

## Original Communication

# Assessing Difficulties in Career Decision Making Among Swiss Adolescents with the German My Vocational Situation Scale

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**Abstract.** Assessing problems in career decision making among adolescents is important for career guidance and research. The present study is the first to investigate among Swiss adolescents the factor structure and convergent validity in relation to personality of the German-language adaptation of the My Vocational Situation Scale. Two preliminary studies ( $N = 217$ ) suggested that using a 5-point Likert scale response format would increase scale reliability. The confirmatory factor analyses in the main study with two cohorts ( $n = 341$ , eighth grade;  $n = 303$ , eleventh grade) confirmed that four main factors, which assess problems with identity, decision making, information, and perceived barriers, underlie the data. The barriers factor was differentiated into aspired vocation and personal situation. Construct validity was supported by significant relationships between favorable personality characteristics (emotional stability, extraversion, agreeableness, conscientiousness, generalized self-efficacy, and internal locus of control) and fewer problems. The results suggest that the vocational identity and barriers scales can be fruitfully applied to research on and the practice of career counseling with adolescents.

**Keywords:** career assessment, career decision making, vocational identity, personality

Adolescence is an important time of vocational preparation for future career development (Super, 1990). One core component of career preparation during adolescence is the achievement of a well-developed career-choice readiness, which can be defined as the readiness and ability of a person to successfully engage in the career decision-making process and reach a well-founded career decision (Phillips & Blustein, 1994). Several international studies have indicated that having a high career-choice readiness and choice clarity in adolescence is related to various components of well-being and adaptation (Creed, Prideaux, & Patton, 2005; Skorikov & Vondracek, 2007). The assessment and prevention of career decision-making difficulties is therefore a major focus in career development research and counseling practice (Brown & Rector, 2008). However, there is a shortage of empirically evaluated and supported German-language measurement scales in this area for adolescents.

In this context, the goals of the present study are (1) to investigate for the first time the applicability of the German-language version of one of the world's most frequently applied scales for the assessment of career decision-making

difficulties, the My Vocational Situation Scale (MVS; Holland, Daiger, & Power, 1980), with Swiss adolescents; and (2) to examine the extent to which individual differences in the hereby assessed difficulties are related to more fundamental personality dispositions of adolescents.

## The My Vocational Situation Scale

Assessing problems in career decision making has traditionally been an important component of career counseling and vocational guidance to identify specific targets for interventions in order to promote career development. The My Vocational Situation Scale (MVS; Holland, Daiger et al., 1980) is one of the world's most frequently applied measures for assessing difficulties in career decision making. It assesses career-related problems in three areas: (1) problems with vocational identity, (2) lack of career information or training, and (3) environmental or personal barriers in career decision making (Holland, Gottfredson, & Power, 1980). Since its publication, the scale has been ex-

tensively evaluated and applied in career research and counseling practice in areas such as assessing the degree of readiness of a client in order to assign the appropriate kind and level of treatment (e.g., Sampson, Peterson, Reardon, & Lenz, 2000), as an outcome measure when evaluating the effectiveness of career interventions (Whiston, Sexton, & Lasoff, 1998), or for assessing theoretically important constructs in career development research (e.g., Multon, Wood, Heppner, & Gysbers, 2007). Apart from these applications as a quantitative measurement scale, the MVS can also be applied in counseling practice as a qualitative treatment tool in that the meaning of answers to individual items can be discussed between counselor and client (Holland, Johnston, & Asama, 1993).

Jörin, Stoll, Bergmann, and Eder (2004) published a German-language adaptation of the MVS. The scale measures the same three areas of career decision-making problems as the original version with 18 items stating possible problems in career decision making (e.g., "I am not sure about my strengths and weaknesses, interests, and abilities"). Answers are provided on a three-point scale with scale values 0 (*not true*), 1 (*partially true*), and 2 (*true*), higher values indicating that more problems were reported. Originally, the 18-item vocational identity subscale was directly adapted from the original English version, but was reduced to 10 items based on the results of scale analyses in the process of scale development research with secondary, high school and university students, and adults. The items for the other two subscales (information, two items, and barriers, six items) were not directly derived from the original scale but generated by Jörin and colleagues based on considerations about possible problems in the career decision-making process in these two areas. Jörin Fux (2006) evaluated the adapted scale with two samples consisting of high-school students, university students, and adults. Based on exploratory factor analyses with these study participants, two reliable factors were identified for the scale: one factor tapping into problems related to personal aspects (i.e., identity and information) and one factor tapping into problems related to problems in the environment (i.e., barriers). Jörin Fux also reported some findings supporting the construct validity of the scale by showing, for example, significant relationships between reported problems and a smaller range of considered career alternatives, more need for counseling, and lower interest profile differentiation.

