General vs health-specific consideration of immediate and future consequences to explain eating and exercise behaviour in a Norwegian student population: A randomised survey experiment.

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Abstract

Over several decades, the consideration of future consequences (CFC) construct has been used to explain and predict health behaviours. However, the reported associations between CFC and health behaviours are relatively weak, leading to the low explanatory power of the models. Recent research suggests that CFC can be a domain-specific construct. In the present study, we explored the psychometric properties of the Norwegian CFC–general and CFC–health questionnaires in terms of factor structure and discriminant and convergent validity and tested the association between the general and domain-specific CFC and exercise and eating behaviours. In a randomised survey experiment, 1001 university students were assigned to either a CFC–general or a CFC–health questionnaire. In the tested models, two dimensions of CFC, consideration of immediate consequences (CFC-I) and consideration of future consequences (CFC-F), were independent variables. The exercise and eating behaviours, measured both as self-evaluated behaviours and self-reported frequency measures, were dependent variables. The results showed that in both CFC–general and CFC–health, CFC-I and CFC-F are distinct dimensions that differentially explain variance in health behaviours. A domain-specific CFC–health explained a significantly higher amount of variance in self-reported eating and exercising behaviours than a general CFC. Self-evaluated health behaviours were better explained by CFC than self-reported behavioural frequencies Practical implications of the findings and avenues for future research are discussed.

Key words: CFC-health, CFC in Norwegian, Consideration of future consequences, domain-specific CFC, domain-specific time perspective.

1. Introduction

The obesity epidemic is a growing concern worldwide (Global Burden of Disease [GBD] 2015 Obesity Collaborators, 2017; Han et al., 2017), including in Norway (Jacobsen & Aars, 2016). Poor diet, that is, a low-fibre diet high in fat, sugar, and processed foods, along with insufficient physical activity, are the main causes of weight gain (Camacho & Ruppel, 2017; Monteiro, Moubarac, Cannon, Ng, & Popkin, 2013; Riera-Crichton & Tefft, 2014). Thus, understanding the underlying drivers of eating and exercise behaviours is essential when developing health behaviour intervention programmes and social marketing campaigns.

The health effects of individuals' dietary choices and physical activity are not attainable immediately, so prioritising future goals, planning, and self-discipline are needed to avoid present temptations and attain future results (Sirois, 2004). Thus, the construct of consideration of future consequences (CFC), defined as 'the extent to which individuals consider the potential distant outcomes of their current behaviours and the extent to which they are influenced by these potential outcomes' (Strathman, Gleicher, Boninger, & Edwards, 1994, p. 743) is suitable for explaining individual health behaviour. The association between CFC and health intentions, and CFC and various health behaviours, including eating and exercising, was established in numerous studies (Adams, 2012; Adams & Nettle, 2009; Daugherty & Brase, 2010; McKay, Percy, & Cole, 2013; Peters, Joireman, & Ridgway, 2005).

CFC was initially introduced as a unidimensional construct with 12 items. However, later research has not been unanimous on whether CFC has one or two dimensions (Hevey et al., 2010; Joireman, Balliet, Sprott, Spangenberg, & Schultz,

2008; McKay, Morgan, van Exel, & Worrell, 2015; Rappange, Brouwer, Job, & Van Exel, 2009). Joireman, Shaffer, Balliet, and Strathman (2012) tested a CFC scale with two extra items and two dimensions: consideration of immediate consequences (CFC-I) and consideration of future consequences (CFC-F). The constructs of CFC-I and CFC-F reflect individual differences in prioritising, respectively, immediate or distant outcomes of one's actions when making decisions. Thus, it is reasonable to expect that high CFC-I individuals who value immediate outcomes of their actions would be more predisposed to unhealthy behaviours with their short-term benefits, such as taste, comfort, and immediate satisfaction of desires. On the contrary, high CFC-F individuals are expected to value more distant future health outcomes of healthy behaviours.

