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Predicting adolescents' health risk behaviors

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The aim of this study was to explore factors of adolescents' health risk behaviors regarding smoking and alcohol consumption in the framework of the prototype/willingness model and approach connecting personality traits and health risk behaviors. The sample consisted of 341 high school students. Their task was to complete several questionnaires measuring relevant risk factors (attitudes, subjective norms, prototypes and willingness), frequency of smoking/drinking, and personality traits (BFI). The results of hierarchical regression analyses show that personality traits do not contribute substantially to the explanation of health risk behaviors comparing to the elements of the prototype/willingness model. Perception of vulnerability and willingness proved to be individual risk factors of smoking and drinking frequency, while subjective norms were significant risk factors of alcohol use frequency. Only agreeableness was protective factor of alcohol use. The results speak of the importance of social and situational influences on health risk behaviors.

Key words: personality traits, the prototype/willingness model, health risk behaviors, adolescents

Over the past twenty years psychosocial factors associated with development of various health problems have been extensively examined (Baban & Craciun, 2007; Bermudez, 1999; Downs & Fischhoff, 2009; Sutton, 2002). There are two different approaches that try to explain why individuals engage in health risk behavior. The basic premise of the first approach is that certain personality characteristics determine the development and maintenance of various health behaviors. The second approach focuses on the analysis of cognitive, affective and motivational processes, which in correlation with situational factors, explain what behavior is initiated and how it is maintained or changed (Baban & Craciun, 2007; Bermudez, 1999; Downs & Fischhoff, 2009; Sutton, 2002).

Personality traits and health risk behaviors

Several personality variables predispose individuals to behave in a way that can be dangerous to their health. Identification of these personality variables and the analysis of their association with various health risk behaviors may give us information about which individuals are vulnerable and how their well-being can be improved (Markey, Markey, Ericksen, & Tinsley, 2006).

The most frequently examined personality traits are those included in the five factor model of personality. Researchers have shown that extraversion, neuroticism, and openness to experience are positively associated with high-risk and delinquent behavior (John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Markey et al., 2006; Markey, Markey, & Tinsley, 2003). On the other hand, agreeableness and conscientiousness are negatively associated with adolescent delinquent behaviors (John et al., 1994; Markey, Ericksen, Markey, & Tinsley, 2001; Markey et al., 2003).

Studies examining the relations between personality dimensions and high-risk health behaviors are important for identifying individual differences in the frequency, intensity and/or predisposition for the development of high-risk behavior. However, they do not fully explain the mechanisms underlying health risk behaviors (Baban & Craciun, 2007; Bermudez, 1999; Downs & Fischhoff, 2009; Sutton, 2002).

Cognitive, emotional, affective, and situational factors associated with health risk behaviors

Most of health risk behaviors' models (e.g., health belief model, protection motivation theory, theory of planned behavior, trans-theoretical model) share the basic hypothesis that human behavior is basically rational and intentional

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(Schwarzer, 2008). On the other hand, the prototype/willingness model (Gibbons & Gerrard, 1995, 1997; Gibbons, Gerrard, Quelette, & Burzette, 1998) attempts to explain the irrational and unintended risk behaviors that occur among adolescents as a reaction to the risky situations in which they enter from time to time. However, adolescents rarely engage in health risk behaviors when they are alone (Nadler & Fisher, 1992). Besides that, they usually have clear social images (prototypes) related to risk behavior, which influence their decision to engage in behaviors harmful to their health (Gibbons & Gerrard, 1995, 1997).

