


Validation of the Career Adapt-Abilities Scale–Short Form across different age groups in the Turkish context

Erkan Işık¹  · Firuzan YeğİN² · Sıddıka Koyuncu² · Ayşe Eser² · Fatma Çömlökcİler² · Kübra Yıldırım²

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Abstract A short 12-item version of the Career Adapt-Abilities Scale–Short Form (CAAS-SF) was validated across three different age groups in the Turkish context. Scale scores demonstrated adequate to high internal consistency and 4-week test–retest reliability, good fit with the original four-factor model, factorial invariance across gender and age groups, strong convergence with the 24-item version, negative associations with trait anxiety and work stress, and positive associations with career decision self-efficacy. It was concluded that the Turkish version of the CAAS-SF appears to be a valid and reliable measure for assessing career adaptability and using it in career education and counseling process.

Résumé. Validation de la version courte de l'échelle de l'adaptabilité de carrière à travers différents groupes d'âge dans un contexte turc. Une version courte à 12 items de l'échelle de l'adaptabilité de carrière (CAAS-SF) a été validée à travers trois groupes d'âge différents dans un contexte turc. Les scores à l'échelle ont montré une consistance interne adéquate à élevée et une fiabilité test–retest de 4 semaines, un bon fit avec le modèle original à quatre facteurs, une invariance factorielle à travers le genre et les groupes d'âge, une forte convergence avec la version à 24 items, une association négative avec l'anxiété et le stress au travail, et une association positive avec le sentiment d'auto-efficacité aux décisions de carrière. Il a été conclut que la version turque du CAAS-SF semble être une mesure valide et fiable pour évaluer l'adaptabilité de carrière et l'utiliser dans le cadre de la formation et de l'orientation professionnelle.

✉ Erkan Işık
eisik@ciu.edu.tr; erkanthelight@gmail.com

¹ Department of Psychological Counseling and Guidance, Faculty of Education, Cyprus International University, Nicossia, 99258 Mersin 10, Turkey

² Department of Psychological Counseling and Guidance, Graduate School of Educational Sciences, Necmettin Erbakan University, Konya, Turkey

Zusammenfassung. Validierung der Kurzform der Laufbahn-Adaptabilitäts-Skala anhand verschiedener Altersgruppen im Türkischen Kontext. Die 12-Item Kurzform der Laufbahn-Adaptabilitäts-Skala wurde anhand dreier unterschiedlicher Altersgruppen im Türkischen Kontext validiert. Die Skalenwerte zeigten eine mittlere bis hohe interne Konsistenz und 4-Wochen Test–Retest Reliabilität, eine gute Übereinstimmung mit dem original Vier-Faktoren-Modell, Faktorinvarianzen zwischen Geschlecht und Altersgruppen, hohe Konvergenz mit der 24-Item Version, negative Korrelationen mit Ängstlichkeit und arbeitsbezogenem Stress, sowie positive Korrelationen mit berufsbezogener Selbstwirksamkeit. Es wird geschlussfolgert, dass die Türkische Version der CAAS-SF ein valides und reliables Messinstrument für die Erfassung von Laufbahn-Adaptabilität darstellt und somit für die Praxis der Laufbahnberatung geeignet ist.

Resumen. Validación de la escala reducida de habilidades de adaptación de la carrera en diferentes grupos de edad en el contexto turco. Una versión reducida de la escala de habilidades de adaptación de la carrera (CAAS-SF) se validó en tres grupos de edad distintos en el contexto turco. Las puntuaciones de las escalas mostraron una alta consistencia interna y una alta fiabilidad test–retest a 4 semanas, un buen ajuste con el modelo de cuatro factores, una invariancia factorial en los grupos de edad y en el género, una fuerte convergencia con la versión de 24 ítems, asociaciones negativas con rasgos de ansiedad y estrés laboral y asociaciones positivas con la autoeficacia en las decisiones de carrera. Se concluyó que la versión turca del CAAS-SF, se muestra como una medida válida y fiable para evaluar la adaptabilidad de carrera y para su utilización en la educación para la carrera y la orientación.

Keywords Career adaptability · Short form · Turkish validation

Introduction

The Career Adapt-Abilities Scale (CAAS; Savickas & Porfeli, 2012) is the most frequently used instrument to assess career adaptability (McIlveen, Perera, Hoare, & McLennan, 2016). The CAAS has been translated and validated in many languages (e.g., Chinese, Dutch, French, Italian, and Portuguese) and has proven to demonstrate an excellent reliability and a stable factor structure across countries (Savickas & Porfeli, 2012). Recently, Maggiori, Rossier, and Savickas (2017) have developed an economical and pertinent alternative to the CAAS in order to use it practically in large surveys along with other instruments and evaluative or organizational studies with time constraints. The Career Adapt-Abilities Scale–Short Form (CAAS-SF) is composed of 12 items selected from the original CAAS with highest factor loading on each of four dimensions of career adaptability, namely concern, control, curiosity, and confidence. Even though the length of the instrument was decreased by 50%, the CAAS-SF demonstrated the same factor structure and very similar psychometric properties to those of the well-established