Earlier studies do not report unanimous results on which CFC factor, CFC-I, CFC-F or both, relates to personality features and behaviours. For instance, Rappange, Brouwer, and van Exel (2009) confirmed a correlation between CFC-I and CFC-F and temporal discounting. CFC-I, but not CFC-F, was positively associated with smoking and body mass index in Adams (2012), and negatively related to environmental concern and behaviour motivation in Arnocky, Milfont, and Nicol (2014). Meanwhile, McKay, Percy, and Cole (2013) showed CFC-F was negatively associated with drinking. A further issue is that the explained variance of the models varies dramatically between studies, and is often rather low (Murphy & Dockray, 2018).

A potential explanation for these controversial findings and the low correlation between CFC and health behaviours in the earlier studies is the fact that CFC was measured at a general level while the behaviours it was expected to explain were on a very specific level. The principle of compatibility or symmetry (Ajzen, 2005; Ajzen &

Fishbein, 1977) states that the more correspondence there is between the degree of generality of criterion and the predictor, the more they are expected to correlate. In other words, specific behaviours are better predicted or explained by the constructs specific to those behaviours. Differences between general and domain-specific scales have been studied for the construct of self-esteem (Gentile et al., 2009), self-efficacy (McAvay, Seeman, & Rodin, 1996) and risk attitude (Zhang, Zhang, & Shang, 2016). Recent research provides evidence that CFC could be regarded as a domain-specific and a behaviour-specific construct since an individual can be immediate- or future-oriented in some spheres of life, but not in others. Murphy, Cadogan, and Dockray (2020) showed that participants varied in their CFC-I and CFC-F scores across five domains: work, health, environment, money and college. McKay, Perry, and Cole (2018) found that the domain-specific CFC–health did not correlate with CFC-Finance in a university student sample, while CFC–environment did not correlate with CFC–academic in an adolescent sample. On a behaviour-specific level, Dassen, Houben, and Jansen (2015) reported that general CFC did not predict eating behaviour, whereas both CFC-Food/immediate and CFC-Food/future were related to eating. Furthermore, van Beek, Antonides, and Handgraaf (2013) noted that only CFC-Food/immediate predicted eating behaviour, and CFC–exercise/future predicted exercise behaviour. Murphy and Murphy (2018) showed that a behaviour-specific CFC–driving was more strongly associated with driving behaviour than a general CFC.

Joireman and King (2016) included domain-specific CFC as one of the eight avenues for future research on the topic of CFC. In a meta-analysis, Andre, van Vianen, Peetsma, and Oort (2018) presented evidence that the domain-specific time perspective

predicted behaviour better than the general construct in the field of education, but acknowledged that research of the domain-specific CFC in the field of health is insufficient. In a recent study by Murphy et al. (2020), CFC–health had a stronger correlation with health behaviours than a general CFC.

Our study contributes to the extant research of the domain-specific CFC–health by testing experimentally whether CFC–health would explain health behaviours better than CFC general. Unlike the previous studies (van Beek et al., 2013; Dassen et al., 2015, Murphy et al., 2020) that used a within-subject design, the present study uses a survey experiment, with random group assignment. Random assignment allows for strong causal inferences through controlling for biases and covariate effects (Kohavi, Longbotham, Sommerfield, & Henne, 2009; Wilkinson & Task Force on Statistical Inference, 1999).

In the light of the earlier research and in accordance with the principle of compatibility (Ajzen, 2005), a behaviour-specific CFC, like CFC-Food or CFC–exercise, should be a better predictor of that particular behaviour than a general CFC, but it is supposedly worse at predicting other behaviours. A behaviour-specific CFC could be good for understanding and targeting that specific behaviour. However, a more general domain-specific CFC, like CFC–health, could be used to predict or explain several behaviours within a domain when temporal and financial resources are limited. Researchers are faced with limited assessment time, and shorter variants of questionnaires are required. Therefore, if CFC–health explains or predicts various health behaviours within the health domain, from the financial and temporal perspective, it might be more reasonable to use it instead of a more behaviour-specific scale. Some

previous research (van Beek et al., 2013; Dassen et al., 2015) examined the relationships between behaviour-specific CFC and health behaviours in a model with behaviour-specific CFC-I and CFC-F as independent variables and those specific behaviours as dependent variables. The present study aimed to explore the psychometric properties of CFC–general and CFC–health in terms of factor structure and discriminant and convergent validity. Another goal was to test whether an adapted CFC–health would have a stronger association with exercise and eating behaviours than a general CFC, and to see whether the strength of the relationships and the explanatory power of the model would be comparable to those of the more behaviour-specific CFC–Food and CFC–exercise in van Beek et al.'s (2013) study.

