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Cross-Cultural Validity of the Consideration of Future Consequences Scale (CFCS-14): A Study on Turkish University Students

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Keywords
Consideration of future consequences, time orientation, subjective well-being, problematic alcohol use, smoking

Abstract
The subjective perception of time, known as time orientation, plays a role in shaping a wide range of health-related behaviors. A popular measure of time orientation is the Consideration of Future Consequences Scale (CFCS-14), which has two dimensions: immediate and future. Although widely used in individualistic societies, the usage of this scale, particularly in collectivist cultures, is limited, creating a gap in understanding the cross-cultural implications of temporal orientation on health behaviors. We translated the CFCS-14 into Turkish and examined its psychometric properties and practical utility within the context of health behaviors. A total of 589 undergraduates completed a survey, consisting of the Turkish version of CFCS-14 and measures of time perspective, sensation-seeking, autonomous-related self, subjective well-being, positive and negative affect, problematic alcohol use, and smoking. Both exploratory and confirmatory factor analyses provided evidence for the existence of two correlated factors. CFC factor scores showed robust links with problematic alcohol use, daily cigarette consumption, sensation-seeking, and autonomous-relatedness. However, correlations with subjective well-being and affect were weaker and statistically non-significant. These findings underscore the cross-cultural applicability of CFCS-14's structure, validity, and reliability. This research contributes to the broader understanding of time orientation theories and their practical implications in diverse cultural settings.

Anahtar kelimeler
Gelecekteki sonuçların dikkate alınması, zaman yönelimi, öznel iyi oluş, problemli alkol kullanımı, sigara kullanımı

Gelecekteki Sonuçların Dikkate Alınması Ölçeği'nin (CFCS-14) Kültürler Arası Geçerliği: Türk Üniversite Öğrencileri Üzerine Bir Araştırma

Öz
Zamanın subjektif algısı olarak bilinen zaman yönelimi, sağlıkla ilgili çeşitli davranışları şekillendirmede rol oynar. Zaman yöneliminin popüler bir ölçeği, Gelecekteki Sonuçların Dikkate Alınması Ölçeği (CFCS-14)'dir. Bu ölçeğin anlık ve gelecek olmak üzere iki boyutu vardır. Geleneksel olarak bireyselci toplumlarda yaygın olarak kullanılmasına rağmen, bu ölçeğin özellikle toplulukçu kültürlerdeki kullanımı sınırlıdır ve bu durum zaman yöneliminin sağlık davranışları üzerindeki kültürlerarası etkilerini anlama konusunda bir eksiklik yaratmaktadır. CFCS-14'ü Türkçeye çevirdik ve sağlık davranışları bağlamında ölçeğin psikometrik özelliklerini ve pratik kullanılabilirliğini inceledik. Toplam 589 lisans öğrencisi, CFCS-14'ün Türkçe versiyonunu ve zaman perspektifi, heyecan arayışı, özerk-ilişkisel benlik, öznel iyi oluş, olumlu ve olumsuz duygular, sorunlu alkol kullanımı ve sigara içme ölçümlerini içeren bir anketi tamamladı. Hem keşifsel hem de doğrulayıcı faktör analizlerinde, ilişkili iki faktörün varlığına işaret eden bulgular elde edildi. CFC faktör puanları, sorunlu alkol kullanımı, günlük ortalama sigara tüketimi, heyecan arayışı ve özerk-ilişkisel benlik ile güçlü ilişkiler gösterdi. Bununla birlikte, öznel iyi oluş ve duygular ile ilişkiler zayıf ve istatistiksel olarak anlamsız bulundu. Bu bulgular, CFCS-14'ün yapısının, geçerliliğinin ve güvenilirliğinin kültürlerarası uygulanabilirliğini vurgulamaktadır. Bu çalışma, zaman yönelimi teorilerinin ve bu teorilerin farklı kültürel bağlamlardaki pratik etkilerinin daha geniş bir anlayışını geliştirmeye katkı sağlamaktadır.

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Time orientation refers to the fundamental ways people think about and experience time. Some individuals focus on the immediate internal and external environment, and value behaviors that produce immediate benefits. Others weigh the outcomes of behaviors more mindfully, and prefer those that produce higher benefits in the long run over immediate small benefits. Thus, while some focus more on the proximal consequences of their actions (i.e., present orientation), others focus more on the distant consequences of actions (i.e., future orientation) (Joireman et al., 2012). Yet, some dwell in the past memories and use them as a proxy to give direction to their life thus affecting everyday behaviors (i.e., past orientation; Zimbardo & Boyd, 1999). Psychological perception of time is related to personality, decision-making, risk-taking and impulsivity, parenting, health behaviors, and environmental decisions (Akirmak, 2021; Akirmak et al., 2019; Boniwell et al., 2010; Joireman et al., 2006; Murphy & Dockray, 2018, Strathman et al., 1994). Thus, it has been successfully utilized in various research contexts to study the complexity of human behavior across various disciplines, including psychology, economics, health sciences, and environmental studies (Joireman & King, 2016).

While time orientation is a crucial aspect of human attitudes, behavior, and well-being, there is a lack of cross-cultural research in this area. For example, a popular measure of time orientation is the Consideration of Future Consequences Scale (CFCS-14; Joireman et al., 2012). There is a wealth of research using the CFCS-14 in Western cultures, especially in the USA (Joireman et al., 2012) and England (McKay et al., 2016), but it has not been utilized globally by non-English speaking researchers. The factor structure of CFCS-14 was examined in different countries, including Germany (Kübell & Wittmann, 2020), France (Camus et al., 2014), Italy (Nigro et al., 2016), Portugal (Echeverría et al., 2015), and Spain (Vásquez et al., 2013). In addition, a few translations of the scale exist in non-Western countries, including Russia and Argentina. However, the scale has not been utilized beyond these adaptation studies, where the primary focus was the scale's psychometric properties. As a result, the generalizability of findings related to CFC remains to be researched. The present research aimed to eliminate this gap in the literature by translating CFCS-14 into Turkish and examining the individual differences in time orientation within the context of health behaviors using a non-Western sample. The present study contributes to the cross-cultural studies on time orientation by examining the psychometric properties of a Turkish version of the CFCS-14 and its associations with health and subjective well-being measures, aiming to validate the applicability of CFC-related findings across cultures.

