	8.75 (1.76)	7.84 (2.48)	7.51 (2.39)	7.47 (2.35)	7.32 (2.63)	8.13 (2.26)
Perceived value threats								
ST	−1.31 (1.43)	−1.84 (1.66)	−1.35 (1.62)	−1.54 (1.49)	−1.44 (1.37)	−0.91 (1.42)	−0.20 (1.02)	−1.23 (1.52)
OP	1.95 (1.57)	0.93 (1.47)	1.50 (1.59)	0.81 (1.10)	0.79 (1.06)	0.62 (1.09)	0.91 (1.21)	1.07 (1.38)
Own values								
ST	-	-	-	-	-	-	-	0.61 (1.47)
OP	-	-	-	-	-	-	-	0.52 (1.63)

ST = self-transcendence vs self-enhancement values, OP = openness to change vs conservation values.

Table 2. Correlations between fear, own values, and perceived value threats in study 1.

		Fear	Own values		Perceived value threats	
			ST	OP	ST	OP
Own values						
ST	r	−.187	1			
	p	.000				
OP	r	−0.022	854	1		
	p	.515	−.280			
Perceived value threats						
ST	r	−.117	0.004	0.026	1	
	p	.001	0.918	.455		
OP	r	.143	0.027	−0.045	−.397	1
	p	.000	0.434	.192	.000	

ST = self-transcendence vs self-enhancement value dimension; OP = openness to change vs conservation value dimension.

Table 3. Regression models testing the effects of values on fear of health impairments in study 1.

	Fear of health impairments				
	b	SE	β	CI	p
Own values					
ST	−.38	.10	−.24	[−.37, −.12]	<.001
OP	−.14	.09	−.10	[−.23, .03]	.119
Perceived value threats					
ST	−.04	.06	−.03	[−.10, .05]	.468
OP	.14	.06	.08	[.01, .16]	.021
Interaction effects					
ST	−.04	.03	−.05	[−.13, .03]	.203
OP	.03	.03	.04	[−.05, .13]	.384

Model's marginal R^2 = .06, correct R^2 = .45, ICC = 0.418, AIC = 3571.25, BIC = 3618.75, RMSE = 1.580. ST = self-transcendence vs self-enhancement values; OP = openness to change vs conservation values.

Main analysis

Fear of health impairments was regressed onto participants' own values, perceived value threats, and their interaction (see Table 3). Own self-transcendence values (vs self-enhancement values) predicted less fear of health impairments, $b = −.38$, $SE = .10$, $β = −.24$ [−.37, −.12], $p < .001$. This suggests that participants who value self-transcendence over self-enhancement express less fear of health impairments. Perceived threat to openness to change values (vs conservation values) predicted more fear of health impairments, $b = .14$, $SE = .06$, $β = .08$ [.01, .16], $p = .021$. This suggests that health impairments threatening openness to change values are more frightening. The interaction effects of values were not significant, ps>.203.

Discussion

Study 1 analyzed associations between values and fear of health impairments. It was found that higher importance of self-transcendence values over self-enhancement values is negatively related to the fear of health impairments. These effects of their own self-transcendence vs self-enhancement value dimension are particularly strong in relation to fear of sensory impairments, disfiguring impairments, and reproductive functions impairments. Self-transcendence is both socially focused and anxiety-free, while self-enhancement – personally focused and anxiety-based values. The fact that individuals who

value self-transcendence rather than self-enhancement express less fear is in line with the reasoning that anxiety-based and self-focused values are positively related to the fear of health impairments.

The effects of perceived threats to values were different from the effects of their own values, described above. First, this study showed that health impairments are perceived to threaten personal focused values (openness to change and self-enhancement) rather than socially focused values (conservation and self-transcendence). Secondly, perceived threat to openness to change values (vs conservation values) was positively related to the fear of health impairments. These effects of perceived threats to openness to change vs. conservation values are particularly strong in relation to fear of disfiguring impairments and fear of impairments in reproductive functions. These results might signify that the effects of perceived value threats on fear are based on personal vs social focus of values.

Finally, contrary to our expectations, it was found that interaction effects between own and perceived value threats are not related to fear of health impairments. Only one significant interaction effect appeared with regard to fear of disfiguring impairments. It indicates that individuals who value self-transcendence over self-enhancement express less fear if this value is threatened. This result can be related to the fact that self-transcendence values are anxiety-free. Moreover, a recent study found that individuals with high self-transcendence values express negative emotions less (Liu et al., 2021). However, this interaction effect only appeared in regard to fear of disfiguring impairments and cannot be generalized.

Finally, some limitations related to the Study 1 methodology should be mentioned. The order of health impairments was not counter-balanced between participants. Thus, it might have affected the way participants evaluated these health impairments.

Study 2

Study 2 was conducted to replicate the findings of Study 1 with a different methodology. Participants evaluated six health impairments as frightening or not. They also evaluated how different values might be threatened by these impairments and reported their own value priorities completing 23 items from the Schwartz's Value Survey.

Method

Participants

One hundred and twenty-five participants took part in the study. Four participants were excluded because they failed the attention checks.[1] The final sample included 121 participants, 69 males, 52 females aged from 19 to 69 years ($M = 35.95$, $SD = .12.12$). The data were collected online on Yandex. Toloka platform, and participants were compensated for their participation. Yandex.Toloka is a platform for online survey research. It enables researchers to recruit participants online and compensate them for their participation. To ensure high data quality, we recruited top-rated active users, meaning that these participants had high ratings based on their performance on Yandex.Toloka.