full version (Maggiori et al., 2017). However, further validation studies are needed to test the stability of the multidimensional hierarchical factor structure and other psychometric characteristics of the CAAS-SF in different regions for its generalizability (Maggiori et al., 2017). Furthermore, studying career adaptability in different cultures and countries is important as “countries vary in the degree to which they prompt the formation of adaptability because they provide different opportunities and imperatives to develop and express psychosocial resources and transactional competencies” (Savickas & Porfeli, 2012, p.663).

The Turkish context

As a developing country with the highest young population rate in Europe (Eurostat, 2016), unemployment among young people has been one of the most important challenges in Turkey. According to recent statistics (TSI, 2017), unemployment rate between the ages of 15 and 24 years was 22.6%, with a 3.5% point increase compared with the same period of the previous year. As a result of rapid growth in population and high unemployment rates, new employment opportunities cannot meet the job demand in the labor market.

Another issue that limits employment opportunities in Turkey is the rapid economic change. Despite being one of the most rapidly developing economies in the world and among of the six biggest economies of Europe (Topkaya, 2012), Turkey has experienced many economic crises to date. In the February 2001 economic crisis, for example, nearly 1500 companies reported to be out of business and 42,000 employees lost their jobs during the first months of the crisis. By August 2002, the number increased to 600,000 companies and 2.3 million employees (Şenses, 2003). A similar situation occurred during the 2008–2009 global financial crisis, and nearly half a million people lost their jobs within a 5-month period (Aytaç, Rankin, & İbikoğlu, 2015).

In that unstable and unpredictable work environment, job insecurity and instability became one of the most threatening problems for many youths in school-to-work transition preparing to enter the workforce and individual workers for the future existence of their jobs in Turkey (Tangian, 2007). To handle these rapidly changing and unpredictable market conditions, especially young people entering workforce and employees in transition in Turkey need to develop their adaptability skills. More specifically, they need to look forward and be prepared for future work demands and become responsible for shaping their life and career paths to meet the future challenges. Simultaneously, they need to explore themselves and their available career opportunities, and pursue career aspirations and expectation of success even when confronted with barriers or failure.

Career adaptability

The concept of career adaptability, derived from Super’s theory of life-span life-space, is the core of career construction theory. Career construction theory uses a contextualist framework, which views career development as an adaptation process rather than maturation of inner structures. It thereby prefers using the term career

adaptability instead of career maturity as adaptation is a more comprehensive explanation of development in children, adolescents, and adults (Savickas, 1997, 2005). Savickas (1997) described career adaptability as “the readiness to cope with the predictable tasks of preparing for and participating in the work role and with the unpredictable adjustments prompted by changes in work and working conditions” (p. 254).

As a multidimensional construct, career adaptability has four underlying components, namely concern, control, curiosity, and confidence (Savickas & Porfeli, 2012). Also known as the 4Cs, these four career adaptability resources constitute the higher order general career adaptability dimension, which reflects self-regulation strategies for adjusting to career developmental tasks, work transitions and traumas (Savickas, 2005). *Concern* is the principle dimension of career adaptability because becoming concerned about the future is a prerequisite for becoming aware of the vocational tasks to be carried out and planning for the near future. It involves a future orientation and a positive and optimistic future time perspective. *Control* is the second most important dimension that it emphasizes the importance of taking responsibility for constructing and shaping one’s vocational future. People may consult significant others in making career choices but they own their own future and thereby should construct it themselves. *Curiosity* includes active exploration of possible selves and future scenarios enabling individuals to know more about their abilities, interests, values, and personalities, as well as about the specific characteristics and requirements to fulfill a job. *Confidence* refers to the self-efficacy needed to actualize one’s own career aspirations, choices, and goals even when confronted with restrictions, challenges, and barriers (Savickas, 2005; Savickas et al., 2009; Savickas & Porfeli, 2012).