2. Method

2.1. Participants and procedure

All students from a larger university in Norway (approx.15000 students) received an e-mail invitation to participate in an online survey in exchange for a chance to win an iPad. A simple Java-script code was written to randomly redirect participants to either a general or a health-specific variant of the questionnaire. The respondents (N=1001) were randomly assigned to answer either a general (N=498) or a health-specific (N=503) variant of the questionnaire. The questionnaires were conducted in Norwegian.

Earlier research (Johnson, 2005) has shown that unsupervised internet surveys can be subject to careless responding defined as "responding without regard to item

content" (Nichols et al., 1989, as cited in Meade & Craig, 2012, p. 437). After removing careless responses, using a combination of three approaches: long string index, psychometric synonyms and antonyms, and Mahalanobis distance (Meade & Craig, 2012), the number of respondents totalled 445 and 465, respectively. In total, we removed 10.6% of responses from the general questionnaire and 7.6% of responses from the health-specific questionnaire. These rates were close to the careless response estimation provided in Meade and Craig (2012). The mean age of the participants was 28 and 27 years in the general and health-specific surveys, respectively, with 60% female participants in both.

2.2. Measures

The general CFC was measured using a two-dimensional variant of the consideration of future consequences scale (CFCS; Joireman et al., 2012), for example, *My behaviour is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions* (CFC-I) and *I consider how things might be in the future, and try to influence those things with my day to day behaviour* (CFC-F). This questionnaire was also adapted to measure a health-specific variant of the CFCS, for example, *My health behaviour is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions* (CFC-I) and *I consider how my health might be in the future, and try to influence my future health with my day to day behaviour* (CFC-F). In the process of adaptation, we tried to stay as close as possible to the original wording of the CFC-14 questionnaire, and only replaced general words with health-specific words, such as *things* replaced with *health* and *behaviour* replaced with *health behaviour*. The 14

items of the CFCS were assessed by a 7-point Likert-type scale, ranging from 1=strongly disagree to 7=strongly agree. The adapted CFC-health scale is presented in Appendices 1 and 2 are in both the English and Norwegian languages, respectively.

For the purpose of comparison with the study by van Beek et al. (2013), we measured eating and exercising behaviour using similar response formats (Christian, Dillman, & Smyth, 2008; Schwarz, 1999). The first format we called 'self-evaluated eating/ exercising behaviours' (SEEB, SEExB), the second 'frequency of eating/exercise behaviour' (FEB, FExB). SEEB and SEExB were measured by the items *How would you rate your general eating/physical activity and exercise habits?* on a 7-point scale, ranging from 1=very unhealthy to 7=very healthy. To assess FEB and FExB, we asked participants to report how often they ate vegetables, fruit, fish, fast food, fatty food and sweets, and drank sugary drinks. The items were measured on a 9-point scale: *never*; *once in a while*; *once in 14 days or more seldom*; *once a week … daily*; *several times per day*. Then, the unhealthy eating items were reverse-coded, and the average of all the items was calculated. Exercise behaviour was estimated by self-reported exercise frequency, assessed on a 7-point scale: *never*; *once per month or less*; *once per week … every day*.

3. Results

3.1. Validity and reliability

First, we performed invariance tests for the dependent variables SEEB, SEExB, FEB, and FExB as well as the independent variable age in the samples. The *t*-tests

revealed no difference in the study variables. Table 1 presents the results of the tests.

Table 1. Comparison of two samples, invariance test of dependent variables and age, the results of two-tailed *t*-tests.