Data were collected in October 2020 among Russian-speaking participants in Russia. It should be mentioned that by this time, Covid-19 continued to spread in Russia and restrictions were put in place (e.g., working from home, online learning in schools, face covering in public transport; RIA Novosti, 2020).

Materials

Participants were asked to evaluate six different health impairments on a feeling thermometer from 1 to 100 (1 – not at all frightening, 100 – very frightening). A feeling thermometer was used because it allows gathering more information about the intensity of emotion (Lavrakas, 2008). The list of health impairments was based on an international classification of impairments (World Health Organization,

1980) and included cognitive impairment, language, and communication impairment, disfiguring impairment, sensory impairment (blindness and deafness combined), motor impairment, and impairment of reproductive function. To ensure that participants completely understood the meaning of these health impairments, the medical terms were explained.

Participants completed 23 items from the Schwartz's Value Survey. This survey was used because unlike the Short Schwartz Value Survey (which is a one-item per value-type measure), it includes more items per factor and thus may result in greater reliability of each value. Participants were asked to rate the importance of 23 items as life-guiding principles (e.g., "Social power") on a 9-point scale (−1 – opposed to my principles, 7 – value of supreme importance). Scores were collapsed into four types of values: openness to change (7 items, Cronbach's Alpha = .80), self-enhancement (4 items, Cronbach's Alpha = .69), self-transcendence (5 items, Cronbach's Alpha = .84), and conservation (7 items, Cronbach's Alpha = .80). These scores were further collapsed into two dimensions: self-transcendence (vs self-enhancement) and openness to change (vs conservation). Self-enhancement scores were subtracted from self-transcendence scores; openness to change scores were subtracted from conservation scores. The data indicated an excellent fit to the hypothesized structure (the Tucker's congruence coefficient = .980).

Participants next completed the 23-item SVS for each of the six health impairments. They were asked to rate how likely values could be threatened because of each of these six impairments: "*Imagine a person who has a mobility impairment because of some disease or trauma. As per your view, what values can be threatened as a result of his/her current health impairment?*" Participants evaluated each item on a scale from −1 (*definitely will not be threatened*) to 7 (*definitely will be threatened*). Data were next analyzed similarly as described above.

Procedure

The order of the questionnaires was the following: participants evaluated six health impairments as frightening or not. They next reported their own value priorities completing the Schwartz's Value Survey. Finally, they completed the Schwartz's Value Survey for each of the six health impairments. The order of health impairments was counter-balanced between participants.

Results

Descriptive statistics

Means and standard deviations of fear were calculated for the six health impairments (see Table 4). Repeated measured ANOVA with Greenhouse–Geisser correction indicated that some health

Table 4. Means and standard deviations of all variables in study 2.

	Motor impairments	Cognitive impairments	Sensory impairments	Language and communication impairments	Disfiguring impairments	Impairments of reproductive functions	Total
Fear	81.29	80.69	74.88	65.80	63.87	57.22	70.63
	(27.39)	(23.58)	(31.57)	(30.20)	(29.16)	(34.02)	(30.74)
Perceived value threats							
ST	−2.14	−1.64	−2.05	−1.93	−1.70	−.61	−1.68
	(1.70)	(1.74)	(1.87)	(1.85)	(1.72)	(1.24)	(1.77)
OP	3.15	1.01	2.88	2.11	1.74	1.97	2.15
	(1.91)	(1.80)	(1.92)	(1.89)	(1.53)	(1.63)	(1.92)
Own values							
ST	-	-	-	-	-	-	−0.01
							(1.44)
OP	-	-	-	-	-	-	−0.08
							(1.47)

ST = self-transcendence vs self-enhancement values, OP = openness to change vs conservation values.

Table 5. Correlations between fear, perceived value threats, and own values in study 2.

		Fear	Own values		Perceived value threats	
			ST	OP	ST	OP
Own values						
ST	r	−0.021	1			
	p	.581				
OP	r	0.001	−.259	1		
	p	.987	.000			
Perceived value threats						
ST	r	−.298	0.054	−.114	1	
	p	.000	.148	.002		
OP	r	.290	−0.037	.175	−.536	1
	p	.000	.326	.000	.000	

ST = self-transcendence vs self-enhancement value dimension; OP = openness to change vs conservation value dimension.

impairments were feared more than others, $F(4.42, 504.26) = 32.61$, $p < .001$, $\eta^2 = .144$. Paired sample t-tests indicated that motor impairments and cognitive impairments were feared more than other impairments, $ps < .016$, Cohen's d (averaged) $= 0.51$. Impairments of reproductive functions were feared to be less than other impairments, $ps < .048$, Cohen's d (averaged) $= −0.50$. One sample t-test (test value = 0) indicated that all health impairments were evaluated as threatening openness to change rather than conservation values ($ps < .001$, Cohen's $d = −0.97$) and self-enhancement rather than self-transcendence values ($ps < .001$, Cohen's $d = 1.19$)

Correlations between own values, perceived value threats, and fear were calculated for all health impairments based on full-scale analysis and unaveraged data (see Table 5). Beliefs that self-transcendence values are threatened more than self-enhancement values were negatively related to fear of health impairments. Beliefs that openness to changing values is threatened more than conservation values were positively related to fear of health impairments.