Previous studies have employed two approaches to parse data obtained with CFCS-14. Some studies have calculated the total score of the CFCS-14 and used this score as an indicator of future orientation. In this approach, higher scores indicate a greater tendency for future orientation, while lower scores indicate a greater tendency for present orientation. Other studies have used the two subscales of the CFCS-14, CFC-Immediate and CFC-Future. This approach separates the subscales into two factors rather than recoding some of the scale items and calculating a scale total score. These factors indicate the extent to which individuals differ in future and present orientation. The first approach views time orientation as two opposing ends of a spectrum, while the second approach views it as two factors that are negatively correlated but are influenced by different processes (Joireman & King, 2016).

In addition to these two approaches, research has also shown that future orientation is associated with several positive outcomes. Both approaches share that a higher level of future orientation is associated with a greater sensitivity to delayed-large rewards, while a higher level of present orientation is associated with a greater preference for immediate-small rewards. A temporal dilemma is a situation in which individuals must choose between two or more behavioral options that have different values and occur at different times. For example, someone might have to choose between watching a movie now or studying for an exam tomorrow. People who are more future-oriented are better able to resist immediate temptations and focus on long-term goals. As a result, they are more likely to choose options that will lead to long-term benefits, such as studying for an exam or saving money. Previous research found that future orientation is positively related to academic achievement, exercise habits, healthy eating, and subjective well-being (Daugherty & Brase, 2010; Joireman et al., 2012; Zimbardo & Boyd, 1999). Furthermore, future orientation is positively associated with delay of gratification (Strathman et al., 1994), self-control (Joireman et al., 2008), life satisfaction (Azizli et al., 2015), and positive emotions (Geers et al., 2010). In contrast, higher scores on immediate orientation are positively associated with gambling, impulsivity, and risk-taking (Zimbardo & Boyd, 1999).

Beyond the individual's psychology, socio-cultural context also influences how time is perceived (Brislin & Kim, 2003). Thus, besides intra-individual psychological processes, inter-individual processes such as child-rearing practices, socialization processes, and education affect temporal orientation (Keough et al., 1999). As an example of cross-cultural differences, past positive and future dimensions of the Zimbardo Time Perspective inventory exhibited a positive correlation in samples from both Turkish and Swedish populations (Akirmak, 2019; Carelli et al., 2011), whereas such an association did not appear in the American sample (Zimbardo & Boyd, 1999). These findings suggest that how people perceive and experience time is influenced by their psychology and the socio-cultural context, underscoring the importance of cross-cultural variability in perceptions of time. Hence, time perception is shaped by both individual psychology and socio-cultural factors, emphasizing the imperative for additional cross-cultural research to comprehend this multifaceted phenomenon.

According to the integrative model of Consideration of Future Consequences, the development of temporal orientation is connected to early experiences and personality characteristics (Joireman & King, 2016). Among these critical determinants, prominent processes include parenting, self-efficacy, sensation-seeking, and the ability to delay gratification (Joireman et al., 2006). Research concerning the association between time orientation and familial dynamics, particularly parenting, remains relatively limited. Nevertheless, existing evidence indicates a robust association between family environments that foster autonomy and relatedness and the endorsement of a balanced-time perspective (Akirmak et al., 2019). A balanced-time perspective represents the capacity to adapt one's temporal orientation in response to situational demands, and it is positively associated with many health-related outcomes (Zhang et al., 2013; Zimbardo & Boyd, 1999). Furthermore, it is essential to underscore the impact of negative emotional states, which can induce impulsivity and elevate sensitivity to short-term outcomes, thereby contributing to a present orientation (Tice et al., 2001). To sum up, the interplay between one's relational patterns with parents, personality traits, affective states, and early learning experiences collectively shapes the extent to which individuals consider future consequences when making behavioral decisions.

Research has shown that present orientation is associated with both smoking (Adams & Nettle, 2009) and alcohol consumption (Daugherty & Brase, 2010; Keough et al., 1999; Percy et al., 2020). These behaviors offer immediate gratification but pose long-term risks (Halperin et al., 2010). Conversely, individuals with a future-oriented mindset tend to exhibit better physical and mental health outcomes than the participants with a present-oriented mindset (see Murphy & Dockray, 2018, for a comprehensive review).

Various theoretical perspectives have been put forth to explain how time orientation is connected to behavior and, consequently, health. One such model in this regard is the awareness model where individuals first evaluate the consequences of a behavioral choice before taking an action. This implies that an individual's time orientation shapes their assessment of the immediate and delayed risks and benefits, subsequently guiding their behavior (Joireman et al., 2006). For instance, individuals with a lower CFC might be more inclined toward smoking and alcohol consumption because they may not fully grasp the potential long-term drawbacks of these behaviors. In contrast, the concern model suggests that time orientation interacts with the perception of consequences in predicting behavior. In this framework, individuals with lower CFC may be aware of the harmful effects but may not be as concerned about the delayed consequences of smoking and drinking alcohol, making them more likely to engage in these behaviors compared to those with higher CFC (Joireman et al., 2006). Thus, in the awareness model, participants assess the risks and benefits of their choices, but these assessments may be influenced by their time orientation. In contrast, in the concern model, individuals acknowledge these risks but may not be as concerned about their delayed consequences. Finally, the buffering and susceptibility model posits that time orientation moderates the relationship between risk factors and behavioral outcomes (Joireman & King, 2016). In the buffering model, future-oriented individuals are more sensitive to future outcomes, while in the susceptibility model, they are more sensitive to immediate outcomes.