To date, the four-factor hierarchical model (with adaptability resources of concern, control, curiosity, and confidence loading on to an overall adaptability factor) was tested in 24 Western and non-Western countries including Australia (Tolentino, Garcia, Lu, Restubog, Bordia, & Plewa, 2014), Iceland (Vilhjálmsdóttir, Kjartansdóttir, Smáradóttir, & Einarsdóttir, 2012), Iran (McKenna, Zacher, Ardabili, & Mohebbi, 2016), Lithuania (Urbanaviciute, Kairys, Pociute, & Liniauskaite, 2014), Macau (Tien, Lin, Hsieh, & Jin, 2014), Nigeria (Olugbade, 2016), Papua New Guinea (de Guzman & Choi, 2013), and the Philippines (Tolentino, Garcia, Lu, Restubog, Bordia, & Tang, 2013). These international studies have found evidence for the metric invariance of the 24-item CAAS across different countries (Savickas & Porfeli, 2012). Yet, there has been very little research examining configural, metric, and scalar invariance of the 24-item CAAS by demographic variables, and, as a newly developed measure, only one study for the 12-item CAAS-SF. Tien et al. (2014) tested the configural and metric invariance of the CAAS in different age groups and found that the four-factor structure was invariant across middle and senior high school students. Using a multiple indicators and multiple causes model, Urbanaviciute et al. (2014) found support for scalar invariance of the CAAS across different sub-groups referring to age, gender, and respondents’ place of residence. In a sample of Italian preadolescents, Di Maggio and colleagues (Di Maggio, Ginevra, Laura, Ferrari, & Soresi, 2015) concluded that configural, metric, and scalar invariance was supported for both boys and girls.

Lastly, McIlveen et al. (2016) tested the full measurement invariance of CAAS scores in divergent social occupations (i.e., retail workers and mothers transitioning from full-time, unpaid care work to paid work) and obtained evidence for the full measurement invariance across three samples. Measurement invariance of the 12-item CAAS-SF was tested by Maggiori et al. (2017) across French and German speaking participants and women and men. Their findings confirmed configural, metric, and scalar invariance across both gender and two languages and they recommended to further test the measurement equivalence of the 12-item version with respect to other demographic variables such as employment status. Responding to this call, we examined measurement equivalence of the CAAS-SF across gender and three different age groups including student and employee samples, which we believe will contribute to the international literature on career adaptability assessment.

Recent studies have documented that career adaptability skills are associated with many career adaptation outcomes across different age groups. In adolescent populations, for example, higher career adaptability skills were related to greater life satisfaction (Hirschi, 2009; Santilli, Marcionetti, Rochat, Rossier, & Nota, 2017), quality of life (Soresi, Nota, & Ferrari, 2012; Wilkins, Santilli, Ferrari, Nota, Tracey, & Soresi, 2014), vocational identity (Negru-Subtirica, Pop, & Crocetti, 2015; Porfeli & Savickas, 2012), school connectedness (Yuen & Yau, 2015), and academic achievement (Negru-Subtirica & Pop, 2016), and to a lesser extent anxiety (Pouyaud, Vignoli, Dosnon, & Lallemand, 2012). Likewise, higher career adaptability skills among undergraduate students were associated with more academic satisfaction (Duffy, Douglass, & Autin, 2015), academic engagement (Merino-Tejedor, Hontangas, & Boada-Grau, 2016), career engagement (Nilforooshan & Salimi, 2016), career decision self-efficacy (Douglass & Duffy, 2015; Duffy et al., 2015; Hirschi, Herrmann, & Keller, 2015), and sense of calling (Buyukgoze-Kavas, Duffy, & Douglass, 2015; Douglass & Duffy, 2015; Guo et al., 2014). With working populations, employees with higher career adapt abilities demonstrated greater life satisfaction (Celen-Demirtas, Konstam, & Tomek, 2015; Konstam, Celen-Demirtas, Tomek, & Sweeney, 2015), career/job satisfaction (Chan & Mai, 2015; Chan, Mai, Kuok, & Kong, 2016; Fiori, Bollmann, & Rossier, 2015; Maggiori, Johnston, Krings, Massoudi, & Rossier, 2013; McKenna et al., 2016; Zacher, 2014a, b, 2015), work engagement (Rossier, Zecca, Stauffer, Maggiori, & Dauwalder, 2012) and lower levels of work stress (Fiori et al., 2015; Johnston, Luciano, Maggiori, Ruch, & Rossier, 2013) and job/career insecurity (Spurk, Kauffeld, Meinecke, & Ebner, 2016). In the current study, following these findings, we proposed that career adaptability would be negatively related to anxiety among high school students and to work stress among working adults, and positively to career decision self-efficacy among undergraduate students using the CAAS-SF.

Aims of the current study

As an economical and pertinent alternative to the CAAS, the abbreviated version (CAAS-SF), which demonstrated very similar psychometric properties to those of the well-established full version needs further validation in other regions and

specific populations (Maggiori et al., 2017). In response to this call and the need to study career adaptability in different cultures and countries (Creed & Hood, 2015; Rottinghaus et al., 2017; Savickas & Porfeli, 2012), the aims of the current study were to examine (a) the psychometric properties of the CAAS-SF in a Turkish sample of high school students, undergraduate students, and working adults, (b) the convergence of the CAAS-SF with the full form and relations to anxiety, career decision self-efficacy, and work stress, and (c) measurement equivalence of the CAAS-SF across gender and age groups.