When adolescents are asked if they are going to engage in health risk behavior they usually respond negatively. On contrary, research shows that they engage in such behavior (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997) and that it happens repeatedly for most of them (Johnston, O'Malley, & Bachman, 2000). The model assumes that there is one unintended component that is involved in risk behavior called willingness to risk behavior. The willingness is defined as openness to risky situations or lack of thinking about risk and potential consequences of risky behavior (Gerrard, Gibbons, Benthin, & Hessling 1996; Gibbons, Gerrard, Blanton, & Russell, 1998). There are two basic differences between behavioral intentions and willingness. The first difference refers to different amount of intention for high-risk behaviors included in these two constructs, while the second difference relates to different attribution of responsibility. Namely, less internal attribution is connected to willingness, while more internal attribution is connected to intention (Pomery et al., 2005). According to the model, willingness is a function of four factors. The first one, subjective norms, is related to the adolescents` perception of whether or not relevant others engage and approve risk behavior. If relevant others engage and approve risk behavior, it is associated with greater willingness to it, as well as greater behavioral intention (e.g., Gibbons, Gerrard, & McCoy, 1995). The second factor, attitudes toward risk behaviors, is defined as adolescents' own perception of vulnerability to possible negative consequences of risk behaviors. Namely, the model assumes that adolescents are largely ambivalent toward health risk behaviors. These behaviors are tempting and exciting for them, however, their possible risks may upset them. The studies show that greater willingness to risk behaviors is connected with lower perception of vulnerability. Third, the experience of involvement in risk behavior in the past is connected to more positive attitudes toward this behavior (Bentler & Speckart, 1981), to positive subjective norms (Gerrard, Gibbons, Benthin, et al., 1996), greater intention (Bagozzi, 1981) and willingness. The fourth factor of willingness is prototype perception or perception of a typical peer who is engaged in some risk behavior (Gibbons & Eggelstone, 1996; Gibbons, Gerrard, & Lane, 2001). Namely, there is a consensus among teenagers about what is a typical adolescent who consumes alcohol or has many sexual partners. Numerous studies (e.g., Gibbons & Gerrard, 1995; Piko, Bak, & Gibbons, 2007) show that the perception of prototype is connected with adolescents' decision about whether they will engage in some risk behavior or not. The more positive the perception of the prototype is, the greater the willingness and the intention are (Chassin, Presson, Sherman, Corty, & Olshavsky, 1981; Gibbons, Helweg-Larsen, & Gerrard, 1995).

The prototype/willingness model has been examined on a variety of risk behaviors such as unprotected sexual experience, risky driving, cigarette smoking, alcohol consumption and drug use, driving under influence of alcohol, etc. (e.g., Gibbons & Gerrard, 1995; Kalebić Maglica, 2009; Litchfield & White, 2006). The results of previous studies indicate consistent relations between personality traits, as well as the elements of the prototype/willingness model and health risk behaviors. The aim of this study was to connect two approaches in examining health risk behaviors, which was rare until now. The first problem of this study was to examine the relationship between five factor personality traits and health risk behaviors (smoking and drinking). The second one is to test whether the elements of the prototype/willingness model can explain the tobacco and alcohol consumption frequency among adolescents after controlling for personality traits. The assumption is that extraversion, openness to experience, and neuroticism will be risk factors for cigarette and alcohol use and that agreeableness and conscientiousness will be protective factors for these behaviors. The elements of the prototype/willingness model are expected to explain the frequency of tobacco and alcohol consumption above personality traits.

METHOD

Participants and procedure

The study involved 341 high school students (209 female and 121 male) from the Croatian cities of Rijeka and Opatija. Participants` age ranged from 14 to 19 years (M = 16.39 years, SD = 1.14 years). The study was carried out by psychology students who were previously prepared for participation in this research. Participation was voluntary and anonymous. Participants completed questionnaires related to personality traits, perceptions of vulnerability, subjective norms, evaluation of the typical smoking and drinking peers prototypes, the willingness of alcohol and cigarette use, and current frequency of consumption of tobacco and alcohol. Study was conducted in classrooms and lasted approximately 90 minutes.

Measures

The Big Five Inventory (BFI). Information about basic personality traits were obtained using The Big Five Inventory - BFI (John, Donahue, & Kentle, 1991; John & Sriv-

Table 1
Correlations between BFI dimensions

Dimensions	1	2	3	4
1. Openness	-			
2. Conscientiousness	.12*	-		
3. Neuroticism	-.03	-.18**	-	
4. Extraversion	.13**	.11*	-.31**	-
5. Agreeableness	.06	.21**	-.31**	.11*

* $p < .05$, ** $p < .01$.

astava, 1999). The questionnaire consisted of 44 items in the form of short verbal phrases (e.g., depressed, open, social). Answers were scored on a scale ranging from 0 (*do not agree*) to 4 (*strongly agree*).