Main analysis

The analysis strategy was similar to Study 1 (see above). Own values, perceived value threats, and their interactions were nested within the fear rate of six health impairments (see Table 6). Fear of health impairments and perceived value threats were not averaged across different health impairments. Participants' ID and health impairments were entered as factors. Perceived threat to self-transcendence values (vs self-enhancement values) predicted less fear of health impairments, $b = −2.56$,

Table 6. Regression models testing the effects of values on fear of health impairments in study 2.

	Fear of health impairments				
	b	SE	β	CI	p
Own values					
ST	0.11	1.63	−.01	[−.14, .15]	.947
OP	−0.63	1.57	−.03	[−.18, .12]	.687
Perceived value threats					
ST	−2.56	.65	−.15	[−.22, −.07]	<.001
OP	2.30	.59	.14	[.07, .22]	<.001
Interaction effects					
ST	0.26	.34	.03	[−.05, .12]	.443
OP	−0.18	.29	−.03	[−.11, .06]	.543

Model's marginal $R^2 = .07$, correct $R^2 = .64$, ICC = 0.611, AIC = 6573.54, BIC = 6619.41, RMSE = 16.822. ST = self-transcendence vs self-enhancement values; OP = openness to change vs conservation values.

SE = .65, β = −.15 [−.22, −.07], p < .001. This suggests that health impairments threatening self-transcendence values are less frightening. Perceived threat to openness to change values (vs conservation values) predicted more fear of health impairments, b = 2.30, SE = .59, β = .14 [.07, .22], p < .001. This suggests that health impairments threatening openness to change values are more frightening.

The effects of our own values on the fear of health impairments were not significant, as well as the interaction effects, ps>.443.

Discussion

Study 2 analyzed associations between values and fear of health impairments. This study did not confirm that their own value priorities were related to fear of health impairments. However, it replicated the effect of perceived value threats on fear. Health impairments are perceived to threaten personally focused values (openness to change and self-enhancement) rather than socially focused values (conservation and self-transcendence). The effect of openness on changing values on fear of health impairments was replicated. Perceived threats to openness to change values (vs conservation values) are related to greater fear of health impairments. This effect is particularly strong with regard to fear of sensory impairments, fear of motor impairments, fear of disfiguring impairments, and fear of reproductive functions impairments. Moreover, threats to self-enhancement values (vs self-transcendence values) are also related to more fear of health impairments. Because openness to change and self-enhancement values are personally focused values, this supports the assumption that the effect of perceived value threats on fear is based on personal vs social focus of values. Put it differently, values associated with the good for the self are related to higher worries about the self.

Finally, similarly to Study 1, the effects of interaction between own values and perceived value threats on fear at superordinate level above the individual univariate results for each health impairment were not significant. However, one significant interaction effect appeared with regard to fear of cognitive impairments. We expected that perceived value threats will have a greater effect on fear if this value is particularly important for the person. Contrary to our expectations, individuals who value conservation over openness to change expressed more fear when openness to change was threatened. One possible explanation of this is that conservation values are anxiety-based and individuals who value them express more fear of cognitive impairments even if they believe that these impairments threaten openness to change values. Moreover, this interaction effect was only significant with regard to fear of cognitive impairments and cannot be generalized to other health impairments.

Another possible explanation is that not value importance, but value centrality plays a role in value-fear link. Value centrality is an important factor, which strengthens the effects of values on attitudes and behaviors (Verplanken & Holland, 2002). Value importance differs from value centrality since value can be declared as important because of social norms and not just a person's self-concept. Value centrality is a less broad concept and reflects the extent to which a value is part of a self-concept. For example, in their study of value centrality, Verplanken and Holland asked participants to evaluate how much a particular value describes them, rather than how important it is to them (Verplanken & Holland, 2002). To test the role of value centrality and replicate the findings of Studies 1 and 2, we conducted a Study 3.

Study 3

Study 3 was conducted to replicate the findings of previous studies. The study was also conducted to test the hypothesis that fear of health impairments is greater if these impairments threaten core values. Thus, in Study 3 we tested the interaction effects between self-centered values and perceived value threats on fear of health impairments. Participants evaluated six health impairments as frightening or not. They also evaluated how different values might be threatened by these impairments and reported their own self-centered values completing the 23-item Schwartz Value Survey.

Method

Participants

One hundred and twenty-six participants took part in the study. Ten participants were excluded because they failed attention checks.[2] The final sample included 116 participants, 68 males, 47 females (1 did not report their gender). The participants were aged from 18 to 64 years (M = 36.43, SD = 11.38). The data were collected online on the Yandex.Toloka platform, and participants were compensated for their participation. To ensure high data quality, we recruited top-rated active users, meaning that these participants had high ratings based on their performance on Yandex.Toloka.

Data were collected in December 2020 among Russian-speaking participants in Russia. It should be mentioned that by this time, due to a significant increase in Covid-19 cases in Russia more restrictions were put in place (e.g., ban on public gatherings, online learning in schools, face covering in public transport; Sobyanin.ru, 2020b).

Materials

Participants were asked to evaluate six different health impairments on a feeling thermometer from 1 to 100 (1 – not at all frightening, 100 – very frightening). The list of health impairments was the same as in Study 2. To ensure that participants completely understood the meaning of these health impairments, the medical terms were explained.