Two potentially important areas of application of the German-language scale are research and counseling practice with adolescents. In the German-speaking countries of Switzerland, Germany, and Austria, there is a strong focus in the educational system on vocational education and training (VET) (Heinz, Kelle, Wirtzel, & Zinn, 1998; Hirschi, 2010; Seifert & Eder, 1991). For example, in Switzerland, about two-thirds of all students pursue VET after finishing compulsory school at the end of ninth grade (Swiss Federal Statistical Office, 2010). This means that students have to become engaged in career planning and decision making comparatively early and, more generally, that ado-

lescence is an important phase of career preparation and development. As a result, research (Heckhausen & Tomasik, 2002; Hirschi & Läge, 2007b; Neuenschwander & Garrett, 2008; Pinguart, Juang, & Silbereisen, 2003) and counseling practice (Marty, Jungo, & Zihlmann, 2011) in German-speaking countries has focused on the adolescent career decision-making process and its difficulties.

Unfortunately, the German-language version of the MVS has not yet been examined regarding its applicability to this potentially important research and practice group (i.e., younger adolescents facing their transition from school to VET). Moreover, all results reported by Jörin Fux (2006) were based on earlier versions of the published scale which consisted of only 16 items (one item for each of the subspects, information and barriers, was added later). The first aim of the present study was therefore to investigate the applicability of the German-language MVS to adolescents with respect to reliability and factor structure using confirmatory factor analysis (CFA).

Our second goal was to provide additional information about the construct validity in terms of the nomological validity of the scale with this group (Peter, 1981). While there is some support for the nomological validity of the scale, no research has ever investigated how individual differences in the assessed career decision-making difficulties are related to the adolescents' personality dispositions. Understanding the relationship between personality traits and problems in career decision making would also have important consequences for the theoretical understanding of adolescent career preparation and counseling intervention practice.

## Personality and Career Decision-Making Difficulties

There is solid evidence that personality dispositions are related to various aspects of vocational and organizational behavior (Tokar, Fischer, & Mezydlo Subich, 1998). Regarding career decision making, research has confirmed that difficulties in this area are significantly related to personality traits such as trait negative affectivity, neuroticism, and negative self-evaluations in terms of career-specific and generalized self-efficacy and control beliefs (e.g., Di Fabio, 2006; Lounsbury, Hutchens, & Loveland, 2005; Saka & Gati, 2007). This pattern was mirrored in findings with the English-language MVS, which showed across many studies that a high score in vocational identity was related to being more extroverted, more conscientious, and less neurotic (Holland et al., 1993). Although we are not aware of research linking the MVS to personality traits in adolescence, research investigating the English version of the MVS scale with adolescents showed positive relationships between higher vocational identity scores and critical consciousness (i.e., the capacity to recognize and overcome

sociopolitical barriers) (Diemer & Blustein, 2007), career search activities (Gushue, Clarke, Pantzer, & Scanlan, 2006; Gushue, Scanlan, Pantzer, & Clarke, 2006), career decision-making self-efficacy beliefs (Gushue, Scanlan et al., 2006), but not family interaction patterns (Hargrove, Creagh, & Burgess, 2002). Extending this research, we hypothesize that individual differences in personality dispositions predict differences in scores in career decision-making difficulties as assessed using the German-language MVS with Swiss adolescents. Specifically, based on existing research with the German and the English versions of the MVS, we expect that adolescents reporting more problems in career decision making in terms of vocational identity, information, and barriers are more neurotic, less extraverted, less conscientious, have more negative generalized self-efficacy beliefs, and more external control beliefs.

## Method

### Participants

Four groups ( $N = 860$ ) of adolescents from the German-speaking part of Switzerland participated in the study. Two groups participated in two preliminary studies. Preliminary Study 1 included 148 students (82 boys = 55%) in the eighth (91%) and ninth grade, their ages ranging from 13 to 16 years ( $M = 14.3$ ,  $SD = 0.7$ ). Participants in Preliminary Study 2 were 68 students in the eighth grade (34% boys). Age was not assessed for this group.