	Mean (SD) General model N=445	Mean (SD) Health-specific model N=465	*t*-value (*p*)
Age (years)	27.6 (7.9)	27.2 (7.1)	.85 (.40)
Self-evaluated eating behaviour	4.7 (1.2)	4.6 (1.0)	1.25 (.21)
Self-evaluated exercising behaviour	4.5 (1.7)	4.3 (1.7)	1.83 (.07)
Frequency of eating behaviour	6.2 (.9)	6.1 (.9)	.80 (.42)
Frequency of exercising behaviour	3.9 (1.5)	3.7 (1.5)	1.60 (.11)

Note: N=number of respondents, SD = standard deviation, *p* = probability

Next, we executed confirmatory factor analyses (CFA) of general and health-specific CFC constructs in IBM SPSS Statistic 24. All items loaded their respective factors. However, CFC-I3: *My convenience is a big factor in the decisions I make or the actions I take* demonstrated extremely low loading (< .3). Toepoel (2010) has also reported that a CFC-I3 item had a very low item-total correlation. CFC-F4: *I think it is important to take warnings about negative outcomes seriously even if the negative outcome does not occur for many years* also demonstrated low loading (< .4). This item had a rather low loading (.5) in Joireman et al. (2012). Both items were removed from further analyses. We allowed for a correlation between error terms of CFC-I1 and CFC-I2, and CFC-F6 and CFC-F7 in both models. Correlating error terms of similarly worded items and

items appearing near to each other on the questionnaire is acceptable (Bollen & Lennox, 1991).

As the current research does not have a uniform position concerning the number of factors of CFCS (Hevey et al., 2010; Joireman, Balliet, Sprott, Spangenberg, & Schultz, 2008; McKay, Morgan, van Exel, & Worrell, 2015; Rappange et al., 2009), we tested two alternative models with items loading on one and two CFC factors in IBM SPSS AMOS 24. The two-factor model demonstrated good data fit: CMIN/df=2.862, GFI=.950, CFI=.954, RMSEA=.065 and CMIN/df=1.979, GFI=.965, CFI=.978, RMSEA=.046 for the general and health-specific scale respectively. The cut-off criteria for good fit are: CMIN/df < 3, GFI ≥ .95, CFI ≥ .90, RMSEA < .08 (Coughlan, Hooper, & Mullen, 2008; Hu & Bentler, 1999). The one-factor model had significantly worse data fit: CMIN/df=9.369, GFI=.795, CFI=.788, RMSEA=.137 and CMIN/df=8.073, GFI=.818, CFI=.840, RMSEA=.123, $\Delta\chi^2$=341.24, Δdf=1 (p=.000) $\Delta\chi^2$=318.88, Δdf=1 (p=.000) for the general and health-specific scales, respectively. Thus, the discriminant validity between CFC-I and CFC-F for both the general and health-specific model is confirmed (Bagozzi, Yi, & Phillips, 1991). The fit indices of one- and two-factor models for CFC–general and CFC–health are summarised in Table 2, while Table 3 presents the correlations and composite reliability scores.

The composite reliability of the constructs was higher than .7 (Hair, Anderson, Tatham, & Black, 1998): CFC-I=.84 and CFC-F=.82 in the general questionnaire, and CFC-I=.85 and CFC-F=.81 in the health-specific questionnaire.

Table 2. Fit indices for confirmatory factor analysis of CFC–general and CFC–health, one- versus two-factor solutions.

	χ^2/df	GFI	CFI	RMSEA	$\Delta\chi^2/\Delta df$ (p)
General model, one-factor	9.369	.795	.788	.137	341.24/1
General model, two-factor	2.862	.950	.954	.065	(p=.000)
Health-specific model, one-factor	8.073	.818	.840	.123	318.88/1
Health-specific model, two-factor	1.979	.965	.978	.046	(p=.000)

Note: χ^2/df=chi-square/degrees of freedom; GFI=goodness-of-fit index; CFI=comparative fit index; RMSEA=root mean square error of approximation.

Table 3. Correlation matrix.