BFI items are good descriptors of all five personality dimensions (openness to experience, conscientiousness, neuroticism, extraversion, and agreeableness) and the inventory has satisfactory psychometric properties, in spite of its simplicity and brevity. Internal consistency coefficients of reliability (Cronbach Alpha) on Croatian students samples were satisfactory and range from .72 to .82 (Kardum, Gračanin, & Hudek-Knežević, 2006). In this study somewhat lower internal reliability coefficients were obtained (.59 for agreeableness to .64 for extraversion and openness). Also, significant intercorrelations were obtained for BFI dimensions, but these associations were low (except for openness and neuroticism, and openness and agreeableness; see Table 1).

Perceptions of vulnerability. The perception of personal vulnerability to possible negative consequences of cigarette consumption was examined by one item, and alcohol consumption by two items ("Regardless of whether you use cigarette/beer or wine/strong alcohol drinks or not, what do you think what is the probability that you will develop some diseases associated with consumption of tobacco/alcohol in the future–e.g. heart disease?"). Answers were scored on the 5-point scale (1-*not at all likely*, to 5-*entirely likely*), where higher score indicated greater perception of personal vulnerability to possible negative consequences of cigarette/alcohol consumption.

The correlation between the perception of personal vulnerability to negative consequences of consumption of wine/beer and strong alcohol was .83 ($p < .01$). Because of that, in further analyses one measure (linear combination of two items) for personal vulnerability perception to possible negative consequences of alcohol consumption has been used.

Subjective norms. Subjective norms scale was constructed for purposes of this study and consisted of two parts. The first part assesses the perception of prevalence of cigarette, beer, wine and strong alcohol drinks consumption among friends and parents. The second one assesses participants' perception of friends` and parents` reaction to their tobacco and alcohol consumption.

The frequency of tobacco and alcohol consumption by parents and friends were estimated by using the response categories from 1 (*never*) to 6 (*every day*). Higher scores indicate frequent consumption of cigarette and alcohol among friends and parents. Friends` and parents` reactions were assessed on a 5-point scale (1-*extremely negative*, 5-*very positive*), where a higher score indicates a positive response of friends and parents.

The overall incidence rate of alcohol consumption by friends and parents consists of three items for each source of social influence. Correlation coefficients for the friends' consumption of beer, wine, and strong liquor ranged between .64 and .82 and for parents' from .41 and .56 (all $p < .01$). Internal consistency coefficients (Cronbach Alpha) obtained for friends' and parents' alcohol consumption were .89 and .74, respectively.

The friends' and parents' reactions to participants' cigarette use was examined by one item, and the reaction of friends and parents to alcohol use was examined by three items separately for each source of influence. The range of correlation coefficients between the reactions of friends on each type of alcohol is from .72 to .85, and for parents from .59 to .88 (all $p < .01$). Cronbach Alpha coefficients for friends` and parents` reactions to alcohol consumption were .91 and .88, respectively.

Prototype. Original Prototype scale (Gibbons & Gerrard, 1995) has been translated and adapted for this study. Participants were asked to indicate their opinion about the "type of the person (of their age) who uses cigarette/alcohol" using 12 adjectives (e.g., smart, popular, immature, "cool"). Answers were scored on the 5-point scale (1-*does not apply to that person* up to 5 - *completely relates to that person*). Items were reversed where necessary, with high scores reflecting more positive perception. Factor analyses (principal axis factoring) of the original questionnaire indicate the existence of three and four factors (Blanton et al., 1997; Spijkerman, van den Eijnden, & Engels, 2005). Scales Cronbach Alpha internal consistency coefficients were satisfactory (Blanton et al., 1997).

In this study the Prototype scale was applied twice, first to estimate typical smoking peers and then to estimate typical drinking peers. Two factor analyses (principal axis factoring) were done. The first factor analysis indicated the existence of a typical smoking peer prototype (one factor), and the second analysis the existence of a typical drinking peer prototype (one factor). Cattell's scree-test was used as a criterion for the decision on a sufficient number of factors. Cronbach Alpha internal consistency coefficients were .77 and .76 for cigarette and alcohol content, respectively.