For the main study, two additional groups were included. The first group consisted of Swiss secondary school students at the beginning of the eighth grade ( $n = 341$ , aged 12–16 years,  $M = 14.1$ ,  $SD = 0.7$ , 50% girls, 82% of Swiss nationality, the rest mostly from southeastern Europe). The majority (63%) attended a school type with advanced requirements (*Sekundarschule*); the others attended one with basic requirements (*Realschule*). The second group consisted of 303 high school students in the eleventh grade (aged 15 to 20 years,  $M = 17.4$ ,  $SD = 1.0$ ; 69% girls; 81% Swiss nationals, the rest mostly from southeastern Europe). Sixty-eight percent ( $n = 206$ ) were doing a vocational apprenticeship; the others attended a high school (*Gymnasium*) and were preparing for college.

### The My Vocational Situation Scale – German-Language Version

The German-language adaptation of the MVS by Jörin et al. (2004) was used. The 18-item scale (e.g., “I am not sure about my strengths and weaknesses, interests, and abilities”) consists of four subscales tapping problems with identity (seven items), decision making (three items), information (two items), and perceived barriers to career development (six items). The components of identity and de-

cision making can be combined into a 10-item scale representing Holland, Daiger et al.’s (1980) notion of vocational identity. Answers in the original format used in Preliminary Study 1 are provided on a 3-point Likert scale with scale values 2 (*true*), 1 (*partially true*), and 0 (*not true*); higher scores indicate more reported problems. Jörin Fux (2006) reported reliability estimates (Cronbach’s  $\alpha$ ) of .83 for the 10-item vocational identity scale and .81 for the 6-item barriers scale derived from samples of  $n = 643$  and  $n = 797$ , respectively, composed of high school students, university students, and adults. In Preliminary Study 2 and the main study a 5-point Likert scale instead of the original 3-point scale was used with the responses including 1 (*not true*), 2 (*mostly not true*), 3 (*partially true*), 4 (*mostly true*), and 5 (*true*).

### Big Five Personality Traits

Neuroticism, Extraversion, Agreeableness, Openness, and Conscientiousness were assessed with the German-language adaptation of the NEO-FFI (Borkenau & Ostendorf, 1993; Costa & McCrae, 1992). The scale consists of 60 statements (e.g., “I am not easily worried”) and answers were provided on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) (Rost, Carstensen, & von Davier, 1999). Support for the validity and applicability of the scale for adolescents is provided by Lüdtke, Trautwein, Nagy, and Köller (2004). Cronbach’s  $\alpha$  for the present sample was .78 for Neuroticism, .75 for Extraversion, .72 for Openness, .68 for Agreeableness, and .77 for Conscientiousness.

### Generalized Self-Efficacy (GSE) and Locus of Control Beliefs

GSE and externality of control (EC) were assessed with the Fragebogen zu Kompetenz- und Kontrollüberzeugungen (FKK; Inventory for the Measurement of Self-Efficacy and Externality, Krampen, 1991). The two constructs are measured by 16 items each (e.g., “I can determine very much of what happens in my life”) and students are asked to indicate on a 6-point Likert scale ranging from 1 (*very wrong*) to 6 (*very true*) how much the statements apply to them. Support for the applicability and validity among adolescents is provided by Krampen (1991). The  $\alpha$ s within the present sample were .70 for GSE and .86 for EC.

### Procedure

All students completed the questionnaires in their classrooms under the supervision of their classroom teacher. Since the use of the NEO-FFI with young adolescents presented some problems regarding inconsistent factor structure (Roth, 2002), it was applied only to the older students

in high school. The secondary school students received the MVS and the FKK, and the high school students the MVS, the FKK, and the NEO-FFI.

## Results

### Preliminary Analysis of Reliability

A first preliminary analysis ( $N = 148$ ) was conducted to estimate the reliability of the 10-item vocational identity subscale with the original 3-point Likert scale. The results showed that reliability (Cronbach's  $\alpha$ ) was only  $\alpha = .64$  (90% CI .55–.72), which is significantly lower than the .83 reliability reported by Jörin Fux (2006). A second preliminary study ( $N = 68$ ) was conducted to investigate whether changing the response scale to a 5-point Likert scale could significantly improve the reliability. The results showed that the reliability significantly increased to  $\alpha = .82$  (90% CI .75–.88). These results led to the use of a 5-point Likert scale, instead of the original 3-point scale, in the following main study.