Recent studies have challenged the two-dimensional view of CFCS-14. Findings indicated that a bi-factor model of CFCS-14 fits the data better than a model with two correlated factors in samples of adolescents (McKay, Morgan, et al., 2015) and undergraduates (McKay, Cole, & Percy, 2015). In contrast, an adaptation study found support for both the bi-factor and two-correlated factors models of CFCS-14 in adolescent and undergraduate samples (Nigro et al., 2016). Another study found an acceptable model fit for the two correlated factors model; however, these factors explained only a small variance in problematic alcohol use and anxiety, suggesting limited practical utility for the scale (Percy et al., 2020). These findings indicate a lack of consensus on the dimensionality of CFCS-14 and the usefulness of its factors in predicting health-related outcomes. Therefore, despite CFCS-14's widespread use in predicting various psychological and physical health outcomes (Joireman & King, 2016; Murphy & Dockray, 2018), further evidence is needed to clarify its factor structure and the practical utility of its two factors, particularly in the context of alcohol and smoking prevention research and practice, where inferences are drawn based on individuals' temporal orientation.

The primary objective of the present research was to validate and cross-validate the Turkish CFCS-14 scale, thus enhancing its cross-cultural validity. To achieve this, we translated the CFCS-14 into Turkish and conducted an exploratory factor analysis (EFA) to examine the scale's dimensionality within one group of participants. Then, we utilized this factor structure for cross-validation in a separate group of participants through confirmatory factor analysis (CFA).

Additionally, we assessed the convergent validity of the scale by examining the associations of CFCS-14 factors with other variables. Our predictions were grounded in previous findings and theories on subjective time, and we assessed the utility of CFCS-14 scores based on the direction of correlations. First, we hypothesized that CFCS-14 subscale scores would exhibit associations with other measures of subjective time. For instance, we expected CFC-Future scores to correlate positively with the Future dimension of ZTPI and negatively with the Present Fatalistic dimension of ZTPI. In contrast, we anticipated a reverse pattern of association for CFC-Immediate. Furthermore, we predicted differences in health behaviors based on time orientation, expecting smoking and problematic alcohol use to be positively associated with present orientation (i.e., higher CFC-Immediate scores) and negatively associated with future orientation (i.e., lower CFC-Future scores). Additionally, given the positive relationship between future orientation and subjective well-being (Murphy & Dockray, 2018), we hypothesized that higher CFC-Future scores would correlate positively with positive affect and satisfaction with life scores and negatively with negative affect scores. Conversely, we expected a reverse pattern of associations for CFC-Immediate scores.

Finally, we explored the associations of CFCS-14 factors with two personality processes: sensation-seeking and autonomous-related self. Previous research has linked sensation-seeking to impulsivity and present orientation (Zimbardo & Boyd, 1999), so we anticipated a positive association between sensation-seeking and CFC-Immediate scores and a negative association with CFC-Future scores. Autonomous-related self (ARS) is a self-construal type developed through mother-child interaction quality and characterized by close family relationships and agency in decision-making (Kagitcibasi, 2005; 2007). Autonomous relatedness has been associated with a higher balanced time perspective, lower trait anxiety, and overall well-being (Akirmak et al., 2019). Given the similarity in the developmental processes affecting time orientation and time perspective (Keough et al., 1999), we expected higher ARS scores to be associated with higher CFC-Future scores and lower CFC-Immediate scores. This prediction was based on previous findings showing a positive relationship between ARS and balanced time perspective, a robust predictor of subjective well-being (Boniwell et al., 2010).

Method

Participants

To determine our sample size, we considered the number of scale items (14) multiplied by 15 cases (Tabachnick & Fidell, 2007). Data was collected from 623 Istanbul Bilgi University undergraduates, mostly women (% 69). The mean age of the participants was 22.13 (*SD* = 3.33), within the range of 18 to 53. We examined the survey completion times to identify fast and careless responses. Participants who responded faster than 5 minutes were removed from the data, resulting in 10 participants being eliminated. Because time orientation is related to age and the average age was relatively low in our sample, we decided to filter participants who were outliers based on age. We calculated the interquartile range (3 years of age), and participants whose scores were above the third quartile plus 1.5 times the IQR (i.e., 23 + 4.5 = 27.5 years of age) were considered outliers. This eliminated 30 participants who were above 27 years of age. The final sample was composed of 589 university students. A total of 369 participants received a monetary reward of 30TL, while 208 participants received course credit for participation. The remaining participants did not opt to receive any incentives.

Measurements

Consideration of Future Consequences Scale: A Turkish translation of the CFCS-14 scale was used to assess time orientation (Joireman et al., 2012). A standard translate-and-back-translate procedure was followed to create the scale's Turkish version. The scale items were translated and back-translated by four psychologists and one bilingual researcher. The disagreements on the item translations were discussed, and changes were implemented when needed.

CFCS-14 consists of two subscales: Immediate (CFC-Immediate) and Future (CFC-Future). Each subscale consists of 7 items rated on a 7-point Likert scale (1 = extremely uncharacteristic of me to 7 = extremely characteristic of me). In the original version of the scale, Cronbach's alpha was found to be .80 for the Future subscale and .84 for the Immediate subscale (Joireman et al., 2012). The scale provides three scores: CFC-Total, CFC-Immediate, and CFC-Future. Higher scores indicate higher endorsement of Immediate and Future orientation for Immediate and Future subscales. The reliability estimates for the total scores, Future subscale, and Immediate subscale were .81, .77, and .76, respectively, in the present sample.