Participants completed 23 items from Schwartz's Value Survey. Instead of rating the importance of 23 items, they evaluated how much these items describe them on a scale from 1 (not at all describes me) to 11 (describes me very well) in line with Verplanken and Holland's measure of value centricity (Verplanken & Holland, 2002). Scores were collapsed into four types of values: openness to change (7 items, Cronbach's Alpha = .78), self-enhancement (4 items, Cronbach's Alpha = .80), self-transcendence (5 items, Cronbach's Alpha = .78), and conservation (7 items, Cronbach's Alpha = .83). These scores were further collapsed into two dimensions: self-transcendence (vs self-enhancement) and openness to change (vs conservation). Self-enhancement scores were subtracted from self-transcendence scores; openness to change scores were subtracted from conservation scores. The data indicated a good fit to the hypothesized structure (the Tucker's congruence coefficient = .976).

Participants next completed the SVS for each of six health impairments. They were asked to rate how likely their values could be threatened because of each of these six impairments: "*Imagine you have a mobility impairment because of some disease or trauma. As per your view, what values can be threatened a result of that health impairment?*" Participants evaluated each item on a scale from 1 (*definitely will not be threatened*) to 11 (*definitely will be threatened*). Data were next analyzed similarly as described above.

Procedure

The order of the questionnaires was the following: participants evaluated six health impairments as frightening or not. They next completed the value centrality measure, the Schwartz's Value Survey. Finally, they completed the Schwartz's Value Survey for each of the six health impairments. The order of health impairments was counter-balanced between participants.

Results

Descriptive statistics

Means and standard deviations of fear were calculated for the six health impairments (see Table 7). Repeated measured ANOVA with Greenhouse–Geisser correction indicated that some health impairments were feared more than others, $F(3.26, 375.29) = 20.78$, $p < .001$, $\eta^2 = .153$. Paired samples t-tests

indicated that motor impairments and cognitive impairments were feared more than all other impairments, $ps < .024$, Cohen's $d = 0.45$. Reproductive function impairments and disfiguring impairments were feared less than all other impairments, $ps < .001$, Cohen's $d = -0.51$. A sample t-test indicated that all health impairments were evaluated as threatening openness to change rather than conservation values ($ps < .001$, Cohen's d (averaged) $= -0.77$), and self-enhancement rather than self-transcendence values ($ps < .001$, Cohen's d (averaged) $= 0.89$).

Correlations between their own values, perceived value threats, and fear were calculated for all health impairments based on full-scale analysis and unaveraged data (see Table 8). Participants who valued self-transcendence over self-enhancement expressed greater fear of health impairments. Participants who valued openness to change over conservation expressed less fear of health impairments. Beliefs that self-transcendence values are threatened more than self-enhancement values were negatively related to fear of health impairments. Beliefs that openness to changing values is threatened more than conservation values were positively related to fear of health impairments.

Main analysis

The analysis strategy was similar to Studies 1 and 2 (see above). Own values, perceived value threats, and their interactions were nested within the fear rate of six health impairments (see Table 9). Fear of health impairments and perceived value threats were not averaged across different health impairments. Participants' ID and health impairments were entered as factors. Own openness to change values (vs conservation values) predicted less fear of health impairments, $b = -3.59$, $SE = 1.40$, $\beta = -.22$

Table 7. Means and standard deviations of all variables in study 3.

	Motor impairments	Cognitive impairments	Sensory impairments	Language and communication impairments	Disfiguring impairments	Impairments of reproductive function	Total
Fear	82.96	85.28	79.33	76.26	65.94	65.59	75.89
	(26.69)	(21.78)	(26.77)	(28.07)	(31.13)	(31.97)	(28.88)
Perceived value threats							
ST	−2.12	−1.78	−2.11	−2.20	−1.64	−0.67	−1.75
	(2.39)	(2.35)	(2.53)	(2.47)	(2.08)	(1.47)	(2.30)
OP	3.08	1.86	2.91	2.53	1.57	1.99	2.32
	(3.13)	(2.50)	(2.91)	(2.76)	(2.10)	(2.08)	(2.66)
Own values							
ST	-	-	-	-	-	-	0.66
							(1.79)
OP	-	-	-	-	-	-	−0.13
							(1.78)

ST = self-transcendence vs self-enhancement value dimension; OP = openness to change vs conservation value dimension.

Table 8. Correlations between fear, threatened values and own values in study 3.

			Own values		Threatened values	
		Fear	ST	OP	ST	OP
Own values						
ST	r	.184	1			
	p	.000				
OP	r	−.221	−.563	1		
	p	.000	.000			
Threatened values						
ST	r	−.280	−.107	0.020	1	
	p	.000	.005	.599		
OP	r	.216	.130	0.067	−.659	1
	p	.000	.001	.079	.000	

ST = self-transcendence vs self-enhancement value dimension; OP = openness to change vs conservation value dimension.

Table 9. Regression models testing the effects of values on fear of health impairments in study 3.

	Fear of health impairments				
	b	*SE*	β	*CI*	*p*
Own values					
ST	1.15	1.37	.07	[−.08, .22]	.402
OP	−3.59	1.40	−.22	[−.37, −.07]	.010
Threatened values					
ST	−1.53	.60	−.13	[−.22, −.04]	.011
OP	1.17	.51	.11	[.02, .20]	.021
Interaction effects					
ST	0.14	0.24	.06	[−.02, .14]	.541
OP	0.12	0.21	.09	[.01, .16]	.567

Model's marginal R^2 = .09, correct R^2 = .52, ICC = 0.477, AIC = 6353.95, BIC = 6399.41, RMSE = 18.26. ST = self-transcendence vs self-enhancement values; OP = openness to change vs conservation values.