Method

Participants and procedures

The data were collected among three independent groups, namely high school students, undergraduate students, and working adults. The first sample consisted of 705 high school students from 9th, 10th, 11th, and 12th grade with a mean age of 16.02 years ($SD = 1.26$). Of the high school sample, 41% were male and 59% were female. The second sample comprised 327 undergraduate students including 131 freshmen (40.1%), 88 sophomores (26.9%), 83 juniors (25.4%), and 21 seniors (6.4%). There were 91 male students (27.8%) and 233 female students (71.3%; three gender unspecified) and their ages ranged from 18 to 25 years old ($M = 20.8$, $SD = 1.71$). The third sample included 247 working adults aged between 22 and 62 years ($M = 29.16$, $SD = 6.93$) with 36.8% male and 63.2% female. The majority of this sample held a bachelor's degree (79.4%) or a master's degree (15%), with fewer doctorate degrees (3.2%) and high school diplomas (2.4%).

For the high school and undergraduate sample, data were collected in class during school hours by a member of the research team under the supervision of a teacher/professor. After listening to a description of the study, students were provided packets of research instruments and written/verbal consent instructions including the information that their responses would be kept anonymous and only group data would be reported. The participants were recruited randomly from two representative public high schools and from counseling psychology classes of two universities located in Konya, in central Turkey. The response rate was 93.9% (358/336) in the undergraduate sample and 94.5% (758/716) in the high school sample, with 327 and 705 providing sufficiently complete data, respectively.

For the working adult sample, a convenience sample of employed individuals were contacted personally and via several institutional research platforms, social and professional networks (e.g., Facebook and LinkedIn) by means of personal e-mail invitations. Online format was e-mailed and paper pencil format was administrated face to face with volunteer participants. The response rate was 12.3% for the e-mails and 94.2% for the paper surveys. Respondents were from diverse occupational backgrounds (e.g., teacher, engineer, psychologist, nurse, health employee and university employee). All participants were orally and/or in writing assured of the confidentiality of their participation and no incentives were offered.

Measures

Career adaptabilities

The Turkish translation of the CAAS (Buyukgoze-Kavas, 2014) contains 24 items as in the CAAS-International Form 2.0 (Savickas & Porfeli, 2012). Ratings are made on a five-point scale from 1 = *not strong* to 5 = *strongest*. The Turkish version demonstrated the same four-factor structure representing concern (e.g. “Preparing for the future”), control (e.g. “Making decisions by myself”), curiosity (e.g. “Investigating options before making a choice”), and confidence (e.g. “Learning new skills”) subscales. Each subscale contains six items and the combined 24-item is used to assess the overall career adaptability, with higher scores reflecting greater adaptability. The Turkish version showed good internal reliability with scores ranging from .74 to .91 and concurrent validity was supported by positive correlation with hope and optimism (Buyukgoze-Kavas, 2014). The short form of CAAS (Maggiori et al., 2017) was developed by selecting three items with highest factor loading on each subscale from the CAAS 24-item version. Confirmatory factor analysis with these selected 12 items supported the same four-factor structure as used in the long form. The CAAS-SF demonstrated good internal reliability, convergent validity, and an almost perfect correlation with the 24-item version.

Trait anxiety

The Trait Anxiety Inventory (TAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was used to assess trait anxiety in the high school sample. Participants rate their general anxiety levels along with a four-point scale from 1 = *almost never* to 4 = *almost always*, with higher scores indicating greater anxiety. Sample items include “I have trouble making up my mind” and “I worry too much.” The TAI yielded a very satisfactory internal consistency and test–retest reliability. The Turkish version of the TAI (Öner & LeCompte, 1985) showed satisfactory psychometric properties as in the original one. The Cronbach’s alpha coefficient of the TAI in this sample was .79.

Work stress

Work stress in the working adult sample was measured using House and Rizzo’s (1972) 7-item Job-Induced Tension Scale (JITS). The JITS assess respondents’ work based perceptions of pressures and frustrations using a five-point scale from 1 = *strongly disagree* to 5 = *strongly agree*. Sample items include “My job tends to directly affect my health” and “I work under a great deal of tension” The scale had a reliability estimate of .84. The Turkish version of the JITS (Efeoğlu, 2006) demonstrated similar psychometric properties with the original scale. The Cronbach’s alpha coefficient of the JITS in this sample was .84.

Career decision self-efficacy

The Career Decision Self-Efficacy Scale–Short Form (CDSE-SF; Betz, Klein, & Taylor, 1996) was used to measure the confidence levels of undergraduate sample in five career decision tasks (e.g., engaging in accurate self-appraisal, gathering occupational information, engaging in goal selection, planning for the future, and engaging in problem solving). Sample items include “Prepare a good resume” and “Accurately assess your abilities.” Responses are made on a five-point scale from 1 = *no confidence at all* to 5 = *complete confidence*, with higher scores indicating greater career-related self-efficacy. The Turkish version of the CDSE-SF (Işık, 2012) yielded high internal consistency, temporal stability, and convergent validity with career maturity. The Cronbach’s alpha coefficient of the CAAS-SF in this sample was .87.

