ORIGINAL ARTICLE

Development and feasibility of the computerized Turkish edition of the Composite International Diagnostic Interview [DIA-X/CIDI version 2.8(TR)]

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Funding information

Volkswagen Foundation, Grant/Award Number: II/84 336

Abstract

The Composite International Diagnostic Interview (CIDI), which has been widely applied in epidemiological research, is a standardized, clinically structured interview that enables the diagnosis of mental disorders based on DSM and ICD criteria. The computerized DIA-X CIDI Version 2.8 investigated in this study is an adaptation of the German DIA-X/Munich CIDI, which was translated in a multi-step process into Turkish and used to survey the prevalence of mental disorders in individuals with Turkish migration backgrounds in Germany ($N = 662$). The bilingual lay interviewers were intensively trained and supervised during the data collection. The survey was accompanied by further quality measures, including editing and documenting. To investigate the instrument's feasibility, quality criteria were used based on the following data sources: (1) socio-demographic sample characteristics; (2) interviewer assessments and (3) quantitative measures (interview duration, non-response items, error items). The results indicated that quality differences between the German and Turkish DIA-X/CIDI are associated with age, educational level and socio-economic status and not with the CIDI version itself. In short, the Turkish DIA-X/CIDI Version 2.8 has comparatively good quality and feasibility relative to its German counterpart.

KEYWORDS

Composite International Diagnostic Interview (CIDI), epidemiology, feasibility, migration, translation

1 | INTRODUCTION

With the implementation of psychiatric classification systems such as the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2013) and the International Classification of Diseases [ICD; World Health Organization (WHO), 1993], the need and opportunity for the development of standardized and structured survey instruments within the context of epidemiological, clinical psychiatric research has become increasingly evident (Robins et al., 1988; Janca, Üstün, & Sartorius, 1994; Meyer, Rumpf, & Ulrich John, 2000). Among other structured survey instruments [e.g. Structured Clinical Interview for DSM (SCID), MINI, Schedules for Clinical Assessment in Neuropsychiatry (SCAN)] the Composite International Diagnostic Interview (CIDI) is a widely used interview to conduct the

prevalence of common mental disorder (Steel et al., 2014). Initially the CIDI, which was based on the earlier Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, Ratcliff, 1981), was developed in the 1980s as part of a cooperative research project between the WHO and the former Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) (Wittchen et al., 1991). One of the central goals in the development of the CIDI was to enable cross-cultural comparisons of prevalence and comorbidity rates and determine potential universal risk factors (Robins et al., 1988) for mental disorders in cross-national studies (Wittchen et al., 1991). For this purpose, standardized translation protocols were developed and applied, including an iterative translation and back-translation process (Robins et al., 1988; Sartorius & Janca, 1996; Kessler & Üstün, 2004). Since its initial availability in 1990, the CIDI has continuously been developed, adapted and

translated in response to various research focuses (Wittchen et al., 1991; Janca et al., 1994; Wittchen, Lachner, Wunderlich, & Pfister, 1998; Kessler & Üstün, 2004; Kessler, 2007).

The CIDI enables the diagnosis of mental disorders according to the diagnostic criteria of the DSM and ICD in epidemiological and clinical studies and within clinical practice (Wittchen et al., 1991). The diagnosis is generated based on a probe flow chart (PFC) system containing a standardized algorithm that tests the clinical significance of relevant symptoms (Wittchen & Pfister, 1997; Andrews & Peters, 2010). Thus, the CIDI generates diagnoses of mental disorders related to lifetime, 12-month, and point (four weeks) prevalence. The psychometric quality criteria of the CIDI has been investigated in several studies that have generally found acceptable to excellent parameters for objectivity, reliability and validity (Janca, Robins, Bucholz, Early, & Shayka, 1992a; Janca, Robins, Cottler, & Early, 1992b; Wittchen, 1994; Haro et al., 2006; Kessler, 2007). Good objectivity, reliability, and validity parameters were also found for the CIDI's relationship to the DIA-X CIDI (Diagnostic Expert System Interview; Wittchen & Pfister, 1997; Wittchen et al., 1998; Reed et al., 1998). The retest reliability of the DIA-X CIDI was good, and high concordance with DSM-IV diagnoses was found in a random population sample ($N = 60$), which was measured twice (interval: 38 days); the results ranged from kappa = 0.56 for *any eating disorder* to kappa = 0.81 for *any anxiety disorder*. However, within the anxiety disorders, the *generalized anxiety disorders* (kappa = 0.45) and *panic disorders* (kappa = 0.57) presented the lowest concordance (Wittchen et al., 1998). Good concordances were also found for diagnostic validity (Reed et al., 1998). In general, the concordances between the clinician and CIDI diagnoses varied from kappa = 0.63 (*any panic disorder*) to kappa = 0.96 (*any depressive episode*). However, lower (although still acceptable) concordances were found for *dysthymia* (kappa = 0.54) and *somatoform disorders* (kappa = 0.50).