Zimbardo Time Perspective Inventory (ZTPI): The ZTPI is a self-report inventory consisting of 56 items. It has five subscales: past positive (PP), past negative (PN), future (F), present hedonistic (PH), and present fatalistic (PF) (Zimbardo & Boyd, 1999). The Turkish version of the scale was utilized in this research (Akirmak, 2021). The items are rated on a 5-point Likert Scale (1 = strongly disagree to 5 = strongly agree). To replicate prior research and keep the survey relatively short, we utilized only two subscales (present fatalistic and future) from the ZTPI. The PF dimension (13 items) measures fatalistic thinking and locus of control, while the F dimension (9 items) measures planning and goal orientation. Higher scores indicate a higher endorsement of fatalism (PF) or goal-oriented thinking and planning (F). The reliability estimates for the PF and F were .67 and .78, respectively, in the present sample.

Autonomous-Relatedness Scale (ARS): ARS is part of a more extensive inventory that assesses different types of self and has 27 items rated on a 5-point Likert scale (1 = totally disagree to 5 = totally agree). The scale consists of three subscales, which are autonomous, relational, and autonomous-related (Kagitcibasi, 2007). In the present study, the autonomous-related subscale was used, which measures the extent to which participants perceive whether having close relationships is a threat or a restriction to their autonomy. Higher scores indicate a lesser conflict between autonomy and relationship and, thus, a self-construal that supports autonomy and close relationships. The reliability estimate for the ARS was .75 in the present sample.

Brief Sensation Seeking Scale (Hoyle et al., 2002): Brief Sensation Seeking Scale (BSSS) has eight items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Higher scores indicate a desire to pursue new and exciting experiences. The Turkish version of the scale (Çelik & Turan, 2016) was used in this study. The reliability estimate for the BSSS was .69 in the present sample.

Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993): This measure consists of 10 items and measures risky and harmful alcohol use. The Turkish version of the scale was used in this research. High scores are indicative of higher problematic alcohol use. The reliability estimate for the AUDIT was .79 in the present sample.

Smoking: Participants were asked three demographic questions regarding their smoking habits and status. Participants were asked to indicate whether they have smoked more than 100 cigarettes (Yes/No) and continue to smoke (yes-everyday, yes-once a week or fewer, no). In addition, if they continue smoking, they were asked to report the number of cigarettes they consume on average daily.

Satisfaction with Life Scale (SWLS): SWLS has five items rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). High scores indicate higher life satisfaction (Diener et al., 1985). The Turkish version of the scale (Dağlı & Baysal, 2016) was used in this research. The reliability estimate for the SWLS was .81 in the present sample.

Scale of Positive and Negative Experience Scale (SPANE; Diener et al., 2010): SPANE has 12 items rated on a 5-point Likert scale (1 = very rarely/never to 5 = very often/always) and assesses the affective component of subjective well-being. SPANE has two subscales: negative (6-items) and positive (6-items) feelings. Participants were asked to indicate the frequency of positive and negative experiences they experienced in the past month. Scale scores indicate how intensively the participants experienced positive and negative emotions. The reliability estimates for the positive affect and negative affect were .89 and .80, respectively, in the present sample.

Statistical analyses

All statistical analyses were conducted using R (R Development Core Team, 2021) and Jamovi (The Jamovi Project, 2021) statistical software. The measures of interest were complete, with no missing data. Exploratory and confirmatory factor analyses (i.e., EFA and CFA, respectively) were conducted to examine the factor structure of the Turkish CFCS-14. Before conducting the analyses, the data (n = 589) was randomly split into two halves, and the EFA (n = 294) and CFA (n = 295) analyses were conducted on the random subsets of the full dataset. Thus, EFA and CFA were conducted on different samples of participants to eliminate capitalization on chance variance (Kline, 2005) and to cross-validate the results of the factorial structure of the CFCS-14. We employed a principal component analysis (PCA) with a direct oblimin rotation to examine the factor structure of the CFCS-14, similar to prior adaptation studies (Nigro et al., 2016; Vásquez et al., 2013). A parallel analysis was employed in deciding how many factors to retain (Horn, 1965). This method has been shown to predict the number of factors more accurately than eigenvalues greater than one rule of thumb (Fabrigar & Wegener, 2012).

The obtained factor structure was cross-validated on a different sample of participants via CFA. As the CFCS-14 items are rated on an ordinal scale and display non-normal distributions, a robust maximum likelihood estimation with robust standard errors (MLM; in 'lavaan', Rosseel, 2012) was utilized. Goodness-of-fit statistics were estimated and compared across various models. Model fit was evaluated by the frequently used conventions (Hu & Bentler, 1999), using Chi-square, the model chi-square to model df ratio ($\chi 2/df$), goodness-of-fit index (GFI), Tucker- Lewis index (TLI), comparative fit index (CFI), root-mean-square error of approximation (RMSEA) and its 90% confidence interval (90% CI), and standardized root mean square residual (SRMR). We computed the omega-hierarchical for the bi-factor model. Omega-hierarchical provides the proportion of the CFCS-14's total score variance uniquely explained by the general CFC factor (i.e., bi-factor) (McDonald, 1999). Thus, omega-hierarchical can be taken as an index of the contribution of the general factor in explaining the scale's total score (Rodriguez et al., 2016). A similar index is computed for the

subscales. It is called the omega-hierarchical-subscale, indicating the subscales' unique contribution to the scale's variance after controlling for the variance due to the general factor.

The remaining statistical analyses were conducted on the full dataset. Internal reliability was evaluated by examining Cronbach's alpha estimates, and the test-retest reliability was evaluated by examining the consistency of CFCS-14 scores on two occasions and assessed with an intra-class correlation coefficient (ICC1; Shrout & Fleiss 1979). Pearson correlation coefficients were used to assess first-order correlations among the measured variables, controlling for the type of motivation incentive (course credit versus money) (we thank Reviewer 1 for this suggestion). Time orientation differences between smoking and non-smoking participants were examined with Welch's t-test due to groups having unequal sample sizes. We used Welch's t-test to compare whether participants who received different incentives differed in the measured variables utilized in this study. Due to the number of t-tests conducted and the absence of an a priori hypothesis, a Bonferroni correction was applied, and the alpha was set to .0056 (i.e., .05/9).