Analyses

All preliminary analyses, descriptive statistics, correlations, and Cronbach’s alpha reliability estimates were conducted with SPSS version 22. All confirmatory factorial analyses were done with AMOS version 22 (Arbuckle, 2013). Skewness and kurtosis values were well-below the recommended threshold (Kline, 2016) ranging from -0.92 to -0.19 and -0.84 to 0.41 across samples, respectively. No outliers were detected using Mahalanobis distance and missing data were handled with Expectation Maximization algorithm as Little’s missing completely at random (MCAR) test was nonsignificant ($p > .05$), suggesting that the data were missing at random.

Results

Descriptive statistics

Item means and standard deviations by subsamples for the Turkish version of the 12-item CAAS-SF are given in Table 1. As seen, the typical response was in the range of strong to very strong for all samples. Scale means, standard deviations, and correlations are reported in Table 2. The typical response was again in the range of strong to very strong for four subscales and the total career adaptability scale. Correlations among the four adaptability scales were all significant ($p < .001$) across three samples ranging from .42 to .71. Furthermore, the four subscales correlated from .77 to .89 to the adaptability total score and were all significant for each three samples ($p < .001$).

Confirmatory factor analysis

To check the stability of the theoretical hierarchical structure of the four-factor CAAS-SF (Maggiori et al., 2017), a second-order confirmatory factor analysis (CFA) with ML estimation was conducted. The results of second-order CFA showed

Table 1 CAAS-SF: item means and standard deviations (by subsamples)

Construct	Item	High school students (<i>n</i> = 650)		Undergraduate students (<i>n</i> = 327)		Working adults (<i>n</i> = 247)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Concern	1. Thinking about what my future will be like	3.71	1.12	3.88	0.96	3.74	0.82
	2. Preparing for the future	3.46	1.12	3.83	0.97	3.65	0.89
	3. Becoming aware of the educational and career choices that I must make	3.71	1.09	3.96	0.93	3.77	0.88
Control	4. Making decisions by myself	3.88	1.06	3.87	1.02	4.09	0.78
	5. Taking responsibility for my actions	4.01	0.99	4.17	0.92	4.35	0.68
	6. Counting on myself	4.07	1.02	3.99	1.02	4.15	0.78
Curiosity	7. Looking for opportunities to grow as a person	3.64	1.07	3.71	0.96	3.98	0.87
	8. Investigating options before making a choice	3.80	1.11	3.88	0.93	4.16	0.79
	9. Observing different ways of doing things	3.57	1.13	3.69	0.99	4.14	0.78
Confidence	10. Taking care to do things well	4.10	1.02	4.11	0.94	4.45	0.68
	11. Learning new skills	3.91	1.04	3.78	0.96	4.25	0.69
	12. Working up to my ability	3.86	1.11	3.79	1.02	4.04	0.80

Table 2 Means, standard deviations, and correlations of the study variables (by subsamples)

	<i>M</i>	<i>SD</i>	1	2	3	4	5
<i>High school</i>							
1. Concern	3.63	0.91	(.75)				
2. Control	4.01	0.81	.47	(.71)			
3. Curiosity	3.67	0.87	.47	.48	(.70)		
4. Confidence	3.96	0.84	.42	.48	.51	(.70)	
5. Career adapt-abilities	3.81	0.66	.77	.77	.79	.77	(.85)
6. Trait anxiety	55.17	6.89	-.28	-.33	-.26	-.21	-.31
<i>Undergraduate</i>							
1. Concern	3.89	0.79	(.79)				
2. Control	4.01	0.82	.47	(.77)			
3. Curiosity	3.76	0.79	.61	.58	(.76)		
4. Confidence	3.89	0.82	.57	.55	.64	(.79)	
5. Career adapt-abilities	3.89	0.66	.81	.79	.86	.84	(.90)
6. Career decision self-efficacy	95.28	14.05	.56	.49	.57	.56	.66
<i>Working adults</i>							
1. Concern	3.72	0.74	(.81)				
2. Control	4.19	0.63	.52	(.80)			

Table 2 continued

	<i>M</i>	<i>SD</i>	1	2	3	4	5
3. Curiosity	4.09	0.71	.57	.71	(.84)		
4. Confidence	4.25	0.61	.54	.61	.69	(.87)	
5. Career adapt-abilities	4.06	0.56	.79	.84	.89	.83	(.91)
6. Work stress	17.94	5.87	-.25	-.26	-.23	-.24	-.31