A key advantage of the CIDI is the lack of explicit clinical experience required to administer it (Robins et al., 1988). Nevertheless, extensive training of the lay interviewers is considered a prerequisite (Wittchen & Pfister, 1997; Meyer et al., 2000). The CIDI is available as both a paper-pencil and computerized version with multiple revisions and adaptations (Janca et al., 1994; Wittchen et al., 1998; Andrews & Peters, 2010). However, the computerized version is easier to use because of its automatic PFC coding system (Wittchen & Pfister, 1997). The present paper investigates a computerized Diagnostic Expert System Interview (DIA-X) version of the CIDI, which is an advanced version of the German Munich Composite International Diagnostic Interview (DIA-X/Munich-CIDI). This version is based on the concept of computer-assisted personal interviewing (CAPI), which allows the standardized implementation of clinically structured interviews in a face-to-face setting (Wittchen & Pfister, 1997; Wittchen et al., 1998). The core content of the Turkish DIA-X/CIDI version 2.8 investigated here was previously implemented in its German language version within the context of a national health survey study (Mental Health Module of the German Health Interview and Examination Survey for Adults; DEGS1-MH) from 2008 to 2011 (Scheidt-Nave et al., 2012; Jacobi et al., 2014).

There are nearly three million individuals with Turkish migration backgrounds living in Germany, and they comprise the largest migrant group in Germany. The group of individuals with migration backgrounds includes persons who moved to the Federal Republic of

Germany after 1949, German-born foreign nationals, or German-born citizens with at least one parent who is a migrant or a German-born foreign national (Statistisches Bundesamt, 2013). Until now, no reliable epidemiological data has been available regarding the prevalence of mental disorders within this migrant population. A research project funded by the Volkswagen foundation initially conducted an epidemiological survey that focused on the prevalence and comorbidity rates of mental disorders. The target group consisted of individuals with Turkish migration backgrounds in Germany. Prior to the data collection process, it became evident that a translation of the applied survey instruments was necessary to increase the probability of subject participation (particularly for individuals with little to no German language skills) and improve the survey's representativeness of the target group (Dingoyan, Schulz, & Mösko 2012). To the best of our knowledge, a Turkish translation of an earlier paper-pencil version of the CIDI 2.1 does exist; however, it only examines the 12-month prevalence of mental disorders (Kılıç & Göğüş, 1997). There is no Turkish language translation of the DIA-X/CIDI, which differs significantly in its content and structure from the paper-pencil CIDI 2.1. This article presents: (1) the translation of the DIA-X/CIDI based on the TRAPD team approach by Harkness (2008), (2) the quality assurance process, and (3) a review and discussion of the feasibility of the DIA-X/CIDI 2.8(TR).

2 | METHODS

Between August 2011 and July 2012, 662 face-to-face interviews were completed in Hamburg ($n = 376$) and Berlin ($n = 286$) using the DIA-X/CIDI 2.8(TR). The target group consisted of individuals with Turkish migration backgrounds aged 18–65 years. The average duration of the CIDI interview was 117 minutes (range: 26–360 minutes). Longer-lasting interviews were conducted in two ($n = 20$) or three ($n = 3$) sessions. Overall, 458 of the fulfilled interviews were conducted in the Turkish language, based on the self-selected language preference (German or Turkish) of the subjects. Because the present paper is focusing on a detailed description of the development and quality assurance steps of the DIA-X/CIDI 2.8(TR), extensive information concerning the study design and sampling methods can be found elsewhere (study protocol by Mösko & Dingoyan, 2016).