[−.37, −.07], *p* = .010. This suggests that participants who value openness to change over conservation express less fear of health impairments.

Perceived threat to openness to change values (vs conservation values) predicted more fear of health impairments, *b* = 1.17, *SE* = .51, β = .11 [.02, .20], *p* = .021. This suggests that health impairments threatening openness to change values are more frightening. Perceived threat to self-transcendence values (vs self-enhancement values) predicted less fear of health impairments, *b* = −1.53, *SE* = .60, β = −.13 [−.22, −.04], *p* = .011. This suggests that health impairments that threaten self-transcendence values are less frightening. The interaction effects of values on fear of health impairments were not significant, *p*s>.541.

Discussion

Study 3 analyzed associations between values and fear of health impairments. The effects of their own values, perceived value threats, and their interactions on fear of health impairments were found. First, it was found that own value priorities are related to fear of health impairments. Higher importance of conservation values to self (as opposed to openness to change values) is positively related to the fear of health impairments. This effect was particularly strong with regard to fear of sensory impairments, language, and communication impairments and disfiguring impairments. Conservation values are anxiety-based values. The fact that people who value conservation rather than openness to change experience more fear are in line with the reasoning that anxiety-based values are positively related to fear of health impairments.

Secondly, it was found that perceived threats to self-enhancement values and to openness to change values are related to more fear of health impairments. The effects of perceived threats to openness to change (vs conservation) values were particularly strong regarding the fear of sensory impairments and reproductive functions impairments. The effects of perceived threats to self-transcendence (vs self-enhancement) values were particularly strong regarding the fear of motor impairments, language, and communication impairments, impairments of reproductive functions and disfiguring impairments. These results replicate the findings of studies 1 and 2. Both self-enhancement and openness to change values are personally focused values, while self-transcendence and conservation values – socially focused values. The fact that perceived threats to self-enhancement and openness to change values are positively related to fear is in line with the reasoning that self-focused values are positively related to worries about self.

Finally, contrary to our expectations, there was no significant effect of interaction between value centrality and perceived threat to values on fear of health impairments on superordinate level above

the individual univariate results for each health impairment. However, one significant interaction effect appeared regarding the fear of disfiguring impairments: individuals who value openness to change (over conservation) expressed more fear when this value was threatened. This interaction effect is in line with our expectations: individuals who consider openness to change values as central to their personality and also believe that these values are threatened, experience more fear of health impairments. However, it was only significant regarding fear of disfiguring impairments and did not manifest itself on a superordinate level, which does not allow us to generalize that result in other health impairments.

General discussion

This paper analyzes systematic links between values and the fear of health impairments. The results showed that health impairments are evaluated differently: some of them are more feared than others. Across all three studies, motor impairments, and cognitive impairments were among the most frightening health impairments, which is in line with previous studies (Ditto et al., 1996). Values associated with these health impairments may at least partly explain why some health impairments are feared more than others. Health impairments are perceived to threaten some values more than the others. Participants evaluated openness to change and self-enhancement values as threatened by health impairments as opposed to self-transcendence and conservation values.

The effects of perceived value threats on fear were observed in all three studies. Health impairments threatening openness to change values were more frightening across all three studies, while impairments threatening self-enhancement values – in two studies. These findings partly support the hypothesis that the threat to self-focused values is related to greater fear of health impairments. In line with Schwartz's reasoning, values associated with the good for self are related to more worries about the self (S. H. Schwartz et al., 2000).

It is important to understand the underlying mechanism of this effect. This effect does not necessarily signify that people are not afraid of health impairments, which threaten socially focused values (self-transcendence and conservation). It rather signifies that they do not believe that these values are threatened by these health impairments. This assumption can be tested in future studies. For example, participants can be asked to describe in detail how health impairments might threaten self-transcendence and conservation values. After reasoning about it, participants might express the same level of fear as participants who reflected about the threats to self-enhancement and openness to change values.

The effect of perceived values on fear of health impairments can also depend on the type of health impairments in question. The health impairments we investigated in the present study may decrease quality of life (cognitive, sensory, and motor impairments, disfiguring impairments, and reproductive function impairments), but they are not life-threatening. The effects of perceived value threats on health impairments, which are believed to be life-threatening (e.g., cancer and heart disease) can be different. For instance, it is possible that perceived threat conservation values (vs openness to change values) will increase the fear of these impairments. Moreover, the health impairments we investigated in the present studies cannot affect other people – they are not infectious. The effect of perceived value threats on infectious health impairments, such as HIV/AIDS (which we did not investigate in the present study), can also be different. Since infectious diseases can cause harm to other people around us, perceived threat to self-transcendence values (vs self-enhancement values). Future studies may include a list of various health impairments and diseases and ask participants to evaluate whether each of these health impairments and diseases: 1) affects quality of life; 2) is life threatening; 3) harms other people. We might expect that this evaluation will moderate the value-fear link. Perceived threats to openness to change and self-enhancement might predict fear of diseases that affect quality of life. Perceived threats to conservation might predict fear of life-threatening diseases. Finally, perceived threats to self-transcendence might predict fear of diseases that are believed to harm other people.