Note: All correlations are significant at $p < .001$. Cronbach Alpha reliability estimates appear on the diagonal

that data obtained across the three samples fit the theoretical model very well. For the high school sample, the fit indices were $\chi^2/df = 3.38$, GFI = .960, CFI = .947, TLI = .930, RMSEA = .061. For the undergraduate sample, the fit indices were $\chi^2/df = 2.13$, GFI = .950, CFI = .966, TLI = .955, RMSEA = .059. For the working adult sample, the fit indices were $\chi^2/df = 2.83$, GFI = .914, CFI = .941, TLI = .922, RMSEA = .082. These results, except for the χ^2/df of the high school sample and the RMSEA of the adult sample, which were slightly over the expected values, conform satisfactorily to the combined fit criteria of the $\chi^2/df \leq 3$, the GFI, CFI, and TLI $\geq .90$, and RMSEA $\leq .08$ (Browne & Cudeck, 1993; Hu & Bentler, 1999). Across three samples, the standardized loadings from items to four first-order factors and from factors to second-order adaptability construct ranged from .59 to .96, suggesting that all items and factors are strong indicators of their respective constructs (Figure 1).

The internal consistency and test–retest reliability

Cronbach's alpha internal consistency reliability coefficients appear in Table 2. As seen, the values were adequate to strong across three samples. Reliability coefficients ranged from .70 to .85 for the high school sample, .76 to .90 for the undergraduate sample, and .80 to .91 for the working adult sample.

In order to check the temporal stability of the CAAS-SF, 123 voluntary students from the high school sample completed the measure a second time after 4 weeks. The Pearson coefficient value was .66 for concern, .62 for control, .68 for curiosity, .64 for confidence, and .82 for the total scale suggesting that the temporal stability was satisfactory.

Convergence with the 24-item CAAS and relations to trait anxiety, work stress, and career decision self-efficacy

To provide additional evidence for the validity of the CAAS-SF, correlational analyses were conducted to test for the associations between the 12-item version and 24-item version. The undergraduate sample was used for this analysis. The results yielded a high convergence with the 24-item version as all subscale scores and the total adaptability scores between the two versions correlated strongly (concern $r = .95$, control $r = .94$, curiosity $r = .93$, confidence $r = .93$, and the adaptability