	1	2	3	4	5	6	7
1. CFC–I	1.00	-.53***	-.18***	-.09	-.27***	-.06	-.20***
2. CFC–F	-.58***	1.00	.26***	.22***	.24***	.18***	.08
3. SEEB	-.39***	.47***	1.00	.48***	.57***	.39***	.12**
4. SEExB	-.39***	.54***	.53***	1.00	.32***	.76***	-.07
5. FEB	-.39***	.37***	.61***	.42***	1.00	.30***	.24***
6. FExB	-.30***	.46***	.31***	.73***	.35***	1.00	-.14***
7. Age	-.11**	.02	.16***	.10**	.16***	-.02	1.00

Note: the correlation coefficients are presented on the top of the table for CFC–general, and on the bottom of the table for CFC–health. CFC–I=consideration of immediate consequences, CFC–F=consideration of future consequences, SEEB=self-evaluated eating behaviour, SEExB=self-evaluated exercise behaviour, FEB=frequency of eating behaviour, FExB=frequency of exercise behaviour. **p < .5, ***p< .01.

3.2. Associations with eating and exercising behaviours.

Using AMOS, we performed SEM analyses of path models to estimate the influence of CFC-I and CFC-F on eating and exercising behaviours. All models demonstrated a good data fit, RMSEA < .07 (Hu & Bentler, 1999). To assess whether the results for a general and a health-specific model were significantly different, we performed several chi-square difference tests comparing paths. We compared the models where all regression paths between independent and dependent variables were constrained to an unconstrained model. This approach helped us to establish the difference between the explanatory power of the models. Then, we compared the models on a path-by-path level. Table 4 summarises the results of the tests.

The explanatory power of the models with health-specific CFCS was higher than of the model with general CFCS: R^2=.31 versus R^2=.05 for SEExB, R^2=.24 versus R^2=.07 for SEEB, R^2=.22 versus R^2=.04 for FExB, R^2=.18 versus R^2=.09 for FEB. All were significantly different, except for FEB. On the path-by-path level, CFC-F has a stronger association with SEExB and FExB, as well as SEEB than CFC-I. CFC-I had a slightly stronger association with FEB than CFC-F. There were no statistically significant gender differences in the causal effects.

The explanatory power of the models with CFC–health is comparable to the models with behaviour-specific CFC in van Beek et al. (2013), who reported R^2 =.39 and .26 for SEExB and SEEB, respectively.

Table 4. Model summary, path coefficients, RMSEA and the results of the chi-square difference test for general and health-specific models

Path/predictive power of the model (R^2)	CFC–general	CFC–health	$\Delta\chi^2/\Delta df$ (p)
Self-evaluated eating behaviour (SEEB)			
CFC–I → SEEB	-.06	-.18***	.821/1
CFC–F → SEEB	.23***	.37***	2.001/1
R^2	.07	.24	6.917/2**
RMSEA	.061	.046	
Self-evaluated exercise behaviour (SEExB)			
CFC–I → SEExB	.04	-.12**	2.508/1
CFC–F → SEExB	.24***	.48***	6.158/1**
R^2	.05	.31	20.959/2***
RMSEA	.059	.042	
Frequency of eating behaviour (FEB)			
CFC–I → FEB	-.19***	-.26***	.065/1
CFC–F → FEB	.14**	.22***	.500/1
R^2	.09	.18	.546/2
RMSEA	.059	.042	
Frequency of exercise behaviour (FExB)			
CFC–I → FExB	.05	-.04	1.153/1
CFC–F → FExB	.21***	.44***	4.383/1**
R^2	.04	.22	13.104/2***
RMSEA	.058	.046	

Note: CFC–I=consideration of immediate consequences, CFC–F=consideration of future consequences, RMSEA=root mean square error of approximation. **$p < .05$, ***$p < .01$.

4. Discussion

The present study was the first to explore the psychometric properties of CFC–general and a domain-specific CFC–health in terms of factor structure, discriminant and convergent validity in the Norwegian student population. Our study presented further evidence that both CFC–general and CFC–health incorporate two related, but distinct, dimensions – CFC-I and CFC-F – that differentially explain variance in health behaviours. In general, CFC-I was negatively related to healthy behaviours, whereas CFC-F was positively associated with healthy behaviours. Nonetheless, the study revealed that CFC-F was a stronger predictor of exercise behaviour than CFC-I. This result supports the findings of van Beek et al. (2013), in which CFC-F, but not CFC-I, was a significant predictor of exercise behaviour. The study further supports the findings by Pozolotina and Olsen (2019) that CFC-F is a better predictor of healthy behaviours than CFC-I. However, unlike the study of van Beek et al. (2013), the present work demonstrated that CFC-F was also a stronger predictor of SEEB than CFC-I in both CFC–general and CFC–health. CFC-I was a significant predictor of SEEB in CFC–health, but not in CFC–general. FEB was significantly predicted by both CFC-I and CFC-F in CFC–general and CFC–health. This finding could potentially result from the fact that FEB was a combination of healthy and unhealthy eating, and there could be different mechanisms underlying the connection between CFC-I and CFC-F and healthy and unhealthy eating.