The DIA-X/CIDI 2.8(TR) is divided into 14 sections and enables the diagnosis of the most common mental disorders in adults based on the ICD-10 and DSM-IV criteria (including the lifetime, 12-month, and four-week prevalence), with the exception of personality disorders and dementia-related illness: demographic factors (Section a: maximum 10 items); tobacco related disorders (Section b: maximum 17 items); somatization disorders (Section c: maximum 304 items); anxiety disorders (Section d: maximum 271 items); affective disorders (Section e: maximum 109 items); mania (Section f: maximum 30 items); psychotic disorders (Section g: maximum 36 items); eating disorders (Section h: maximum 82 items); disorders linked to alcohol abuse and dependency (Section i: maximum 30 items); obsessive compulsive disorders (Section k: maximum 34 items); disorders linked to drug abuse and dependency (Section i: maximum 573 items); post-traumatic stress disorder (Section n: maximum 126 items); utilization data (Section q: maximum 519 items); interviewer assessment (Section x: maximum 76 items).

2.1 | Translation process

To ensure a maximum of content equivalence the DIA-X/CIDI 2.8 and its accompanying 42-page booklet were translated using a multi-step process (TRAPD team approach by Harkness, 2008). The individual items, answer choices and interview instructions were initially processed in tabular form so that the Turkish translation could be entered next to the original German. In the initial step, the individual items (questions, answer choices and instructions) of the CIDI were translated independently by two native Turkish speakers with translation experience (one advanced psychology student and one translator in the last phase of education; *Translation phase*). Both translations were placed next to each other and compared by a third person, a Turkish-speaking psychologist, taking the original German version into account. As a result, a third version of the translation was prepared for the entire survey instrument (*Advanced translation phase*). This temporary version was then discussed and reviewed item by item (including answer choices and instructions) among the whole translation team (*Review phase*). If disagreement or uncertainty regarding the appropriate translation arose within the team, three additional Turkish-speaking experts (psychiatrist and researchers) were contacted in writing and asked to suggest a translation for each contested item. The translation was again reviewed and finalized via discussion and by combining the initial team and external expert translations (*Adjudication phase*). The resulting CIDI translation was then tested for intelligibility. The test subjects ($n = 6$) were individuals living in Hamburg and Berlin with Turkish migration backgrounds who indicated a personal preference for the Turkish language (*Pretest phase*). After the language problems (e.g. comprehension difficulty) and technical programming issues (e.g. errors in filtering) that had arisen during the pretest were corrected, the Turkish version of the DIA-X/CIDI 2.8 was able to be finalized by clicking through the whole interview and adjusting errors in several runs. The individual steps of the translation process and the challenges that arose within its course were consequently documented (*Documentation phase*). The entire translation process took place over a period of approximately two months (from 18 April 2011 to 24 June 2011).

2.2 | Interviewer training

Over the course of the data collection process, a total of 28 bilingual interviewers (22 female/6 male) were active in Hamburg and Berlin. The selected interviewers went through an extensive interviewing process in which their German and Turkish language proficiency was tested. During this testing, the interviewers were asked to read German and Turkish passages aloud from the DIA-X/CIDI 2.8(TR). Within a maximum four-day training period, the interviewers were instructed in the following theoretical and practical topics: (1) symptoms and diagnoses of mental disorders; (2) study design and data collection process; (3) using the computerized survey instrument, DIA-X/CIDI 2.8(TR); (4) the language specifics of the Turkish DIA-X/CIDI 2.8; (5) practice conducting clinically structured interviews in German and Turkish; (6) handling difficult interview situations (e.g. sadness, anger, suicide); (7) documentation and study management.