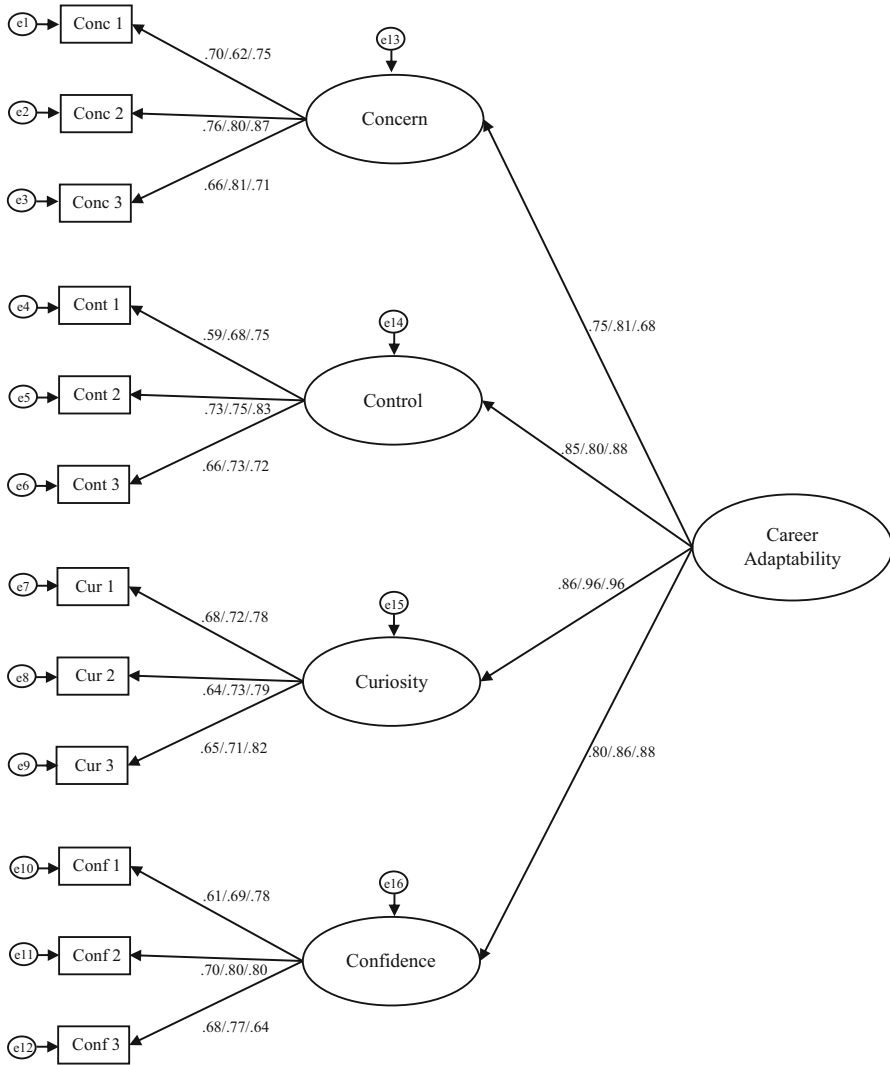


Figure 1 Hierarchical confirmatory factor model and standardized factor loadings across three samples. Standardized factor loadings are given for high school students, undergraduate students, and working adults, respectively. All factor loadings are significant at $p < .001$

total scale $r = .98$). In addition, based on previous evidences suggesting that career adaptability is negatively related to work stress (Fiori et al., 2015; Johnston et al., 2013; Maggiori et al., 2017) and trait anxiety (Pouyaud et al., 2012), and positively to career decision self-efficacy (Douglass & Duffy, 2015; Duffy et al., 2015; Hirschi et al., 2015), we further examined associations of the 12-item CAAS-SF and the 24-item CAAS with trait anxiety in high school sample, with work stress in adult sample, and with career decision self-efficacy in undergraduate sample (see Table 2). As expected, the CAAS-SF total and subscale scores correlated negatively

Table 3 Goodness-of-fit statistics for tests of multigroup invariance across gender and age groups

Model	χ^2	df	TLI	CFI	RMSEA (90% CI)	Comparison	Δ CFI	Δ RMSEA
<i>Gender</i>								
M1 (configural)	297.70	100	.949	.962	.040 (.035–.046)	–		
M2 (metric)	314.94	108	.951	.960	.040 (.035–.045)	M2 vs. M1	.002	.000
M3 (scalar)	316.92	112	.953	.960	.039 (.034–.044)	M3 vs. M2	.000	.001
<i>Age groups</i>								
M1 (configural)	416.98	150	.936	.951	.038 (.034–.043)	–		
M2 (metric)	433.67	166	.942	.951	.036 (.032–.041)	M2 vs. M1	.000	.002
M3 (scalar)	441.38	172	.943	.950	.036 (.032–.040)	M3 vs. M2	.001	.000

with trait anxiety (correlations ranging from $-.21$ to $-.33$) and work stress (correlations ranging from $-.23$ to $-.31$), and positively with career decision self-efficacy (correlations ranging from $.49$ to $.66$). Similar results were found for the CAAS long form that the coefficients varied between $-.23$ and $-.36$ with trait anxiety, between $-.24$ and $-.34$ with work stress, and between $.56$ and $.68$ with career decision self-efficacy.

Measurement invariance across gender and age groups

A multi-group CFA was conducted to test the measurement invariance (i.e., configural, metric, and scalar) of the four-factor model across both genders and three age groups (see Table 3). Specifically, through a hierarchical procedure (Dimitrov, 2010; Schmitt & Kuljanin, 2008; Vandenberg & Lance, 2000), a baseline model with no equality constraints across groups (M1: Configural model) was tested at first. As seen in Table 3, the configural model demonstrated very good fit to the data for both gender and age groups, suggesting that factor structures were not different across age and gender groups. Next, a second model in which factor loadings were constrained to be equal across groups (M2: Metric model) was tested and the results were compared to the M1. The metric model fit was also good and change in CFI and RMSEA was well below the recommended cutoff criteria of the Δ CFI $\leq .01$ and Δ RMSEA $\leq .015$ (Chen, 2007) for both gender and age groups, suggesting that different groups respond to the items in the same way. Establishing metric invariance, a last model in which item intercepts were constrained to be equal across groups (M3: Scalar model) was tested and the results were compared to the M2. The fit indices for the scalar invariance model showed a good fit, and once again the change in CFI and RMSEA was well below the cutoff values across gender and age groups, suggesting that respondents who have the same score on the latent factor would obtain the same score on its indicator regardless of their group membership (Milfont & Fisher, 2010).

Discussion

The current study sought to validate the CAAS-SF, which is an abbreviated economical version of the most widely used instrument of career adaptability across three different age groups in the Turkish context. With this purpose, the factorial structure was tested separately for each age group, reliability estimates were calculated, and the relations of CAAS-SF with the full form and hypothesized relations to anxiety, work stress, and career decision self-efficacy were examined. In addition, measurement invariance across gender and age groups were tested on configural, metric, and scalar levels. Overall, consistent with the findings of Maggiori et al. (2017), CAAS-SF demonstrates similar psychometric properties to those of the full form when applied in the Turkish context.