Willingness to risk behavior. The assessment of behavioral willingness was based on items used by Gibbons, Gerrard, Blanton, et al. (1998). Participants were asked to imagine themselves at a party with some friends where one

of those friends offered them cigarette/alcohol. This was followed by three questions asking participants how likely it would be that they would (a) accept cigarette/alcohol, (b) say "no thanks" and refuse cigarette/alcohol, and (c) leave the situation. Answers for each of the possible reactions were measured on a 5-point scale ranging from 1 (*not at all likely)* to 5 *(extremely likely)*. Responses to the negatively worded items were reverse-scored. Three items were then averaged to create the willingness scale. Scales Cronbach Alpha internal consistency coefficients were .71 and .85 for cigarette and alcohol content, respectively.

Tobacco smoking and alcohol consumption frequency. The tobacco smoking frequency was examined with one item, while the alcohol consumption frequency was examined with three items (beer, wine, and strong alcoholic beverages). Answers were scored on the 5-point scale (1-*never* to 5–*every day*). Higher score on this questionnaire indicates more frequent cigarette and alcohol use.

Correlations between beer, wine, and strong alcohol consumption frequency vary from .42 to .66 (all coefficients are significant $p < .01$). Cronbach Alpha coefficient for the alcohol use frequency is .78.

RESULTS

To examine relations between personality traits, elements of the prototype/willingness model, and the tobacco smoking and alcohol consumption frequency, two hierarchical regression analyses were conducted. Personality traits were included in the first step of the analyses and the elements of the prototype/willingness model in the second. The tobacco and alcohol use frequencies served as criteria. First, correlation coefficients between personality traits, elements of the model and the tobacco and alcohol use frequencies were calculated. The correlations obtained are shown in Tables 2 and 3. Analyses were done on the sample of participants who reported occasionally or daily use of cigarette/alcohol.

Table 2
Correlations between personality traits, elements of the prototypes/willingness model, and the frequency of cigarette use

	O	C	N	E	A	Frequency of cigarette use
Vulnerability - cigarette	.05	-.08	.16*	.06	-.05	.28**
Cigarette consumption - friends	.00	.04	-.17*	.21**	.24**	.17**
Cigarette consumption - parents	-.08	.08	.03	.09	.08	.10
Friends` reaction - cigarette	-.02	.05	-.09	.08	.11	.17*
Parent's reaction - cigarette	-.05	.10	-.06	.12	.11	.11
Prototypes - cigarette	.10	.09	-.01	.09	.11	.26**
Willingness - cigarette	-.10	-.03	-.04	.00	.02	.43**
Frequency of cigarette use	.03	-.08	.03	.08	.07	1

Note. O = openness, C = conscientiousness, N = neuroticism, E = extraversion, A = agreeableness.
* $p < .05$, ** $p < .01$.

Table 3
Correlations between personality traits, elements of the prototypes/willingness model and the frequency of alcohol use

	O	C	N	E	A	Frequency of alcohol use
Vulnerability - alcohol	-.06	-.18**	.15**	.00	-.12*	.21**
Alcohol consumption - friends	.03	-.07	-.05	.07	-.05	.28**
Alcohol consumption - parents	.06	-.07	.00	-.05	-.07	.18**
Friends reaction - alcohol	-.02	-.02	-.02	-.04	-.01	.26**
Parents reaction - alcohol	.08	-.04	-.04	-.03	.00	.18**
Prototypes - alcohol	.05	.15*	-.07	.00	.07	.13*
Willingness - alcohol	-.06	-.15*	.01	.00	-.10	.44**
Frequency of alcohol use	.04	-.12*	-.02	.09	-.17**	1

Note. O = openness, C = conscientiousness, N = neuroticism, E = extraversion, A = agreeableness.
* $p < .05$, ** $p < .01$.

Table 2 shows that extraversion and agreeableness are positively associated with friends` cigarette consumption. Neuroticism is negatively associated with friends` cigarette consumption and positively with the perception of vulnerability. None of personality traits were associated with the cigarette smoking frequency, as opposed to elements of the model which are more closely associated with the cigarette use frequency among adolescents (except for parents` consumption and their reactions). Effect sizes of *r* values obtained in this study (.16 to .28) could be characterized as small (Cohen, 1988), except for *r* between willingness and smoking which falls within a range of large coefficients.