In the first three training days, the following subject matter was conveyed: After a short introduction to the background and the goals

of the survey, the interviewers were given instruction on the topic of *mental disorders* (e.g. What are mental disorders? What are classification systems? What are the core symptoms of the individual disorder profiles that can be gathered with the DIA-X/CIDI 2.8?). After the study design and the planned survey process were discussed, the individual survey instruments were introduced. The use of the DIA-X/CIDI 2.8(TR) as the primary instrument and its accompanying booklet were demonstrated and explained step by step. This demonstration included a detailed presentation and explanation of the various window types (e.g. standard window, windows with free text entry fields) and question types (e.g. screening questions, symptom questions, onset questions, recency questions) and the various answer options. Furthermore, the interviewers were taught important issues related to the interview process (e.g. the principle of neutrality, the principle of exact reproduction of the interview questions, the importance of following the interview instructions) and the rules for coding (e.g. conservative coding in age entries, calculation of the alcohol index).

In addition, the particulars of the Turkish version were noted (e.g. the translation of specific central terms, the sentence structure and emphasis on specific sentence contents in the Turkish translation). The interviewers were then given the opportunity to practice using the DIA-X/CIDI 2.8(TR) in both languages via case examples and role playing. In the subsequent teaching block, difficult situations that might arise (e.g. the interviewee breaks into tears, the interviewee appears unmotivated and exhausted, the interviewee answers in too much detail, the interviewee responds angrily and wants to end the interview, the interviewee expresses suicidal thoughts) were broached, and possible coping strategies were developed. In the final teaching block, the interviewers were instructed regarding organizational issues (e.g. appointment coordination, documentation, reference people, data transmission). In preparation for the fourth training day, the interviewers were asked to complete a full practice interview in both languages within a week. On the fourth training day, the conducted interviews and any associated questions were discussed.

The interviewers were also given guidelines regarding the training contents and a question-and-answer catalogue that was continuously updated over the course of the survey. The survey was accompanied by regular supervision sessions (conducted weekly initially and at 14-day intervals later), which were moderated by two interdisciplinary teams, one in Hamburg (consisting of psychotherapists and a Turkish-speaking psychologist) and the other in Berlin (consisting of a psychologist, a Turkish-speaking ethnologist and an educationalist). Additionally, the interviewers had the opportunity to ask the supervisors any time via telephone or e-mail.

2.3 | Editing

A further step in the quality assurance process (as recommended by Meyer et al., 2000) consisted of a review of the interviews a few days after their completion that considered the following components: completion, plausibility and consistency. The accompanying booklet of the DIA-X/CIDI 2.8(TR) and the diverse output data (application data files, aborted data files, reloaded data files, problem data files, test data files) that the DIA-X program created served as the basis for the reviews.

Because of the prompt reviews, it was possible to identify application errors early on, undertake correction and instruct interviewers in the correct application during the course of the data collection process.

After the data were edited, the raw data files were revised (e.g. to correct the age entry or the alcohol index) and were reviewed to ensure the plausibility and consistency of specific details (e.g. the accuracy of the subject and interviewer ID and the interview date, the plausibility of the interview duration, the presence of error messages related to unusually rapid answer entry and the plausibility of the answer tendency (e.g. 'answer refused' and 'don't know'). The interview quality was also assessed using section x (the Interview assessment) of the CIDI, which consisted standardly of following items: Cx3: How do you rate the overall quality of the collected data?; Cx4: In fully completed interviews: Did the subject complete all of the questionnaires in the accompanying booklet?; Cx5: Was the interview conducted in multiple sessions? (Cx5b1: Unexpected event on the part of the interviewer; Cx5b2: Unexpected event on the part of the subject; Cx5b3: Subject is tired or bored; Cx5b4: Subject is annoyed by the questions; Cx5b5: Subject is confused by the questions; Cx5b6: other reasons); Cx7: Did the subject refuse to answer any questions? The quality assessment was documented according to a protocol.

2.4 | Documentation

The interviewers documented their work process based on recording sheets and the check lists contained therein. The recording sheets were developed on the basis of the planned implementation design of the DIA-X/CIDI 2.8(TR) and contained areas where the interviewer could note any problems that occurred during the interview. In the final documentation section, which was to be filled out after the completion of the interview, the interviewer was asked to estimate the interview quality and write down which problems (if applicable) arose: (1) The implementation of the interviews was: (a) unproblematic, (b) partially problematic, (c) problematic; (2) The interviewee could follow the interview: (a) very well/well, (b) partially, (c) poorly; (3) The answer options and instructions were: (a) just right, (b) too complicated, (c) not always comprehensible, (d) too detailed/too long; (4) Assessment of the interviewee: Is he/she literate?