The present study was the first to use a randomised experimental design to present evidence that the domain-specific CFC–health explains specific health behaviours, in particular, eating and exercise behaviours, better than the general CFC.

The differences between the explanatory powers of the models with CFC–general and CFC–health were statistically significant, except for the models for FEB, although the explanatory power of the domain-specific model was twice as high as the general model. In general, self-evaluated health behaviours were better explained by the health-specific CFC than self-reported behavioural frequencies. The higher correlation between self-evaluated behaviours and CFC might be explained by the fact that the respondents were asked to evaluate how healthy/unhealthy their behaviours were. Individuals can differ greatly in their beliefs about what is healthy and unhealthy (Carels, Konrad, & Harper, 2007), and a self-evaluative measure would account for such differences. In contrast, the relationship between a frequency measure of specific behaviour and CFC could be influenced by individual beliefs. This scenario particularly applies to FEB, because while most people agree that exercise and physical activity are good for health, individuals can vary in their beliefs about what food is healthy/unhealthy. For instance, some believe that vegan food is best for their health, while others believe in a low-carbohydrate diet and try to avoid fruit and vegetables in favour of meat and fats. Another explanation to this finding could lie in individual compensatory beliefs which deem that it is possible to perform some unhealthy behaviours and still be healthy, as long as such behaviours are compensated for by healthy behaviours. For example, unhealthy eating or smoking compensated for by extra physical activity (Berli, Loretini, Radtke, Hornung, & Scholz, 2014). Thus, individuals might care about their future health, and score high on CFC-F (health) which would correlate with their self-evaluated health behaviour but score low on a behavioural frequency measure due to their specific health beliefs.

The results of the present study have several practical implications and suggest several avenues for future research. First, we have experimentally shown that the domain-specific CFC–health was a better predictor of health behaviours than a general CFC. Furthermore, the explanatory power of the models with CFC–health is comparable to the models with behaviour-specific CFC in van Beek et al. (2013). In cases where one particular health behaviour is in focus, it might be more advantageous to use behaviour-specific CFC. However, van Beek et al. (2013) showed that behaviour-specific CFCs were not good predictors of other behaviours from the same domain. Thus, it is necessary to collect answers to several behaviour-specific CFCs in studies and intervention programmes that target multiple health behaviours simultaneously. Increased questionnaire length could cause an increased number of careless responses (Gibson & Bowling, 2020) as well as a loss of interest and increased burden experienced by the respondent, which, in its turn, could cause dropouts (Galesic, 2006). Therefore, if a more general CFC–health could predict or explain specific health behaviours almost as well as behaviour-specific CFCs, it might be more beneficial to use it in studies and health intervention campaigns that target multiple health behaviours (Murphy et al., 2020). In such scenarios, using CFC–health might help avoid exhausting and irritating respondents with overly lengthy questionnaires.

Second, the finding that CFC–health had a stronger association with self-evaluated health behaviour than behavioural frequencies revealed that health beliefs might be influencing the relationship that people's beliefs about the healthiness of their behaviours might deviate from actual health behaviours. We encourage further research on the effect of individual health beliefs and compensatory beliefs on the relationship

between CFC and health behaviours. The results might suggest that health beliefs should be considered and targeted in health intervention programmes.

Next, the finding that CFC–health/future had a stronger association with exercise behaviour than the CFC–health/immediate suggests that the health communication emphasising future health benefits of exercising might be more effective than minimising immediate participation costs. However, because CFC–health is still an emerging construct, further studies on the relationship between CFC–health and health-promoting health-damaging behaviours are needed. Furthermore, we should be careful trying to extend our recommendations to other cultures. Thus, future research is encouraged to test CFC–health in different cultures.