### Main Analysis of Reliability

In the main study ( $N = 644$ ), reliability estimates showed  $\alpha = .80$  (90% CI .72–.87) for the 7-item identity subscale,  $\alpha = .58$  (90% CI .52–.63) for the 3-item decision-making subscale,  $\alpha = .83$  (90% CI .81–.85) for the 10-item vocational identity scale,  $\alpha = .44$  (90% CI .35–.52) for the 2-item information scale,  $\alpha = .69$  (90% CI .65–.72) for the 6-item barriers scale, and  $\alpha = .85$  (90% CI .83–.87) for the total 18-item scale.

### Data Analytical Approach for CFA

The first objective of the present study was to examine the internal structure of the MVS questionnaire. Since a theoretical idea of the relationships between the assessed constructs already exists (Holland, Daiger et al., 1980) and the structure of the questionnaire has been examined using EFA (Jörin Fux, 2006), the use of CFA is indicated (Ullman, 2006). CFA requires the researcher to specify a priori hypotheses about the structure based on existing theory and that those be tested. It provides a stricter test of the factor structure; thus, it is particularly well-suited for use after certain ideas about the structure of the construct have been theoretically developed and empirically examined using EFA (van Prooijen & van der Kloot, 2001). In the present study, confirmatory factor analysis was conducted with Mplus 6.1 (Muthén & Muthén, 2010).

In the case of the MVS questionnaire, four factors were proposed based on theory: (1) problems with identity, (2) decision making, (3) information, and (4) perceived barriers

to career development (Holland, Daiger et al., 1980; Jörin Fux, 2006). Consistent with this theory, Jörin Fux (2006) extracted four factors when analyzing the German version using EFA with oblique rotation. However, not all items displayed their highest loadings on the theoretically expected factor and hence the meaning of the four empirically derived factors differed from theory (Jörin Fux, 2006). To address this contradiction between theory and exploratory empirical results, several models were tested and compared in this study as outlined below. To begin, we tested the following three models.

#### Model I

In a first step, and as proposed by the test publisher, a four-factor model distinguishing between a 7-item identity factor, a 3-item decision-making factor, a 2-item information factor, and a 6-item barriers factor was specified (Jörin Fux, 2006). All loadings of the 18 variables onto their respective factor were freely estimated. All other parameters were fixed to zero; hence, no cross-loadings were allowed.

#### Model II

The second model tested here is consistent with the four-factor solution of the EFA conducted by Jörin Fux (2006). The aim here is to test whether results obtained in EFA can be replicated in CFA, which presents a stricter approach to the investigation of internal structure. When specifying a model based on the results of an EFA, some simplification is required. Specifically, one has to decide which loadings are high enough to be specified as free parameters in the model and which are negligible and should therefore be constrained to be zero. As one aims for a simple structure in both EFA and CFA, the model was specified as follows: Items were assigned to factors based on the highest loading obtained in the EFA conducted by Jörin Fux (2006) and factors were named according to our interpretation of the EFA results (see Figure 1). The two additional items (12 and 17) were assigned to the factor they belong to theoretically (i.e., information and barriers, respectively) (Jörin Fux, 2006). All other parameters were constrained to be zero and variables were only allowed to load onto one factor even though some displayed secondary loadings in the exploratory analysis. Restricting any potential cross-loadings was based on the rationale that this is consistent with the scoring of the questionnaire where each item is always assigned to one scale only. As the results of the EFA were based on oblique rotation, the four factors were allowed to covary in the CFA.

#### Model III

The third and most parsimonious model followed a suggestion by Jörin Fux (2006) to group the items into two factors,