Interestingly, the effects of own value priorities are different from the effects of perceived value threats. First, they are less consistent across three studies compared to the effects of perceived value threats. Secondly, it is unlikely that personal vs social focus of values underlies these effects. In Study 1 it was found that people who value self-transcendence over self-enhancement expressed less fear of health impairments. Study 3 found that people who value openness to change over conservation express less fear of health impairments. Thus, it is possible that anxiety-based values are positively related to this fear, while anxiety-free values are negatively related to it. Higher importance of anxiety-based values might increase fears for health. This might signify that different mechanisms underlie the effects of our own values on fear of health impairments and the effects of perceived value threats on this fear. The effects of own values are related to anxiety-based and anxiety-free distinction, while the effects of perceived value threats are related to personal vs social focus of values.

Finally, we expected that not only the value's content, but its importance to the self impacts the value-fear link. In particular, it was expected that the effect of values on fears is higher when the value is not only perceived as threatened, but when it is important to the self. However, the studies described in this manuscript did not reveal significant effects of interactions between their own values and perceived value threats. Interaction effects emerged only in relation to specific health impairments (disfiguring impairments, cognitive impairments) and were not consistent across studies. It is possible that value importance and value centrality are relatively independent of the effects of perceived value threats on fear. Put differently, perceived value threats can be similar among people with different value priorities.

There are some important limitations that should be mentioned. First, the studies described in this paper are correlational and do not allow drawing conclusions about the impact of perceived value threats on fear. It is also possible that fear people experience affects their value priorities. For instance, it was found that Covid-19 pandemic increased the importance of conservation values (Daniel et al., 2021). To investigate the impact of perceived value threats on fear, future studies should explore whether mental accessibility of value threats increases the fear of health impairments. If this is the case, encouraging value fulfillment despite health impairments might decrease the fear of these impairments.

Secondly, although a fear of health impairments and illnesses may occur even before the person becomes ill, our participants did not suffer from health impairments but instead imagined how values might be threatened because of these impairments. Investigating beliefs about value threats among people who do not face health impairments is important since not only the actual sufferings, but fear of future sufferings has an important role in decision-making (Ganzini et al., 2003; Pearlman et al., 2005; Volker, 2001). However, in a situation of a real health threat value-fear link might change. It is thus important for future studies to explore value-fear links among people who face health impairments.

Finally, it should be mentioned that all the studies were conducted during the Covid-19 pandemic and it is possible that it affected their values, fear of health impairments and perceived value threats. During virus-induced pandemics, respondents report more health worries (Bults et al., 2011; Lau et al., 2010). Covid-19 pandemic was also followed by a major mental health burden, involving health anxiety and fear of infection (Jungmann & Witthöft, 2020; Qiu et al., 2020). Finally, it also affects value priorities (Daniel et al., 2021) Although the health impairments investigated in the present study are not infectious, they can still be perceived as a result of Covid-19 infection. Thus, it is possible that fear of health impairments and perceived value threats were greater because of Covid-19 pandemics.

Overall, the study found that health impairments are believed to threaten personally focused values (openness to change and self-enhancement) more than socially focused values (conservation and self-transcendence). Threats to these personally focused values are related to greater fear of health impairments. This information can be used in psychotherapy with patients since it contributes to our understanding of increased fear of disease and/or secondary effects of treatment, which may involve disfiguring, sensory, motor, reproductive, and cognitive impairments. Moreover, including perceived value threats in fear-based messages in health care may increase their persuasiveness. Future studies should compare the persuasiveness of fear-based messages involving perceived value threats

with more traditional fear appeals. We might expect that fear-based pictures on cigarette packaging creating emotional arousal may have more short-term effects on intentions to quit smoking, whole fear-based images involving threats to values – more long-term effects.

Notes

1. Attention checks were 4 items. In each item, participants were asked to select a certain response option (e.g., "*Please select the answer 1*").
2. Attention checks were 4 items. In each item, participants were asked to select a certain response option (e.g., "*Please select the answer 1*").

Data access statement

Data directly supporting this manuscript can be found at https://osf.io/gskec/.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Marina Iosifyan is a Senior Research Associate at the University of St Andrews. Her research interests include the psychology of values, health psychology and social cognition.

Galina Arina is a Senior Lecturer at the Department of Psychology, Lomonosov Moscow State University. Her main research interests involve psychosomatic medicine, abnormal psychology and health psychology

Ethics statement

All studies reported in this manuscript were approved by the ethics committee of the Higher School of Economics University (Russia).

Data availability statement

The data described in this article are openly available in the Open Science Framework at https://doi.org/10.17605/OSF.IO/GSKEC.

Open scholarship

This article has earned the Center for Open Science badges for Open Data and Open Materials through Open Practices Disclosure. The data and materials are openly accessible at https://doi.org/10.17605/OSF.IO/GSKEC.

References

Barni, D., Vieno, A., Roccato, M., & Russo, S. (2015). Basic personal values, the country's crime rate and the fear of crime. *Social Indicators Research*, 3(129), 1057–1074. https://doi.org/org/10.1007/s11205-015-1161-9

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2014). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48. https://doi.org/10.18637/jss.v067.i01

Bilsky, W., Janik, M., & Schwartz, S. H. (2011). The structural organization of human values: Evidence from three rounds of the European Social Survey (ESS). Journal of CrossCultural Psychology, 42, 759–776.