The self-reported measure of health behaviour is a limitation of the study (McAuliffe, DiFranceisco, & Reed, 2007). Future research, using objective measures of behaviour, such as diaries, is encouraged. Another limitation of the present study is that its survey design does not permit to establish causality between CFC and health behaviours, so future studies using an experimental design are encouraged. This study was performed on a university student sample, that was rather homogeneous in terms of age; thus, we could not test for the effects of age on study variables and associations between them. We would like to encourage further research in this area. However, our results support the findings of the study by Murphy et al. (2020) which was performed on the general population; this suggests that the results can be generalised to the general population.

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Appendix 1.

Health-specific Consideration of future consequences scale (CFC–Health) in English.

1. I consider how my health might be in the future, and try to influence my future health with my day to day behaviour. (F)
2. Often I engage in a particular health behaviour in order to achieve health outcomes that may not result for many years. (F)
3. I only act to satisfy immediate concerns; the future health is of less importance. (I)
4. My health behaviour is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions. (I)
5. My convenience is a big factor in the health decisions and health choices I make. (I)
6. I am willing to sacrifice my immediate happiness or wellbeing in order to achieve better health in future. (F)
7. I think it is important to take warnings about negative health outcomes seriously even if the negative outcome will not occur for many years. (F)
8. I think it is more important to perform a health behaviour with important distant consequences than a behaviour with less important immediate consequences. (F)
9. I generally ignore warnings about possible future health problems because I think the problems will be resolved before they reach crisis level.
10. I think that sacrificing something unhealthy now is usually unnecessary since future health outcomes can be dealt with at a later time. (I)
11. I only act to satisfy immediate concerns, figuring that I will take care of future health problems that may occur at a later date. (I)
12. Since my day-to-day work has specific outcomes, it is more important to me than health behaviour that has distant outcomes. (I)
13. When I make a decision, I think about how it might affect my health in the future. (F)
14. My behaviour is generally influenced by future health consequences. (F)

Appendix 2.

Health-specific Consideration of future consequences scale (CFC–Health) in Norwegian

1. Jeg vurderer hvordan min helse kan bli i fremtiden, og prøver å påvirke min fremtidige helse med min daglige atferd.
2. Jeg blir ofte engasjert i et bestemt helsetiltak for å oppnå helseresultater som ikke vises før om mange år.
3. Jeg gjør ting bare for å tilfredsstille umiddelbare behov, og det som skjer med min helse i fremtiden er mindre viktig.
4. Min helseatferd er påvirket av bare de umiddelbare (dvs. noen dagers eller ukers) konsekvenser av mine handlinger.
5. Min bekvemmelighet er en viktig faktor i helsebeslutninger jeg tar eller mine helsevalg.
6. Jeg er villig til å ofre min umiddelbare lykke og trivsel for å oppnå bedre helse i framtiden.
7. Jeg tror at det er viktig å ta signaler om negative helsekonsekvenser på alvor, selv om det negative helseresultatet ikke vil oppstå før etter mange år.
8. Jeg prioriterer en atferd med viktige langsiktige helsemål over en atferd med mindre viktige umiddelbare konsekvenser.
9. Generelt ignorerer jeg advarsler om mulige fremtidige negative helsekonsekvenser fordi jeg tror konsekvensene vil bli løst før de når krisenivå.
10. Jeg tenker at det å gi avkall på noe usunt nå, er unødvendig. Det som skjer med min helse i fremtiden kan tas hånd om når det kommer.
11. Jeg handler bare tilfredsstiller mine umiddelbare behov, med tanke på at jeg vil håndtere fremtidige helseproblemer som kan oppstå på et senere tidspunkt.
12. Siden mine daglige gjøremål viser konkrete resultater, er de viktigere for meg enn helseatferd som har langsiktige konsekvenser.
13. Når jeg foretar en beslutning tenker jeg på hvordan den kan påvirke min helse i fremtiden.
14. Min atferd er generelt påvirket av fremtidige helsekonsekvenser.