It can be seen from Table 3 that conscientiousness and agreeableness were negatively, and neuroticism positively associated with the perception of vulnerability. Conscientiousness was positively associated with the perception of prototype, and negatively with willingness. All elements of the prototype/willingness model tested were positively associated with the alcohol consumption frequency, while only conscientiousness and agreeableness were negatively associated with the above criteria. Effect sizes of *r* values obtained in this study from .12 to .28 could be characterized as small (Cohen, 1988), except for *r* between willingness and drinking which is large. Table 4 and 5 give the results of hierarchical regression analyses (only significant predictors are shown).

Personality traits and elements of the prototype/willingness model explain 32% of the variance of the cigarette use frequency among adolescents. However, the contribution of variables from the first step was not significant. Contribution of variables from the second step was significant (29% of variance). Individual predictors from the second step were perception of personal vulnerability and willingness to health risk behavior.

Both groups of predictors explained 45% of the total variance of the frequency of alcohol consumption. Personality traits explained 9% of the variance and elements of the model 36%. Significant protective factor in the first step of analysis was agreeableness, while significant risk factors in the second step were the perception of vulnerability, friends` and parents` alcohol consumption and willingness to health risk behavior which was the best predictor of the alcohol consumption frequency.

Table 4

Hierarchical regression analysis with personality traits and elements of the prototype/willingness model as predictors of the cigarette consumption

	Frequency of cigarette use		
Predictors	β	ΔR^2	R^2
Step 1 Personality traits		.03	.03
Step 2 Elements of model:		.29**	.32**
Vulnerability to negative effects of cigarette smoking	.22**		
Willingness to smoke	.40**		

Note. Only significant predictors are shown. ΔR^2 = contribution of a particular group predictors to explained variances; R^2 = overall contribution to explained variances.
* $p < .05$, ** $p < .01$.

Table 5

Hierarchical regression analysis with personality traits and elements of the prototype/willingness model as predictors of the alcohol consumption

	Frequency of alcohol use		
Predictors	β	ΔR^2	R^2
Step 1 Personality traits:		.09**	.09**
Agreeableness	-.18*		
Step 2 Elements of model:		.36**	.45**
Vulnerability to negative effects of drinking	.16**		
Friends' alcohol use	.12**		
Parents' alcohol use	.10*		
Willingness to drink	.44**		

Note. Only significant predictors are shown. ΔR^2 = contribution of a particular group predictors to explained variances; R^2 = overall contribution to explained variances.
* $p < .05$, ** $p < .01$.

DISCUSSION

Results of the present study indicate that personality traits explain only a small and negligible percentage of cigarette smoking, as opposed to elements of the prototype/willingness model. Regarding alcohol consumption, personality traits also explain a smaller percentage of criterion variable than the elements of the prototype/willingness model. However, personality variables as a group proved to be a significant predictor, with agreeableness as the individual protective factor for alcohol consumption.

The results obtained are not fully consistent with the results referred in the literature, according to which extraversion, neuroticism and openness to experience are a risk, while agreeableness and conscientiousness are protective factors for different risk behaviors, including tobacco smoking and alcohol consumption. The results of this study show that only agreeableness is a protective factor for alcohol use among adolescents (John et al., 1994; Markey et al., 2001; Markey et al., 2003). Similar results are those of Markey et al. (2006). Their results show that low agreeableness is a risk factor for cigarette, alcohol and marijuana consumption among girls and boys. Martin & Sher (1994) found low agreeableness to be connected with problems of alcohol consumption measured three years later, which could be explained by behavior patterns characterizing this personality trait. It might be possible that individuals who are rude, un-

cooperative and reluctant to help experience more unpleasant emotions which make them indulge in more frequent alcohol use (McCrae & Costa, 1999).

The results of this study are somewhat surprising since the majority of research still shows the effects of personality on health risk behaviors. A possible explanation could be that only those participants who reported cigarette and alcohol use were included in the analysis. Besides, the design of this study was cross-sectional, and therefore, future research should include the longitudinal aspect. Furthermore, because BFI is mostly applied on adults, there is also a question of its applicability to adolescents. In this study somewhat lower reliability coefficients were obtained compared to those found by Kardum et al. (2006) on a sample of Croatian students.