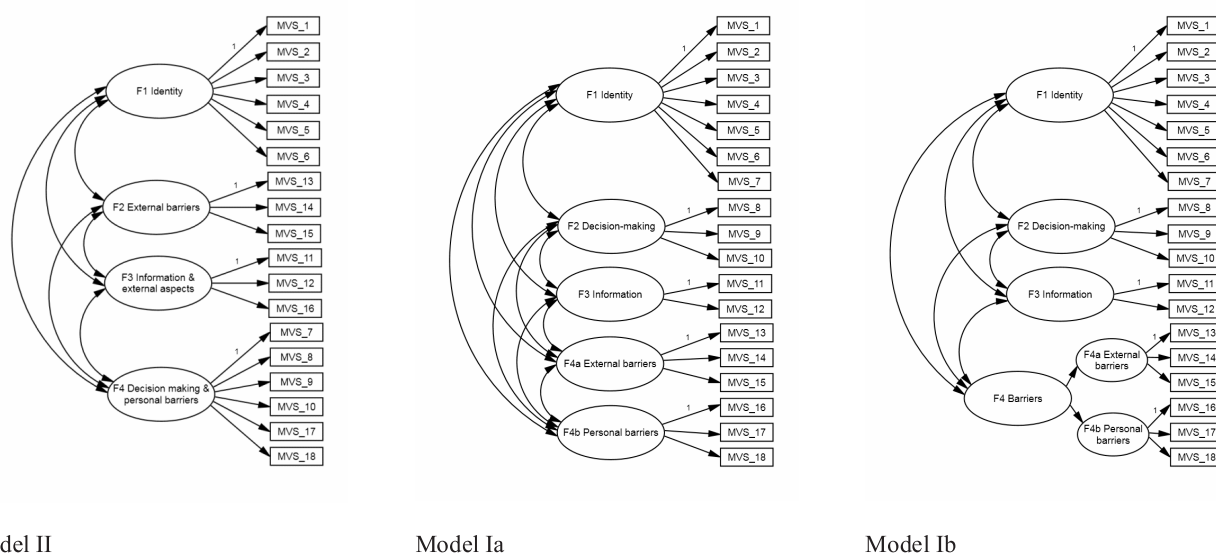


Figure 1. Confirmatory factor analysis models. Model II: Four-factor structure consistent with results of the EFA conducted by Jörin Fux (2006). Model Ia: Modified version of Model I in which two separate barriers factors (external and personal) are specified. Model Ib: Modified version of Model I in which a hierarchical model with one higher-order barriers factor is specified, which is defined by two latent subfactors (external and personal).

one containing the three subscales tapping into problems with identity (seven items), decision making (three items), and information (two items); and the second one comprising the six items on perceived barriers to career development. The first one represents internal aspects concerned with the vocational situation whereas the latter one describes external issues in this context. The same approach as with the previous model was used and items were assigned to factors based on their highest loading obtained in the EFA conducted by Jörin Fux (2006) and were not allowed to cross-load on the second factor.

Across all models, the covariances between the latent variables were freely estimated, thus specifying oblique models. In addition, the error variances of the variables were never allowed to correlate because their existence suggests that additional factors may be present that are not currently specified in the model (James, Mulaik, & Brett, 1982).

To our knowledge this was the first attempt to fit CFA models to the German version of the MVS questionnaire. Previous applications of CFA have shown that it is not uncommon to find poor fit when attempting to confirm the internal structure of a self-report questionnaire obtained by EFA (e.g., Hopwood & Donnellan, 2010; Quilty, Oakman, & Risko, 2006; Slocum-Gori, Zumbo, Michalos, & Diener, 2009). We had therefore planned to modify the best-fitting of the three models described above if model fit was not acceptable, thus changing from a confirmatory to an exploratory approach. The aim of this subsequent analysis was twofold. Firstly, we wanted to establish what modifications are required to obtain acceptable model fit. Secondly, and more importantly, we wanted to explore the substan-

tive implications these modifications may have. In other words, beyond the magnitude of modifications, the objective was to establish what structure of the construct the data suggested. However, modifications were only to be applied if they were conceptually sound as well as suggested by the data to improve model fit. All modifications and their impact on fit indices are discussed below.

## The Factor Structure of the MVS

Before conducting the CFA, we assessed the univariate as well as multivariate normality of the 18 MVS items with an SPSS macro provided by DeCarlo (1997). The interpretation of results for univariate normality was based on guidelines by Curran, West, and Finch (1996), who found skewness larger than 2.0 and kurtosis larger than 7.0 to be problematic. In the present sample, only one item (Item 17) displayed values above these cut-offs (2.32 for skewness). However, the data also displayed multivariate nonnormality (Mardia test; Mardia, 1970) with a normalized coefficient of 33.68 ( $p < .001$ ), which is much greater than the cut-off of 3.00 suggested by Bentler (2005). To avoid the issues caused when applying ML estimation to nonnormal data, a robust estimation method available in Mplus (Muthén & Muthén, 2010) was applied. This estimation method is robust to nonnormality with regard to the estimation of standard errors.