Additional material

The results of the confirmatory factor analyses of CFC–general and CFC–health, and skewness and kurtosis.

CFC–general

	Factor loadings					
	CFC-I	CFC-F	Mean	SD	Skewness	Kurtosis
CFC-F1 I consider how things might be in the future, and try to influence those things with my day to day behavior.		.788	5.13	1.25	-.590	.379
CFC-F2 Often I engage in a particular behavior in order to achieve outcomes that may not result for many years.		.717	4.40	1.50	-.213	-.677
CFC-I1 I only act to satisfy immediate concerns, figuring the future will take care of itself.	.594		3.13	1.40	.304	-.702
CFC-I2 My behavior is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions	.670		2.80	1.37	.563	-.341
CFC-I3 My convenience is a big factor in the decisions I make or the actions I take.	.436		4.56	1.27	-.365	-.174

CFC-F3 I am willing to sacrifice my immediate happiness or well-being in order to achieve future outcomes.		.594	4.86	1.42	-.504	-.223
CFC-F4 7. I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years.		.518	5.53	1.15	-.726	.543
CFC-F5 I think it is more important to perform a behavior with important distant consequences than a behavior with less important immediate consequences.		.649	4.81	1.20	-.183	-.115
CFC-I4 I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level.	.749		3.10	1.51	.414	-.651
CFC-I5 I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time.	.770		3.17	1.54	.408	-.651
CFC-I6 I only act to satisfy immediate concerns, figuring that I will take care of future problems that may occur at a later date.	.777		2.75	1.43	.663	-.196
CFC-I7 Since my day to day work has specific outcomes, it is more important to me than behavior that has distant outcomes.	.647		3.36	1.29	.245	-.312
CFC-F6 When I make a decision, I think about how it might affect me in the future.		.719	5.27	1.20	-.618	.415
CFC-F7 My behavior is generally influenced by future consequences.		.759	4.83	1.24	-.511	.305

CFC–health

	Factor loadings					
	CFC-I	CFC-F	Mean	SD	Skewness	Kurtosis
CFC-F1 I consider how my health might be in the future, and try to influence my future health with my day to day behaviour.		.689	5.10	1.32	-.813	.842
CFC-F2 Often I engage in a particular health behaviour in order to achieve health outcomes that may not result for many years.		.697	3.68	1.65	.067	-.748
CFC-I1 I only act to satisfy immediate concerns; the future health is of less importance.	.772		3.19	1.54	.387	-.790
CFC-I2 My health behaviour is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions.	.770		3.08	1.48	.227	-.836
CFC-I3 My convenience is a big factor in the health decisions and health choices I make.	.418		4.46	1.40	-.489	-.074
CFC-F3 I am willing to sacrifice my immediate happiness or wellbeing in order to achieve better health in future.		.673	4.20	1.62	-.175	-.754
CFC-F4 I think it is important to take warnings about negative health outcomes seriously even if the negative outcome will not occur for many years.		.507	5.80	1.20	-1.171	1.818

CFC-F5 I think it is more important to perform a health behaviour with important distant consequences than a behaviour with less important immediate consequences.		.704	4.65	1.30	-.143	-.318
CFC-I4 I generally ignore warnings about possible future health problems because I think the problems will be resolved before they reach crisis level.	.693		2.88	1.59	.553	-.634
CFC-I5 I think that sacrificing something unhealthy now is usually unnecessary since future health outcomes can be dealt with at a later time.	.715		2.82	1.57	.726	-.235
CFC-I6 I only act to satisfy immediate concerns, figuring that I will take care of future health problems that may occur at a later date.	.805		3.00	1.39	.189	-.711
CFC-I7 Since my day-to-day work has specific outcomes, it is more important to me than health behaviour that has distant outcomes.	.633		3.51	1.43	-.013	-.709
CFC-F6 When I make a decision, I think about how it might affect my health in the future.		.737	4.43	1.48	-.342	.430
CFC-F7 My behaviour is generally influenced by future health consequences.		.737	4.08	1.43	-.086	.415

Note: CFC–I=consideration of immediate consequences, CFC–F=consideration of future consequences, SD = standard deviation.