Procedure

The ethics approval was received from Istanbul Bilgi University before data collection. An online questionnaire was prepared on the Qualtrics platform. The announcements for this research were made via posters, online student pages, and class announcements. The order of the scales was randomized for each participant. The survey took an average of 18 minutes to complete. Before completing the survey, participants were asked whether they would like to participate in a two-week follow-up of this research. Two weeks later, a questionnaire that only contained the Turkish CFCS-14 was sent to those who agreed to participate. All participants were informed about the procedures and expectations of the study via an informed consent form.

Results

Exploratory Factor Analysis

The parallel analysis indicated the presence of two factors. The Kaiser-Meyer-Olkin measure (KMO) of sampling adequacy was high, .842. Bartlett's test of sphericity was significant, $\chi 2$ (91) = 1129, $p < .001$. The determinant of the correlation matrix was 0.0197, above the recommended value of 0.00001. However, one of the scale items (#12) had a factor loading of .28, an average inter-item correlation of .10, and communality of .07. Because these indexes collectively indicate this is a problematic item (Field, 2005), item 12 was removed from the scale, and exploratory factor analysis (EFA) was re-conducted. There were no other problematic items in this final analysis including the 13 items. The PCA yielded two factors explaining 46.10 % of the variance, with the first factor (CFC-Future) and the second factor (CFC-Immediate) accounting for 24.1 % and 22.0 % of the variance, respectively. Table 1 shows the item-factor loadings of the Turkish CFCS-14. All item-factor loadings except item 2 (.39) were higher than .40. There were no cross-loadings (i.e., item loadings higher than .30 on two factors, and the difference between these loadings is less than .10). The two factors correlated moderately, $r = -.43$.

Table 1
Results of the Principal Component Analysis of the Turkish CFCS-14

Item	Factor Loading	
	1	2
Factor 1: Future		
CFC-1	**0.755**	-0.019
CFC-14	**0.734**	-0.098
CFC-8	**0.718**	0.014
CFC-13	**0.691**	-0.002
CFC-6	**0.641**	-0.078
CFC-7	**0.584**	-0.124
CFC-2	**0.390**	0.302
Factor 2: Immediate		
CFC-11	-0.036	**0.775**
CFC-9	0.008	**0.755**
CFC-10	-0.101	**0.743**
CFC-3	-0.055	**0.628**
CFC-5	-0.168	**0.559**
CFC-4	0.326	**0.540**

Note. $N = 294$. The extraction method is principal component analysis with a direct oblimin rotation. Factor loadings above .40 are printed in bold except for CFC-2 where loading is .39.

Confirmatory Factor Analysis

CFA model specifications were as follows. One factor model included all items loaded onto a single factor. Two uncorrelated factors model included the factor structure obtained from the first sample, and the factor correlation was fixed to 0. Two correlated factors model included the same factor specification as the two uncorrelated factors model with the addition that factors are allowed to covary. In the bi-factor model, all items were specified to load onto a general factor; the correlation between Immediate and Future factors was constrained to zero. The metric was set by setting the factor variances to one.

Table 2 presents the fit indices of the CFA models. One factor model and two uncorrelated factors models had GFI, TLI and CFI values lower than .90 and the RMSEA values over .07, indicating inadequate fit to the data. The two correlated factors model had acceptable model fit with GFI, TLI, and CFI values above .90 and the RMSEA value of .06. In this model, the factor correlation (Φ) was -.48. The bi-factor model demonstrated excellent fit to the data, as evidenced by CFI and TLI values above .95 and RMSEA and SRMR values lower than .05. These values indicate that the model fits the data well and is not overly complex.

Table 2
CFA Goodness-of-fit Indices for the Alternative Models of the Turkish CFC-14

	S-B $\chi 2$	*df*	GFI	TLI	CFI	RMSEA	[90% CI]	SRMR
One factor	262.56*	65	0.788	0.645	0.704	0.118	[.103 - .133]	0.105
Two uncorrelated factors	156.22*	65	0.910	0.849	0.874	0.077	[.062 - .092]	0.130
Two correlated factors	140.15*	64	0.925	0.909	0.925	0.060	[.042 - .077]	0.065
Bi-factor model	67.59	54	0.956	0.973	0.982	0.032	[.000 - .055]	0.044

Note. S-B $\chi 2$ = Satorra-Bentler scaled $\chi 2$ statistic; GFI = Goodness of Fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root-Mean-Square Error of Approximation; 90% CI = Confidence Interval; SRMR = Standardized Root-Mean-Square Residual. Robust estimates are provided for the GFI, TLI, CFI, and RMSEA indices.
* $p < .001$

Finally, we calculated omega-hierarchical (ω_h) to examine the relative contributions of the general factor and the individual factors (also see Appendix B specific findings regarding standardized factor loadings of the bi-factor model). Omega-hierarchical quantified the proportion of total score variance attributable to each level of the factor structure. The results showed that omega-hierarchical for the general factor was ω_h= .14, indicating that it explained a modest amount of variance in the CFCS total scores. In contrast, the CFC-Future had a substantially higher omega-hierarchical ($\omega_{h\text{-}ss}$ = .62), suggesting that it accounted for a significant portion of the total score variance. The CFC-Immediate had a lower omega-hierarchical ($\omega_{h\text{-}ss}$ = .09), indicating a smaller contribution to the overall variance. These findings support a two-dimensional interpretation of the Turkish CFCS-14, with the CFC-Future accounting for significantly more variability in CFCS total scores than the general factor and CFC-Immediate.