Next, the model fit of the factor models detailed above was assessed. While none of the models achieved acceptable fit according to all fit indices, the results suggest that Model I (four-factor model) is the best model. However, as

Table 1  
Fit indices of the confirmatory factor analyses ( $N = 712$ )

	SB- $\chi^2$	df	SB- $\chi^2/df$	CFI	TLI	RMSEA	RMSEA 90% CI	SRMR	AIC <sub>c</sub>	$\omega(\text{AIC}_c)$
Model I	402.22	129	3.11	.895	.876	.055	(.049–.061)	.053	35476.15	0.82
Model II	403.46	129	3.13	.895	.875	.055	(.049–.061)	.054	35479.20	0.18
Model III	564.15	134	4.21	.835	.812	.067	(.061–.073)	.061	35657.17	0.00
Model I	402.22	129	3.11	.895	.876	.055	(.049–.061)	.053	35476.15	0.00
Model Ia	296.48	125	2.37	.934	.919	.044	(.037–.050)	.046	35358.24	0.16
Model Ib	297.97	127	2.35	.934	.921	.043	(.037–.050)	.046	35354.86	0.84

Notes. SB- $\chi^2$  = Satorra-Bentler  $\chi^2$ ; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; AIC<sub>c</sub> = corrected Akaike information criterion;  $\omega(\text{AIC}_c)$  = corrected Akaike weights.

Table 2  
Partial correlations, means, and standard deviations for the MVS scales and personality measures

	Identity	Decision	Info	Barriers	VID	MVS	GSE	EC	$M$	$SD$
Identity <sup>1</sup>	–	.59***	.48***	.44***	.96***	.89***	–.32***	.19***	16.94	5.65
Decision <sup>1</sup>	.47***	–	.46***	.44***	.78***	.76***	–.37***	.39***	7.07	2.43
Info <sup>1</sup>	.41***	.44**	–	.45***	.52***	.76***	–.16**	.22***	4.60	1.73
Barriers <sup>1</sup>	.28***	.30***	.31***	–	.49***	.75***	–.20***	.34***	11.87	3.66
VID <sup>1</sup>	.95***	.73***	.48***	.32***	–	.93***	–.37***	.28***	24.01	7.34
MVS <sup>1</sup>	.83***	.69***	.63***	.69***	.89***	–	–.35***	.34***	40.48	10.74
GSE <sup>2</sup>	–.28**	–.34***	–.23***	–.26***	–.34***	–.37***	–	–	–	–
EC <sup>2</sup>	.36***	.45***	.33***	.31***	.44***	.48***	–	–	–	–
N <sup>3</sup>	.19**	.34***	.24**	.13	.27***	.28***	–	–	–	–
E <sup>3</sup>	–.18**	–.17*	–.19**	–.08	–.20**	–.20**	–	–	–	–
O <sup>3</sup>	.06	.07	.11	–.01	.08	.07	–	–	–	–
A <sup>3</sup>	–.12	–.02	–.17*	–.14*	–.10	–.16*	–	–	–	–
C <sup>3</sup>	–.29***	–.16*	–.25***	–.15*	–.29***	–.30***	–	–	–	–
$M$	16.91	7.01	4.47	12.21	23.92	40.59	–	–	–	–
$SD$	5.06	2.36	1.70	4.04	6.49	9.63	–	–	–	–

Notes. Above diagonal: secondary school students ( $n = 341$ ), below high-school students (<sup>1</sup>  $n = 303$ , <sup>2</sup>  $n = 283$ , <sup>3</sup>  $n = 210$ ;  $n$  varies because not all students filled out every scale or they did not fill out every scale correctly or completely)

VID = vocational identity; MVS = My Vocational Situation total score; GSE = generalized self-efficacy; EC = externality of control, N = neuroticism; E = extraversion; O = openness; A = agreeableness; C = conscientiousness. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

indices differ only slightly (especially between Model I and II), a comparison of the three nonnested models based on Akaike weights was conducted. This also allows computing the relative likelihood for each model (see Table 1). The corrected AIC (AIC<sub>c</sub>) rather than AIC was used when computing Akaike weights because the ratio of sample size to the numbers of model parameters was small (Burnham & Anderson, 2010). The comparison showed that Model I is about 4.5 times more likely (i.e.,  $\omega_I/\omega_{II} = 0.82/0.18$ ) than Model II (three-factor model), the second-best model, while Model III (two-factor model) is highly unlikely.