Specifically, the results of CFAs supported the four-factor hierarchical structure with 12 items for both student samples (high school and undergraduate) and employed individuals. As mentioned earlier, since the development of the 24-item CAAS in 2012, the proposed four-factor hierarchical model (with an overall higher-order adaptability factor subsuming all four lower-order adaptability resources of concern, control, curiosity, and confidence) has been cross-validated in numerous Western and non-Western countries. The current findings provide additional support for this international body of research and initial support for the factor structure of the 12-item version of the CAAS in a non-Western country.

For internal consistency, the Cronbach's alpha coefficient values were high for the total scale and satisfactory to high for the subscales across three age groups. Similar results were reported from the studies using the full form (Savickas & Porfeli, 2012) and the short form (Maggiori et al., 2017). In terms of test-retest reliability, the CAAS-SF demonstrated high scores for the subscales and the total scale over a 4-week period. To our knowledge, this is the first study to report the temporal stability of the CAAS-SF. The results were consistent and comparable with previous research on the temporal stability of the CAAS over a 4-week (Tolentino, Garcia et al., 2014), 3-month (Di Maggio et al., 2015), and 4-month period (Tolentino, Sedoglavich, Lu, Garcia, & Restubog, 2014).

In line with Maggiori et al.'s (2017) findings, the CAAS-SF indicated strong convergence with the 24-item version. Additional correlational analysis suggesting that career adaptability as assessed with the short form and the long form is negatively related to trait anxiety (Pouyaud et al., 2012) and work stress (Fiori et al., Johnston et al., 2013; Maggiori et al., 2017), and positively to career decision self-efficacy (Douglass & Duffy, 2015; Duffy et al., 2015; Hirschi et al., 2015) supported the hypothesized relationships.

Lastly, we decided to examine whether the four-factor model was similar across gender and different age groups. Testing measurement invariance is important because it provides further information about an instrument that it is operating in the same way and that the underlying construct has the same theoretical pattern for each group (Dimitrov, 2010). In line with studies testing measurement equivalence of the 24-item (Di Maggio et al., 2015; McIlveen et al., 2016; Tien et al., 2014; Urbanaviciute et al., 2014) and the 12-item CAAS (Maggiori et al., 2017), the

current findings supported evidence for the configural, metric, and scalar invariance of the 12-item solution across gender and student and employed populations.

Implications for practice

Many professionals working in the field of vocational psychology in varied settings aim at enhancing their clients' career adaptability resources as it is seen as a primary goal of career education and counseling in an ever-changing world of work (Savickas & Porfeli, 2012). Given the time constraints of these career interventions, the CAAS-SF can be a better alternative to the long form as a pre- and post-instrument to evaluate the effectiveness of such programs. Along with those interventions, the short form is also advantageous to monitor change in career education programs where the career adaptability is not the primary focus, but a feature, such as educational settings or employment services.

Additionally, the current results support that the Turkish version of the CAAS-SF is ready for use by practitioners and researchers who wish to assess career adaptability resources among both student (e.g., high school and undergraduate) and employed populations. In particular, researchers can use the CAAS-SF in studies targeting individuals in career transition or longitudinal changes in vocational behavior, at which reducing the burden on respondents and improving the completion rates are critical issues. Lastly, we believe that researchers will benefit from using a shorter instrument in studies where data collection is difficult and time consuming such as in organizational settings where the time needed to complete an instrument is quite limited.

Limitations and future directions

The results of the current study should be interpreted with its limitations in mind. For instance, two outcome measures of career adaptability (anxiety and work stress) considered in the study indicated weak relations with adaptability. Although the correlations were significant, they were low for the subscales and moderate for the general adaptability score. As the cross-sectional nature of this data limits its interpretation, further longitudinal studies using these variables or with other potential work and non-work related antecedents (i.e., big five traits, dispositional positivity, and cognitive ability) and outcomes (i.e., job stress, subjective well-being, and work well-being) of career adaptability in diverse populations are necessary to gather more evidence for convergent/discriminant validity of the 12-item CAAS-SF. Another limitation was that the data for working adults was collected using a convenience sample of participants from professional occupations such as teacher, engineer, or psychologist. Although there were participants from non-professional occupations, the majority were well-educated professionals, which limits the generalizability of the findings. For the future research testing the applicability of the CAAS-SF in working populations, it would be valuable to further replicate studies in other professional and non-professional occupations.

In conclusion, the CAAS-SF appears to be a valid and reliable instrument for use by researchers and practitioners to measure career adaptability resources among

high school students, undergraduate students, and working adults in the Turkish context. As a more parsimonious and practical version that still maintains similar psychometric characteristics, it would be an advantage to use the CAAS-SF especially in studies with time constraints or testing more complicated models of career adaptability with multiple variables. However, further studies are needed to verify the replicability and psychometric properties of the multidimensional hierarchical factor structure of the CAAS-SF in diverse cultural contexts and with different population characteristics (such as education level, career stage or employment status) for its generalizability.

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