Reliability

Cronbach's alpha estimate was calculated on the full dataset (n = 589). The Cronbach's alpha coefficients for the CFC-Total scores, CFC-Future, and CFC-Immediate were .81, .76, and .77, respectively. These results indicate that the CFC subscales and total scores have good internal consistency. Test-retest reliability was estimated by intraclass-correlation coefficients (ICC) on 119 participants who filled out the CFCS-14 scale twice over a two-week interval. ICC was .75 [95% *CI* = 0.65 – 0.82] for the CFC-Future, .65 [95% *CI* = 0.54 – 0.75] for the CFC-Immediate, and .77 [95% *CI* = 0.68 – 0.83] for the CFC-Total scores. These values indicate that the Turkish CFCS-14 scale is a reliable measure of time orientation.

Convergent and Discriminant Validity

ZTPI-Future scores were positively correlated with CFC-Total scores (r = .62, $p < .001$) and CFC-Future scores (r = .57, $p < .001$) and negatively correlated with CFC-Immediate scores (r = -.45, $p < .001$). In contrast, ZTPI-Present Fatalistic scores were negatively correlated with CFC-Total scores (r = -.39, $p < .001$) and CFC-Future scores (r = -.24, $p < .001$) and positively correlated with CFC-Immediate scores (r = .41, $p < .001$). ZTPI-Future scores and ZTPI-Present Fatalistic scores were

negatively correlated (r = -.31, p < .001). As expected, CFCS-14 factors correlated reliably with factors from another scale that measured similar temporal constructs.

Table 3 presents the bivariate correlations and descriptives of the Turkish CFCS-14 factors and other measured variables. The correlations were computed separately for each motivation incentive (money vs. extra credit) to control the differences in these incentives. While many correlations remained consistent in direction and magnitude, some differences were noted between the two incentives. Specifically, the correlations between ARS and the two CFCS-14 factors and CFC-Total scores were significant for participants motivated by the course credit, but failed to reach statistical significance for those motivated by monetary rewards. Accordingly, ARS scores were positively correlated with CFC-Total and CFC-Future scores but negatively correlated with CFC-Immediate scores. Sensation-seeking scores were negatively correlated with CFC-Total and CFC-Future scores but positively correlated with CFC-Immediate scores. These associations were slightly stronger for the participants motivated by extra credit rather than monetary rewards. A similar correlation pattern was observed for the association between AUDIT scores and CFC scores, except that the positive correlation between AUDIT and CFC-Immediate was stronger among participants receiving monetary rewards. SWL scores were positively correlated with CFC-Total and CFC-Future scores but only among those motivated by monetary reward. The correlation between SWL and CFC scores did not reach statistical significance for individuals motivated by course credit. The associations of CFC scores with positive and negative affect scores were weak and did not reach statistical significance. An exception to this trend was the weak positive association between CFC-Future and positive affect scores, observed among participants receiving monetary rewards. However, this association did not achieve statistical significance for participants motivated by extra credit.

Table 3
Descriptive Statistics and Correlations of the Variables

	1	2	3	4	5	6	7	8	9
1. CFC-Total Score	-	.82***	-.82***	.08	-.15**	-.21***	.04	.02	.14**
2. CFC-Future	.87***	-	-.35***	.08	-.07	-.18**	.10*	.01	.18***
3. CFC-Immediate	-.84***	-.46***	-	-.05	.18***	.17**	.04	-.02	-.04
4. ARS	.21**	.14*	-.23***	-	-.03	-.23***	.27***	-.12*	.16**
5. SS	-.24***	-.21**	.21**	-.06	-	.15*	.08	.02	-.12*
6. AUDIT	-.27***	-.25***	.21**	-.04	.31***	-	-.20***	.21***	-.09
7. PA	.07	.09	-.02	.09	.05	-.03	-	-.52***	.48***
8. NA	-.04	-.01	.06	-.10	.03	.13	-.70***	-	-.40***
9. SWL	.10	.09	-.08	.16*	-.09	-.05	.55***	-.43***	-
Mean	4.66	4.62	3.29	4.14	3.29	16.34	19.81	16.09	16.07
SD	.87	.98	1.13	.52	.67	4.05	4.84	4.89	3.97

Note. N = 491 for AUDIT, for all other variables n = 614. Lower diagonal presents data for participants who received course credit and upper diagonal presents data for those who received monetary reward. CFC = consideration of future consequences, ARS = autonomous-related self, SS = sensation-seeking, AUDIT = alcohol use disorders identification test, SWL = satisfaction with life, PA = positive affect, NA = negative affect.
* p < .05, ** p < .01, *** p < .001

A series of Welch's t-tests showed that participants who had smoked more than 100 cigarettes in their life (smokers) compared to participants who had not smoked more than 100 cigarettes in their life (non-smokers) did not statistically differ in any of the CFC scores. However, among smokers, participants' daily average cigarette consumption estimates were positively correlated with CFC-Immediate scores (r = .14, p = .009, n = 335), but no reliable association was found with CFC-Future

scores (r = -.02, p = .67) and CFC-Total scores (r = -.09, p = .09). These results suggest that daily average cigarette consumption among smokers is related to only CFC-Immediate. Finally, Welch's t-tests showed that smokers and non-smokers did not significantly differ in the other measured variables.

Based on the previously reported t-test results, there were no significant differences in CFC scores among smokers and non-smokers. However, given that we observed the influence of incentive type on correlations, we sought to account for its impact on the association between smoking and CFC. To achieve this, we conducted a 2x2 between-subjects ANOVA, using smoking status (smoker vs. non-smoker) and incentive type (course credit vs. money) as factors. We then examined their effects on CFC-Future, CFC-Immediate, and CFC-Total scores. None of the three 2x2 factorial ANOVAs performed yielded statistically significant main effects. However, a significant interaction between smoking status and incentive type emerged when analyzing CFC-Total scores. Smokers (M = 4.83, SD = .80) exhibited higher CFC-Total scores than non-smokers (M = 4.63, SD = .89) when motivated by monetary rewards. Conversely, under the course credit incentive, smokers (M = 4.53, SD = .91) displayed lower CFC-Total scores compared to non-smokers (M = 4.65, SD = .87), $F(1,573)$ = 4.59, MSe =.76, p = .03, n_p = .01.