Given the strong support for Model I, subsequent modifications were only pursued for Model I. Rather than simply improving model fit by freeing parameters, we were interested in finding out if the data support the theoretical idea of the constructs. An examination of residual variances and modification indices showed that the barriers items were particularly poorly represented by the imposed mod-

el. The error terms of the first and the last three items of the barriers scale were highly correlated. However, researchers are advised not to simply allow the error terms of a congeneric set of indicator variables to correlate but instead to identify substantial reasons for their occurrence and modify the model accordingly (Rubio & Gillespie, 1995). The pattern of correlated error terms suggests that an extraneous factor exists among the barrier items that was not specified in the original model. As modifications should not be data-driven but also make sense conceptually, the items of this scale were examined. Based on the item content as well as the modification indices, one could propose that the barriers scale may actually consist of two aspects, the first three items describing barriers related to the nature of the aspired vocation and the latter three referring to difficulties arising from the individual's personal situation. Thus, two alternative models were tested. In Model Ia, two separate barriers factors were specified. For Model

Ib, a hierarchical structure was proposed in which one higher-order barriers factor was defined by two latent subfactors (see Figure 1).

Both modified models achieved acceptable fit (see Table 1). Corrected Akaike weights were used in a subsequent comparison with the original Model I. We found that Model Ib is about five times more likely (i.e.,  $\omega_{Ib}/\omega_{Ia} = 0.84/0.16$ ) than Model Ia. Model Ib is also more parsimonious than Model Ia. The original Model I is highly unlikely based on this comparison. In conclusion, our results showed that the MVS applied with adolescents measures career decision-making difficulties along four dimensions: (1) vocational identity, (2) decision making, (3) information, and (4) barriers regarding (i) aspired vocation and (ii) personal situation.

## Relationship to Personality

In order to provide additional information about the validity of the MVS with adolescents, we calculated partial correlations, controlling for age and gender, for the four different MVS scales and personality measures in terms of the big five traits and generalized self-efficacy and locus of control beliefs. The results in Table 2 largely confirmed our hypotheses and research with the original version of the MVS by showing that within both cohorts higher generalized self-efficacy beliefs were negatively related to and more externality of control beliefs positively related to more problems with identity, decision making, vocational identity, information, and barriers. Among the cohort in eleventh grade, higher neuroticism was positively related to and more extraversion negatively related to more problems with identity, decision making, vocational identity, and information, but not barriers. Openness was unrelated to problems. More agreeableness was negatively related to problems with barriers and information, but was unrelated to identity, decision making, or vocational identity. Finally, conscientiousness was negatively related to problems in all domains.

## Discussion

The results of the two preliminary studies showed that the reliability of the vocational identity scale can be significantly improved by applying a 5-point Likert response scale instead of the originally proposed 3-point scale. Particularly for future research with adolescents, this strongly recommends that the response format be adapted accordingly. In the main studies, reliability estimates for the subscales of identity, vocational identity, and barriers were good to sufficient and allow their interpretation as quantitative measures for practice and research. However, the subscales of decision making and information only showed modest reliability, which might be explained by their small

number of items. This suggests that they can be used in practice as indicators of problems in those areas but may not be appropriate as quantitative measures.

The confirmatory factor analysis supported the proposition that the MVS measures multiple, related factors of problems in career decision making. Specifically, the results suggest that the German-language MVS assesses problems in the areas of vocational identity, career decision making, information, and barriers (Holland, Daiger et al., 1980; Jörin Fux, 2006). However, we could not confirm that the scale measures two factors, one referring to personal career decision-making difficulties and one to environmental difficulties, as suggested by Jörin Fux (2006). Moreover, our data showed that the barriers factor consists of two related but separate factors – barriers concerning one's aspired vocation and barriers related to one's personal situation. This result confirms previous research on barriers in career development which established that career barriers are multifaceted (Swanson & Tokar, 1991).

The investigation of correlations with personality characteristics supported the nomological validity of the MVS for adolescents. In line with results obtained with the original English-language version and other research on difficulties in career decision making (e.g., Holland, 1997; Holland et al., 1993; Lounsbury et al., 2005; Lucas & Epperson, 1990), reporting more problems in the MVS correlated significantly with having less favorable personality dispositions.

The influence of personality traits on career development generally, and career decision making specifically, is well-established in the literature (Seibert, 2001; Tokar et al., 1998). According to the trait perspective of personality (McCrae et al., 2000), this general relationship can be explained in the way that traits represent endogenous basic tendencies of thinking, feeling, and acting, which in a dynamic process of selection of and reactions to external influences lead to the development of characteristic adaptations, or culturally-conditioned phenomena, including career attitudes and self-concepts. Conversely, the dynamic socioanalytic perspective on personality (Caspi, Roberts, & Shiner, 2005) would suggest that people select environments that correlate with their personality traits and are exposed to social influences that in turn affect personality functioning. As such, significant correlations might also be the result of career attitudes affecting personality characteristics over time.