Boehnke, K., & Schwartz, S. H. (1997). Fear of war: Relations to values, gender, and mental health in germany and israel. *Peace and Conflict: Journal of Peace Psychology*, 3(2), 149–165. https://doi.org/org/10.1207/s15327949pac0302_3

Borg, I., & Bardi, A. (2016). Should ratings of the importance of personal values be centered? Journal of Research in Personality, 63, 95–101. https://doi.org/10.1016/j.jrp.2016.05.011

Bults, M., Beaujean, D. J., de Zwart, O., Kok, G., van Empelen, P., van Steenbergen, J. E., Richardus, J. H., & Voeten, H. A. (2011). Perceived risk, anxiety, and behavioural responses of the general public during the early phase of the Influenza A (H1N1) pandemic in the Netherlands: Results of three consecutive online surveys. *BMC Public Health*, 11(1), 2. https://doi.org/10.1186/1471-2458-11-2

Cho, H., & Salmon, C. T. (2006). Fear appeals for individuals in different stages of change: Intended and unintended effects and implications on public health campaigns. *Health Communication*, 20(1), 91–99. https://doi.org/10.1207/s15327027hc2001_9

Citrin, D. L., Bloom, D. L., Grutsch, J. F., Mortensen, S. J., & Lis, C. G. (2012). Beliefs and perceptions of women with newly diagnosed breast cancer who refused conventional treatment in favor of alternative therapies. *The Oncologist*, 17(5), 607–612. https://doi.org/10.1634/theoncologist.2011-0468

Corter, A. L., Findlay, M., Broom, R., Porter, D., & Petrie, K. J. (2012). Beliefs about medicine and illness are associated with fear of cancer recurrence in women taking adjuvant endocrine therapy for breast cancer. *British Journal of Health Psychology*, 18(1), 168–181. https://doi.org/10.1111/bjhp.12003

Daniel, E., Bardi, A., Fischer, R., Benish-Weisman, M., & Lee, J. A. (2021). Changes in personal values in pandemic times. *Social Psychological and Personality Science*, 194855062110240. https://doi.org/10.1177/19485506211024026

Ditto, P. H., Druley, J. A., Moore, K. A., Danks, J. H., & Smucker, W. D. (1996). Fates worse than death: The role of valued life activities in health-state evaluations. *Health Psychology*, 15(5), 332–343. https://doi.org/10.1037/0278-6133.15.5.332

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. https://doi.org/10.3758/bf03193146

Ganzini, L., Goy, E., Miller, L. L., Harvath, T. A., Jackson, A., & Delorit, M. A. (2003). Nurses' experiences with hospice patients who refuse food and fluids to hasten death. *New England Journal of Medicine*, 349(4), 359–365. https://doi.org/10.1056/NEJMsa035086

Halpern, J., & Arnold, R. M. (2008). Affective forecasting: An unrecognized challenge in making serious health decisions. *Journal of General Internal Medicine*, 23(10), 1708–1712. https://doi.org/org/10.1007/s11606-008-0719-5

He, J., & van de Vijver F. J. R. (2015). Self-presentation styles in self-reports: Linking the general factors of response styles, personality traits, and values in a longitudinal study. Personality and Individual Differences, 81, 129–134. https://doi.org/10.1016/j.paid.2014.09.009

Jette, A. M. (2006). Toward a common language for function, disability, and health. *Physical Therapy*, 86(5), 726–734. https://doi.org/10.1093/ptj/86.5.726

Jungmann, S. M., & Witthöft, M. (2020). Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: Which factors are related to coronavirus anxiety? *Journal of Anxiety Disorders*, 73, 102239. https://doi.org/10.1016/j.janxdis.2020.102239

Lau, J. T., Griffiths, S., Choi, K. C., & Tsui, H. Y. (2010). Avoidance behaviors and negative psychological responses in the general population in the initial stage of the H1N1 pandemic in Hong Kong. *BMC Infectious Diseases*, 10(1), 139. https://doi.org/10.1186/1471-2334-10-139

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* (Vol. 1). Sage Publications, Inc. https://doi.org/10.4135/9781412963947

Lazarus, R. S. (1991). Cognition and motivation in emotion. *American Psychologist*, 46(4), 352–367. https://doi.org/10.1037/0003-066X.46.4.352

Lee-Jones, C., Humphris, G., Dixon, R., & Bebbington Hatcher, M. (1997). Fear of cancer recurrence — a literature review and proposed cognitive formulation to explain exacerbation of recurrence fears. *Psycho-Oncology*, 6(2), 95–105. https://doi.org/10.1002/(SICI)1099-1611(199706)6:2<95::AID-PON250>3.0.CO;2-B

Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: Using common sense to understand treatment adherence and affect cognition interactions. *Cognitive Therapy and Research*, 16(2), 143–163. https://doi.org/10.1007/BF01173486

Lindeman, M., & Verkasalo, M. (2005). Measuring values with the short Schwartz's value survey. *Journal of Personality Assessment*, 85(2), 170–178. https://doi.org/10.1207/s15327752jpa8502_09

Liu, P., Wang, X., Li, D., Zhang, R., Li, H., & Han, J (2021). The benefits of self-transcendence: Examining the role of values on mental health among adolescents across regions in China. *Frontiers in Psychology*, 12, 630420. https://doi.org/10.3389/fpsyg.2021.630420

Loewenstein, G. (2005). Hot-cold empathy gaps and medical decision making. *Health Psychology*, 24(4), 49–56. https://doi.org/10.1037/0278-6133.24.4.S49

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology*, 19(5), 469–479. https://doi.org/org/10.1016/0022-1031(83)90023-9

Montbriand, M. J. (1998). Abandoning biomedicine for alternate therapies: Oncology patients' stories. *Cancer Nursing*, 21(1), 36–45. https://doi.org/10.1097/00002820-199802000-00005

Ostrom, T. M., & Brock, T. C. (1968). A cognitive model of attitudinal involvement. In R. P. Abelson, E. Aronson, W. J. McGuire, T. M. Newcomb, M. J. Rosenberg, & P. H. Tannenbaum (Eds.), *Theories of cognitive consistency: A sourcebook* (pp. 373–383). Rand-McNally.