3 | DATA ANALYSIS

3.1 | Quality measures

The quality criteria collected from two sources and analysed here, were closely related to the application process of the DIA-X/CIDI 2.8(TR). As described earlier in detail, these were: (1) the interviewer quality assessment on the basis of the described measures of the CIDI section x and of the recording sheets, and (2) quantitative quality assessment on the basis of objective measures, such as interview duration, non-response and error messages.

3.2 | Statistical analysis

Data analysis was conducted using SPSS Statistics version 22. Socio-demographic sample characteristics (see Table 1) were weighted

according to the stratification variables gender, age and education based on the micro-census data provided for Hamburg and Berlin residents of Turkish migrant backgrounds (personal communication with regional statistical office, 2012). To analyse the differences between the participants who chose the Turkish versus the German language version of the CIDI DIA-X, cross-tabulations with χ^2 tests for categorical data or t-tests for continuous data were performed. To measure the effect size, we computed phi or Cramer's V or Cohen's d. Linear multiple regression analyses were conducted to analyse the relationship between quality criteria (dependent variables) and socio-demographic predictors that were significantly correlated to quality criteria in the previous univariate analyses. The regression analysis were conducted with the SPSS command of 'listwise deletion'.

4 | RESULTS

4.1 | Sample

The sample consisted of 58% women and 42% men with a total mean age of 40 years [standard deviation (SD) = 12, range: minimum =18 and maximum =65] who resided in Germany and had a Turkish migration background.

First-generation migrants were predominant in the investigated sample, comprising 75%, and approximately 77% of the sample reported having experienced migration themselves. The category 'first-generation migrants' comprises people who immigrated as adults (>18 years) to Germany after 1949 (Statistisches Bundesamt, 2013). Their children, who migrated later or were born in Germany, are categorized as 'second-generation migrants', whereas the category 'own migration experience' comprises persons who had experienced migration themselves regardless of their generational status. Additionally, the results present significant differences between those who opted to take the Turkish CIDI and those who took the German CIDI regarding all socio-demographic variables except 'gender'. As the Cramer's V and phi values show, there were large effect sizes, particularly for 'nationality', 'generational status' and 'own migration experience'. With the exception of 'gender', all other socio-demographic variables differed and had medium effect sizes.

4.2 | Interviewer quality assessment

Based on the interviewer estimation in section x, there was a significant difference with a small effect size between the total ratings of both CIDI versions (see Table 2). Here, the overall quality of the Turkish CIDI version was rated significantly more poorly by the interviewers. The results also indicated a slight tendency to refuse to answer questions more frequently among the participants who opted to take the Turkish CIDI.

When considering the quality assessment based on the recording sheets (see Table 3), significant differences between the Turkish and German CIDI versions with small effect sizes become evident for all included quality criteria. While the majority of interviewers rated the implementation of both CIDI versions as unproblematic, the Turkish version was rated as partially unproblematic or as problematic somewhat more often than the German version was.

TABLE 1 Socio-demographic sample characteristics adjusted by gender, age and educational level and a comparison of frequencies between interviews conducted with the Turkish or German DIA-X/CIDI version 2.8