Discussion

This study aimed to assess the psychometric properties of a Turkish version of the CFCS-14 and explore its correlations with health and well-being measures. Prior adaptation studies primarily focused on the CFCS-14's psychometric properties without delving into the specific connections between time orientation and health behaviors, personality, or well-being in cross-cultural contexts. Addressing this gap, we conducted a study with a non-Western sample to examine how cultural contexts influence time orientation and its relation to health behaviors. Findings showed that the factor structure of the Turkish CFCS-14 and its associations with health behaviors were consistent with prior research conducted on Western samples (McKay, Cole, & Percy, 2015; Nigro et al., 2016; Joireman & King, 2016). In summary, our findings confirm that the 13-item Turkish CFCS-14 is a reliable and valid instrument for assessing time orientation in university students.

Results of EFA revealed issues with one scale item, stemming from poor item-factor loading, communality, and inter-item correlations. After removing this item, we assessed the factor structure using the 13 items via CFA. The unidimensional and two uncorrelated factors models did not fit the data adequately. In contrast, the two-correlated factors model demonstrated an acceptable fit, while the bi-factor model showed excellent model fit. To estimate the shared variance by the general factor and specific factors (CFC-Future and CFC-Immediate), we computed omega hierarchical, controlling for the general factor. Our results indicated that the CFC-Future factor explained the highest variance, with the general factor accounting for slightly more variance than CFC-Immediate. These results contrast with earlier findings from a British sample (McKay, Cole, & Percy, 2005) where the general factor explained more variance than the specific factors. Discrepancies between our results and McKay et al.'s (2005) results may be attributed to differences in bi-factor model specifications, methodological variations, such as sampling strategies and motivational incentives, or potential cultural differences. Future research should explore these factors further to understand their impact on the CFCS-14's factor structure. In addition, a recent study demonstrated that a two-correlated-factors model produced excellent model fit for shorter versions of the CFCS-14 (i.e., CFC-4 and CFC-6), but

the original 14-item version resulted in inadequate model fit (Chng et al., 2022). These results suggest that the original version of the scale may be better captured by a bi-factor model, which includes a general factor in addition to the two specific factors. However, there may be no need for a general factor in shorter versions of the CFC scale, as the items that heavily load on the general factor are likely to be removed from the scale.

To sum up, our findings support that the CFC-Future and CFC-Immediate factors are not measurement artifacts. The Turkish CFCS-14 is best conceptualized as a two-dimensional scale, at least when applied to a Turkish sample and under specific motivational incentives (e.g., course credit, money, etc.). Researchers are advised to weigh the suitability of employing the general factor or specific factors based on the specific objectives of their research, keeping in mind that general factor do not have a significantly more contribution to total score variance than the individual factors combined. Future research should focus on identifying the antecedent conditions that differentially affect the two CFC factors and also test the plausibility of brief versions of the scale in different cross-cultural contexts (see Chng et al., 2022).

Our reliability findings indicate that CFC-Total, CFC-Future, and CFC-Immediate scores display strong internal consistency. Test-retest reliability results over two weeks suggest the Turkish CFCS-14 scale is a reliable measure of time orientation, with the limitation of fair test-retest reliability for CFC-Immediate. This may be due to the changing demands of university life, which could impact construct stability. Future studies should further explore this issue. Additionally, our findings demonstrate convergent validity for the Turkish CFCS-14. CFC-Future scores positively correlate with ZTPI-Future scores, while CFC-Immediate scores positively correlate with ZTPI-Present Hedonistic scores, consistent with previous studies (Camus et al., 2014; Nigro et al., 2016).

Correlations between psychological measures and CFC scores were examined controlling for different motivation incentives (money vs. extra credit). Overall, the correlations remained consistent in direction and magnitude across both incentives. Since we did not hypothesize the effect of incentive type on these correlations, caution is necessary when interpreting these findings, as they are exploratory and warrant replication. Despite generally small effect sizes, the large sample size indicates that many correlations are robust with p-values below .001, suggesting non-zero true effect sizes (Cumming, 2008). Sensation-seeking and problematic alcohol use scores were positively associated with present orientation and negatively associated with future orientation, replicating previous findings in Western samples (Joireman & King, 2016). These results underscore the potential importance of emphasizing future orientation in reducing behaviors that pose long-term health risks. Sensation-seeking is linked to immediate reinforcement and constitutes a risk factor for adolescent alcohol use (Sznitman & Engel-Yeger, 2017). Given its association with various risky behaviors, future research should explore how sensation-seeking and CFC interact in predicting risk-taking and health behaviors.

Among smokers, a notable association was observed between immediate orientation and the average number of cigarettes smoked per day. Surprisingly, smokers and non-smokers did not significantly differ in any CFC scores. However, this association (i.e., smoking and CFC) was influenced by incentive type. Smokers motivated by monetary rewards displayed higher CFC-Total scores than non-smokers, whereas those motivated by course credit displayed lower CFC-Total scores than non-smokers. These findings highlight the complex interaction between motivation and time

orientation in predicting health outcomes, emphasizing the importance of carefully considering motivational incentives in health research, particularly when utilizing university samples.