Pearlman, R., Hsu, C., Starks, H., Back, A., Gordon, J., Bharucha, A., Koenig, B., & Battin, M. (2005). Motivations for physician-assisted suicide. *Journal of General Internal Medicine*, 20(3), 234–239. https://doi.org/10.1111/j.1525-1497.2005.40225.x

Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. *General Psychiatry*, 33(2), e100213. https://doi.org/10.1136/gpsych-2020-100213

R Core Team. (2013). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. http://www.R-project.org/

Reynolds, L. M., Bissett, I. P., & Consedine, N. S. (2018). Emotional predictors of bowel screening: The avoidance-promoting role of fear, embarrassment, and disgust. *BMC Cancer*, 18(1), 518. https://doi.org/10.1186/s12885-018-4423-5

RIA Novosti. (2020). *Face covering and gloves are compulsory in Moscow transport*. https://ria.ru/20201015/kontrol-1580016043.html

Rogers, R. W. (1975). A Protection motivation theory of fear appeals and attitude change. *The Journal of Psychology*, 91(1), 93–114. https://doi.org/10.1080/00223980.1975.9915803

Schwartz, S. H. (2003). *A proposal for measuring value orientations across nations*. Questionnaire development report of the European Social Survey. http://naticent02.uuhost.uk.uu.net/questionnaire/chapter_07.doc

Schwartz, S. H., Sagiv, L., & Boehnke, K. (2000). Worries and values. *Journal of Personality*, 68(2), 309–346. https://doi.org/10.1111/1467-6494.00099

Schwartz, S. H. (2015). Basic individual values: Sources and consequences. In D. Sander & T. Brosch (Eds.), *Handbook of value* (pp. 63–84). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198716600.003.0004

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1–65). Academic Press.

Schwartz, S. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture*, 2(1), 3–20. https://doi.org/org/10.9707/2307-0919.1116

Simard, S., & Savard, J. (2009). Fear of cancer recurrence inventory: Development and initial validation of a multi-dimensional measure of fear of cancer recurrence. *Supportive Care in Cancer*, 17(3), 241–251. https://doi.org/10.1007/s00520-008-0444-y

Simard, S., Thewes, B., Humphris, G., Dixon, M., Hayden, C., Mireskandari, S., & Ozakinci, G. (2013). Fear of cancer recurrence in adult cancer survivors: A systematic review of quantitative studies. *Journal of Cancer Survivorship*, 7(3), 300–322. https://doi.org/10.1007/s11764-013-0272-z

Sobyanin.ru. (2020a, March 16). *Covid-19. Ban on public gatherings and other restrictions*. https://www.sobyanin.ru/koronavirus-ogranichitelnye-mery-16-03–2020

Sobyanin.ru. (2020b). *Covid-19. Night clubs ban and other restrictions from 10. 11.2020*. https://www.sobyanin.ru/koronavirus-resheniya-10-11-2020

Tannenbaum, M. B., Hepler, J., Zimmerman, R. S., Saul, L., Jacobs, S., Wilson, K., & Albarracín, D. (2015). Appealing to fear: A meta-analysis of fear appeal effectiveness and theories. *Psychological Bulletin*, 141(6), 1178–1204. https://doi.org/10.1037/a0039729

Taylor, S. (1993). The structure of fundamental fears. *Journal of Behavior Therapy and Experimental Psychiatry*, 24(4), 289–299. https://doi.org/10.1016/0005-7916(93)90053-Y

van der Laan, D. M., Elders, P., Boons, C., Beckeringh, J. J., Nijpels, G., & Hugtenburg, J. G. (2017). Factors associated with antihypertensive medication non-adherence: A systematic review. *Journal of Human Hypertension*, 31(11), 687–694. https://doi.org/10.1038/jhh.2017.48

Verplanken, B., & Holland, R. W. (2002). Motivated decision making: Effects of activation and self-centrality of values on choices and behavior. *Journal of Personality and Social Psychology*, 82(3), 434–447. https://doi.org/10.1037/0022-3514.82.3.434

Volker, D. (2001). Perspectives on assisted dying. *Oncology Nursing Forum*, 28, 39–49.

Wolf, L. J., Weinstein, N., & Maio, G. R. (2019). Anti-immigrant prejudice: Understanding the roles of (perceived) values and value dissimilarity. *Journal of Personality and Social Psychology*, 117(5), 925–953. https://doi.org/10.1037/pspi0000177

World Health Organization. (1980). *International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of disease, published in accordance with resolution WHA29.35 of the Twenty-ninth World Health Assembly, May 1976*. https://apps.who.int/iris/handle/10665/41003

Yang, D. J. (2018). Exploring the communication effects of message framing of smoking cessation advertising on smokers' mental processes. *International Review on Public and Nonprofit Marketing*, 15(3), 315–332. https://doi.org/10.1007/s12208-018-0201-y