As expected, less generalized self-efficacy and more external control beliefs were related to more reported problems in all areas. This supports previous research findings that perceptions of control and power in one's life facilitate career decision making (e.g., Lucas & Epperson, 1990). One possible reason is that they affect career decision-making self-efficacy, a specific form of efficacy beliefs that represent a person's perceived ability to successfully master the career decision-making task (Betz, 2007). Research shows that lack of career decision-making self-efficacy is an important predictor of difficulties in career decision

making (Creed, Patton, & Prideaux, 2006), presumably because it inhibits career commitment and career exploration (Gushue, Clarke et al., 2006).

Supporting previous research (Jin, Watkins, & Yuen, 2009; Lounsbury et al., 2005; Lounsbury, Tatum, Chambers, Owens, & Gibson, 1999), the results also suggest a significant relationship between conscientiousness and fewer reported problems in career decision making. Career preparation and (preliminary) career decision making are important developmental tasks for most adolescents and young adults in Switzerland (Fend, 1991). Hence, students who are generally more conscientious, as compared to students who feel less involved and invest less effort, can be expected to also be more engaged in and devoted to this task, which in turn facilitates their career decision making. This logic is supported by significant relationships of conscientiousness and active career exploration in other samples (Rogers, Creed, & Ian Glendon, 2008).

Neuroticism and less extraversion were also related to more problems in identity but not barriers. This supports previous research findings that those traits are particularly related to difficulties in vocational identity and decision making (Holland, 1997; Holland et al., 1993; Lounsbury et al., 2005). In a meta-analysis, Brown and Rector (2008) showed that different personality characteristics from the neuroticism cluster (i.e., trait negative affect, trait anxiety, depression, dysfunctional thinking) form a specific factor that explains career indecision that they named "indecisiveness/trait negative affect." One reason why neuroticism predicts problems in career decision making might thus be its relationship to dysfunctional thinking patterns concerning career development or anxiety about one's vocational future.

The relationship to extraversion might be based on the significant relationship between extraversion and energy and proactivity (McCrae & Costa, 1999); hence, extraversion could facilitate active self- and environmental exploration which is in turn related to more progress in career decision making (Hirschi & Läge, 2007a). Moreover, career exploration entails self-reflection and environmental exploration (Zikic & Hall, 2009), which might be more difficult for students low in extraversion because they might lack the energy to actively explore their environment or feel uncomfortable about novel social interactions that often accompany acquiring new career information.

Contrary to some studies (Lounsbury et al., 1999, 2005), agreeableness was not related to identity. On the other hand, it was correlated with fewer problems with barriers. This suggests that students who are better able to go along with people in their environment also receive more support for their career. However, overall, the results support the rather weak relationship between agreeableness and career decision making in the literature. Similarly, openness was not significantly related to problems in any area. Lounsbury et al. (2005) reported a weak but significant relationship between openness and career decidedness among US 12th graders, but not among 7th and 10th graders. Howev-

er, Holland et al.'s (1993) literature overview also did not clearly support the relationship between openness and vocational identity, which confirms the generally weak relationship between these two constructs.

To summarize, our results support the validity of the MVS scores by showing a number of significant relationships with personality characteristics that are in line with theoretical assumptions and previous research.

## Implications for Research

As for research, the results imply that the German-language version of the MVS represents a valid and economical measure of problems in career decision making among adolescents. Specifically, the 7-item vocational identity scale and the 6-item barriers scale can be used as reliable measures of distinct but related problems in career decision making in research studies. Research efforts might include investigating additional factors that affect difficulties in career decision making, such as social support, parental influence, or environmental constraints. Moreover, researchers should investigate the outcomes of problems in career decision making with respect to the transition to vocational educational and training, university education, or regular paid employment.

## Implications for Practice

As for practice, the results of the present study imply that the German-language version of the MVS can be rightfully used with adolescents. All four subspects of identity, decision making, information, and barriers can be taken into account as separate but related factors of problems in career decision making when interpreting the MVS scores. However, one should refrain from comparing scores in the decision-making and information subscales across individuals due to their restricted reliability. Based on the problems reported in the different areas, the general readiness of a client for career decision making can be assessed and specific interventions targeting salient problems can be administered.

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