A unique finding of this study is the positive association between ARS and future orientation and the negative association of ARS with immediate orientation, though these findings were qualified by the incentive type. ARS is a type of self-construal that develops through parent-child interactions supporting autonomy and emotional connection to family (Kagitcibasi, 1996). Based on the current data, CFC is related to the perception of the nature of familial interaction patterns, as measured by ARS. Evidence suggests that mother-child attachment quality relates to delayed gratification (Jacobsen et al., 1997), which may underlie considerations of future consequences. Future research could explore the role of familial interaction patterns as potential antecedent of CFC. Although ARS is a measure specifically developed in Turkey, similar measures such as the Basic Psychological Needs Scale (BPNS; Deci & Ryan, 2000) that tap into related constructs could be utilized in future studies. The BPNS assesses individuals' perceptions of their basic psychological needs for autonomy, competence, and relatedness, which are essential for psychological well-being and may play a foundational role in the capacity for CFC.

While our study enhances understanding of the temporal mechanisms underlying health behaviors, it has limitations. The use of a convenience sample of university students may limit generalizability. Additionally, the cross-sectional design prevents establishing causal relationships. Future research involving more diverse samples and longitudinal designs can provide more generalizable results.

Our research contributes to the cross-cultural validity of the CFCS-14 and offers valuable insights into time orientation and its implications for health behaviors, personality, and well-being. We confirmed the two-factor structure of the Turkish CFCS-14 and established its associations with various health-related measures. Understanding the complex interplay between time orientation, health, and motivation is crucial for developing effective interventions and promoting well-being across different cultures and contexts. In conclusion, the present results underscore the need to consider CFC within a broader context that encompasses motivations underlying behaviors. Future research into the association between motivation and time orientation is a promising avenue of investigation.

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Appendix A: Gelecekteki Sonuçların Dikkate Alınması Ölçeği -14 (GSDÖ-14)

1. İşlerin gelecekte nasıl olabileceğini dikkate alırım ve günlük davranışlarımla bunları etkilemeye çalışırım. (G)
2. Uzun yıllar netice vermeyebilecek sonuçlara ulaşmak için sıklıkla belirli bir davranışta bulunurum. (G)
3. Geleceğin kendi başının çaresine bakacağını düşünerek yalnızca anlık endişeleri gidermek için eyleme geçerim. (G)
4. Davranışım yalnızca eylemlerimin anlık (örneğin, birkaç günlük ya da haftalık) sonuçlarından etkilenir. (A)
5. Benim rahatlığım, verdiğim kararlarda ya da aldığım eylemlerde büyük bir faktördür.(A)
6. Gelecekteki sonuçlara ulaşmak için anlık mutluluğumu ya da esenliğimi feda etmeye istekliyimdir. (G)
7. Olumsuz sonuç uzun yıllar ortaya çıkmayacak olsa da olumsuz sonuçlarla ilgili uyarıları ciddiye almanın önemli olduğunu düşünürüm. (G)
8. Daha sonra sonuç alınan önemli bir davranış sergilemenin şimdi sonuç alınan daha az önemli bir davranış sergilemekten daha önemli olduğunu düşünürüm. (G)
9. Gelecekteki sorunlar hakkındaki uyarıları genellikle görmezden gelirim çünkü sorunlar kriz düzeyine ulaşmadan önce çözüleceklerini düşünürüm. (A)
10. Gelecekteki sonuçlarla daha ilerideki bir zamanda uğraşılabileceği için şimdi fedakârlık yapmanın gereksiz olduğunu düşünürüm. (A)
11. Gelecekteki sorunlarla daha ilerideki bir vakitte ilgileneceğimi düşünerek sadece anlık kaygılarımı gidermek için eyleme geçerim. (A)
12. Günden güne çalışmamın belirli sonuçları olduğundan bu, benim için uzak sonuçları olan davranıştan daha önemlidir. (A)
13. Bir karar verirken bunun beni gelecekte nasıl etkileyebileceği hakkında düşünürüm.(G)
14. Davranışım genellikle gelecekteki sonuçlardan etkilenir.(G)

Not. G = GSDÖ-Gelecek alt-ölçek maddesi. A = GSDÖ-Anlık alt-ölçek maddesi.

Ölçek yönergesi: “Sunulan her bir ifade için lütfen ifadenin sizin için geçerli olup olmadığını belirtin. Eğer ifade sizin için son derece geçersizse (size hiç benzemiyorsa) lütfen ifadenin sağ tarafında sizin için bırakılan boşluğa "1" yazın; eğer ifade sizin için tamamen geçerliyse (size oldukça benziyorsa) lütfen sizin için bırakılan boşluğa "7” yazın. Elbette, uç noktaların arasına düşüyorsanız da aradaki sayıları kullanın.”

Appendix B: Bi-Factor Model of the Turkish CFCS-14

Table

Standardized (B) and Unstandardized (B) Factor Loadings and Standard Errors for the CFC General Factor and Two Specific Factors of the CFCS-14 in the Bi-Factor Model

General Factor				CFC-Future			CFC-Immediate		
Item	*β*	*B*	SE	*β*	*B*	SE	*β*	*B*	SE
1	.31	.47	.10	**.65**	.94	.09			
2	-.03[1]	-.05	.11	**.43**	.67	.11			
3	**-.56**	-.91	.15				**.61**	.90	.13
4	**-.50**	-.77	.10				.39	.60	.16
5	**-.30**	-.54	.11				.15[1]	.26	.14
6	.36	.63	.11	**.41**	.72	.11			
7	**.37**	.57	.10	**.36**	.55	.12			
8	.21*	.32	.10	**.54**	.81	.09			
9	**-.55**	-.92	.10				.11[1]	.19	.17
10	**-.88**	-1.35	.10				-.21[1]	-.32	.19
11	**-.73**	-1.24	.10				.15[1]	.26	.19
13	.35	.47	.09	**.58**	.79	.09			
14	.26	.39	.10	**.63**	.93	.08			

Note. All factor loadings are statistically significant at the $p < .001$ level except * $p < .01$ and 1 non-significant. Items in bold have the highest loading in a given factor except for item 7, where there is a tie.