	Total (n = 662)		DIA-X/CIDI 2.8 Turkish (n = 458)		DIA-X/CIDI 2.8 German (n = 204)		Test (df)	p Value	Cramer-V/ phi ^a
	n	%w	n	%w	n	%w			
Gender	662	100	458	100	204	100	$\chi^2 = 1.407 (1)$	0.236	-0.046
Female	386	58.3	274	59.8	112	54.9			
Male	276	41.7	184	40.2	92	45.1			
Age (years)	662	100	458	100	204	100	$\chi^2 = 138.100 (2)$	<0.001	0.457
18–29	139	21.0	44	9.6	95	46.6			
30–49	385	58.2	283	61.8	102	50.0			
50–65	138	20.8	131	28.6	7	3.4			
Educational level	662	100	458	100	204	100	$\chi^2 = 61.261 (2)$	<0.001	0.304
Low	257	38.8	223	48.7	34	16.7			
Medium	161	24.3	96	21.0	65	31.9			
High	244	36.9	139	30.3	105	51.5			
Socio-economic status	552	83.4	388	84.7	164	80.4	$\chi^2 = 37.186 (2)$	<0.001	0.260
Low	360	54.4	276	60.3	84	41.2			
Medium	117	17.7	81	17.7	36	17.6			
High	75	11.3	31	6.8	44	21.6			
Nationality	654	98.8	452	98.7	202	99.0	$\chi^2 = 95.350 (3)$	<0.001	0.382
Turkish	415	62.7	341	74.5	74	36.3	$\chi^2 = 237.183 (1)^b$	<0.001 ^b	0.603 ^b
German	184	27.8	79	17.2	105	51.5			
Both	53	8.0	31	6.8	22	10.8			
Other	2	0.3	1	0.2	1	0.5			
Generational status	649	98.0	448	97.8	201	98.5	$\chi^2 = 247.085 (1)$	<0.001	0.617
First generation	498	75.2	422	92.1	76	37.3			
Second generation	151	22.8	26	5.7	125	61.3			
Own migration experience	653	98.6	452	98.7	201	98.5	$\chi^2 = 249.283 (1)$	<0.001	0.618
Yes	502	76.9	426	93	76	37.3			
No	151	18.7	26	5.7	125	61.3			
Mother tongue	653	98.6	452	98.7	201	98.5	$\chi^2 = 94.482 (3)$	<0.001	0.380
Turkish	534	81.8	402	87.8	132	64.7	$\chi^2 = 50.538 (3)^b$	<0.001 ^b	0.278 ^b
German	17	2.6	0	0	17	8.3			
Both	63	9.5	19	4.1	44	21.6			
Other	39	5.9	31	6.8	8	3.9			

^aThe phi value is given for correlations of nominal variables with only two values each; Cramer's V is given in cases with more than two values for at least one variable.

^bBecause of the limited number of cases, the values 'German', 'Both' and 'Other' were combined in the category 'not exclusively Turkish'.

4.3 | Quantitative quality assessment

For all three quantitative quality criteria no significant differences between the two groups were found (see Table 4).

4.4 | Predictors of five different quality criteria

Using multivariate linear and logistic regression analysis, a further step investigated the potential relationship between selected quality criteria (dependent variables) and possible socio-demographic predictors (independent variables) that showed significant results in the univariate analyses. The variables 'nationality' and 'own migration experience' were not included in the regression analysis despite significant results (see Table 1) to avoid multicollinearity due to high correlations of both variables with each other and the third variable

'generational status' that was considered in the regression analysis. The regression analysis (see Table 5) demonstrated that reduced quality in the different criteria variables was significantly associated with higher age, lower education, or lower socio-economic status.

5 | DISCUSSION

5.1 | Key findings

In the first stage, data analysis indicated significant differences between the group interviewed with the Turkish DIA-X/CIDI 2.8 version versus those interviewed with the German version in terms of socio-demographic sample characteristics and some of the included quality criteria (overall quality, implementation quality, attention,

TABLE 2 Quality assessment by the interviewers via section x; comparison of the Turkish and German DIA-X/CIDI Version 2.8