Although the five factor Model is a valuable taxonomy of personality, and frequently used in research on relation between personality traits and health, it is hardly useful for the analysis of behavior in a specific context (Smith & Williams, 1992). Namely, it does not explain how each of its dimensions manifests itself in different contexts and what consequences these dimensions have for individual's well-being and adaptation in different situations (Van Heck, 1997). It is possible that some other personality traits like self-esteem, anxiety and locus of control are more important for adolescents' health risk behavior than five factor personality traits.

As noted above, variables of the prototype/willingness model explain higher percentage of cigarette and alcohol consumption variance. Risk factors for cigarette use frequency in this analysis were the perception of personal vulnerability and willingness to use cigarettes. Perceptions of personal vulnerability, willingness to use alcohol, as well as friends` and parents` alcohol consumption are risk factors for drinking.

The results of this study are consistent with previous results, according to which the perception of personal vulnerability is associated with more frequent cigarette and alcohol usage (e.g., Gerrard, Gibbons, Benthin, et al., 1996; Gerrard, Gibbons, & Bushman, 1996). It is possible that adolescents use mechanisms to reduce the gap between two cognitions (e.g., „I drink alcohol and drinking can lead to the development of disease in the future"; Gerrard, Gibbons, Benthin, et al., 1996) or have a strong sense of invulnerability which is characteristic for this period (Dacey & Kenny, 1994). In line with this, studies are showing that people tend to underestimate the probability of occurrence of undesirable consequences of their own risk behavior (Weinstein, 1982) and overestimate control over them thinking that behavior which is under control is less risky (Ashton, 1983). Gerrard, Gibbons, & Bushman (1996) indicate false consensus effect as a possible explanation of these results.

The problem of perception of vulnerability is the fact that the authors often examine perceptions of long-term effects of tobacco/alcohol consumption, which is actually quite far from the thinking of adolescents. Rating probability of the occurrence of long effects of alcohol/tobacco consumption represents a problem when measuring perception of vulnerability, especially in adolescents, because people often do not think about long term effects. Therefore, it is better to ask teenagers about the possible short-term negative effects of current cigarette/alcohol use on their health (e.g. accident, the weakening of reflexes, a sense of false confidence, etc.; McGinnis & Foege, 1993; Sarafino, 1998).

The results of this study also show that the willingness to health risk behavior is a risk factor for cigarette smoking and alcohol consumption. In accordance with the prototype/willingness model, the results obtained indicate that cigarette/alcohol consumption is not always planned (Gerrard, Gibbons, Benthin, et al., 1996; Gibbons, Gerrard, Blanton, et al., 1998). Therefore, adolescents who are prone to cigarette/alcohol consumption when given opportunity to use these substances, are those who use cigarette/alcohol more frequently in everyday life. The results obtained are consistent with many findings and with other risk behaviors such as risky sexual behavior, drug use, etc. (e.g., Gerrard et al., 2002; Spijkerman, van den Eijnden, Vitale, & Engels, 2004).

The important predictors of the alcohol consumption frequency in this study are subjective norms, i.e., alcohol consumption by parents and friends, because they represent models and create standards for the adolescents` behavior (e.g., Simmons & Blyth, 1987). Mechanisms of learning (theory of operant conditioning, social learning theory) may be the reasons why adolescents engage or maintain risk behaviors (Ary, Tildesley, Hops, & Andrews, 1993; Ennett & Bauman, 1991).

From the results of this study we can conclude that the variables of the prototype/willingness model, compared to personality traits, explain the higher percentage of the variance of cigarette/alcohol consumption, which indicates to its importance. When examining health risk behavior it is important to take into account the social (parents and friends) and situational (willingness) influence (Gibbons et al., 2001). There are several issues that should be involved in working with adolescents: developing skills for resisting unwanted social pressure (from friends and peers), and education that many risk behaviors are not intended or planned but are a product of social situation. Emphasis should be put on adolescents` own responsibility when they choose risk behaviors.

Finally, some limitations of this study should be mentioned. First, it was an occasional sample of respondents included in the study. Second, analyses were done only on those who reported occasionally or daily use of cigarette/alcohol. Third, it was difficult for adolescents to assess prototypes, because they are often described as exemplars. The description of prototypes in this study included some specific examples of real people that adolescents have met before (Fiske & Taylor, 1991). Finally, the prototype scale

in this study is unidimensional, while in some other studies (e.g., Skalle & Rise, 2006) it is multidimensional, which may complicate the comparison of the results.

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