DIA-X/CIDI 2.8 Turkish n (%)	DIA-X/CIDI 2.8 German n (%)	Total n (%)	Test (df)	p Value	Cramer-V/ phi ^a
<i>Overall quality, cx3</i>					
n = 456	n = 204	n = 660 ^b	$\chi^2 = 17.090$ (3)	0.001	0.161
Very good					
172 (37.7%)	111 (54.4%)	283 (42.9%)			
Good					
230 (50.4%)	79 (38.7%)	309 (46.8%)			
Uncertain					
52 (11.4%)	14 (6.9%)	66 (10.0%)			
Poor					
2 (0.4%)	0 (0.0%)	2 (0.3%)			
<i>Booklet completed, cx4</i>					
n = 456	n = 204	n = 660 ^b	$\chi^2 = 5.226$ (2)	0.073	0.089
yes					
418 (91.7%)	195 (95.6%)	613 (92.9%)			
no					
36 (7.9%)	7 (3.4%)	43 (6.5%)			
<i>Multiple sessions, cx5</i>					
n = 456	n = 204	n = 660 ^b	$\chi^2 = 0.000$ (1)	0.988	0.001
yes					
20 (4.4%)	9 (4.4%)	29 (4.4%)			
no					
436 (95.6%)	195 (95.6%)	631 (95.6%)			
<i>Stopped by interviewer, cx5b1</i>					
n = 419	n = 197	n = 616	$\chi^2 = 0.493$ (2)	0.782	0.028
yes					
1 (0.2%)	0 (0.0%)	1 (0.2%)			
no					
18 (4.3%)	9 (4.6%)	27 (4.4%)			
<i>Stopped by participant, cx5b2</i>					
n = 419	n = 197	n = 616	$\chi^2 = 0.173$ (2)	0.917	0.017
yes					
3 (0.7%)	2 (1.0%)	5 (0.8%)			
no					
16 (3.8%)	7 (3.6%)	23 (3.7%)			
<i>Tired/bored, cx5b3</i>					
n = 419	n = 197	n = 616	$\chi^2 = 0.413$ (2)	0.813	0.026
yes					
4 (1.0%)	1 (0.5%)	5 (0.8%)			
no					
15 (3.6%)	8 (4.1%)	23 (3.7%)			
<i>Annoyed, cx5b4</i>					
n = 419	n = 197	n = 616	$\chi^2 = 0.000$ (1)	0.985	0.001
yes					
0 (0.0%)	0 (0.0%)	0 (0.0%)			
No					
19 (4.5%)	9 (4.6%)	28 (4.5%)			
<i>Confused, cx5b5</i>					
n = 419	n = 197	n = 616	$\chi^2 = 0.003$ (2)	0.999	0.002
yes					
2 (0.5%)	1 (0.5%)	3 (0.5%)			
no					

(Continues)

TABLE 2 (Continued)

DIA-X/CIDI 2.8 Turkish n (%)	DIA-X/CIDI 2.8 German n (%)	Total n (%)	Test (df)	p Value	Cramer-V/ phi ^a
17 (4.1%)	8 (4.1%)	25 (4.1%)			
<i>Other reasons, cx5b6</i>					
n = 419	n = 197	n = 616	$\chi^2 = 0.033$ (2)	0.984	0.007
yes					
12 (2.9%)	6 (3.0%)	18 (2.9%)			
no					
7 (1.7%)	3 (1.5%)	10 (1.6%)			
<i>Refused to answer, cx7</i>					
n = 456	n = 204	n = 660 ^b	$\chi^2 = 3.434$ (1)	0.064	0.072
yes					
39 (8.6%)	27 (13.2%)	66 (10.0%)			
no					
417 (91.4%)	177 (86.8%)	594 (90.0%)			

^aThe phi value is given for correlations of nominal variables with only two values each; Cramer's V is given in cases with more than two values for at least one variable.

^bIn two cases of the 662 interviews section x was not filled by the interviewers.

comprehension of the answer items and illiteracy). The determined effect sizes indicated that these quality criteria were mildly correlated with the group that was interviewed with the Turkish CIDI version, while all socio-demographic variables (excluding gender) showed a medium to high correlation. This was particularly true for the variables associated with migration background (nationality, generational status, own migration experience). This is not surprising because these components are correlated with one another. Furthermore, the regression analysis indicated that age, educational level and socio-economic status were significantly correlated with two to five of the included quality criteria. Considering the highly significant results, the following quality reductions (from the perspective of the interviewer) emerge: (1) low socio-economic status accompanied a lower general quality; (2) high age accompanied a lower implementation quality; (3) high age and low educational level accompanied reduced attention capability for the participants. The relationship with illiteracy showed solely an association with a low and middle educational level which seems to be an evident result; nevertheless it should be noted that this pertained to a small number of participants (3.8% of the sample). Overall, it can be deduced that when the socio-demographic variables were kept constant, the varying CIDI versions had no influence on the quality of the interview; thus, the Turkish DIA-X/CIDI version had a good quality and feasibility similar to that of the German version.

Regarding the aborted interviews ($n = 30$), frequently given explanations were 'too exhausting' (e.g. a decline in concentration and difficulty comprehending the questions and answers) and 'too long'. The duration of the interview before it was ceased varied greatly (range: 54–315 minutes). The length of the CIDI interview has been discussed critically in numerous studies because it increases considerably in the presence of illiteracy or comorbid mental disorders (e.g. Kishore, Kapoor, & Reddaiah, 1999; Wittchen et al., 1991; Quintana et al., 2004). Data on the prevalence and comorbidity of mental disorders, which were assessed using the DIA-X/CIDI 2.8(TR) in the present study, will be discussed in further publications. The average duration of the CIDI interview in our sample was 117 minutes (range: 26–360 minutes), excluding the quality assessment (section x). Kishore

et al. (1999) report a similar average interview time in their translated version of the CIDI (average time: 110.56 minutes), while other studies showed considerably shorter implementation times: e.g. 90 minutes, not including section g (Wittchen et al., 1998); 66 minutes, SD 27.2 (Jacobi et al., 2014); and 63 minutes, range: 20–185 minutes (Brugha, Jenkins, Taub, Meltzer, & Bebbington, 2001).

5.2 | Strengths and limitations

As socio-economic status was found to be an important predictor of nearly all analysed quality criteria (see Table 5) it should be critically noted that there exists a significant amount of missing data (16.6% of the total sample). This is an important limitation for the interpretation of the results. Possible reasons for the higher number of missing information on socio-economic status in comparison to other variables could be due to mistrust, anxiety and concerns about data privacy protection in the context of health research studies (Dingoyan et al., 2012). However, one of the fundamental strengths of this study is that it offers the first translation of the DIA-X/CIDI for the largest migrant group currently living in Germany and tested the translated version immediately upon its first implementation.

Translation and comprehension difficulties related to the CIDI and interviewer difficulties with handling taboo topics (e.g. sexuality or depression) have been reported in previous studies (Kishore et al., 1999; Smits, de Vries, & Beekman, 2005; Wittchen et al., 1991). To obtain the best possible content equivalence to the German DIA-X/CIDI, the translation and back-translation method was declined in favour of a more elaborate translation process based on the TRAPD team approach (Harkness, 2008). This permitted the inclusion of differentiated and culturally relevant nuances; for example, those related to different subjective theories of disease and expressions of psychological symptoms (Vardar, Kluge, & Penka, 2012). As described, a pretest ($n = 6$) was conducted with this translated version of the CIDI, and adjustments were made. Because of the project's time and financial limitations, it was not possible to conduct cognitive pretesting before field application, which could have potentially identified further

TABLE 3 Quality assessment by the interviewers via the protocol sheets; comparison between the Turkish and German DIA-X/CIDI version 2.8

DIA-X/CIDI 2.8 Turkish <i>n</i> (%)	DIA-X/CIDI 2.8 German <i>n</i> (%)	Total <i>n</i> (%)	Test (df)	<i>p</i> Value	Cramer-V
<i>Implementation quality</i>					
<i>n</i> = 441	<i>n</i> = 195	<i>n</i> = 636	$\chi^2 = 7.401$ (2)	0.025	0.108
unproblematic					
358 (81.2%)	175 (89.7%)	533 (83.8%)			
partially unproblematic					
73 (16.6%)	17 (8.7%)	90 (14.2%)			
Problematic					
10 (2.3%)	3 (1.5%)	13 (2.0%)			
<i>Attention</i>					
<i>n</i> = 439	<i>n</i> = 196	<i>n</i> = 635	$\chi^2 = 21.460$ (2)	<0.001	0.184
followed very well					
320 (72.9%)	175 (89.3%)	495 (78.0%)			
partially followed					
101 (23.0%)	19 (9.7%)	120 (18.9%)			
followed poorly					
18 (4.1%)	2 (1.0%)	20 (3.1%)			
<i>Comprehension</i>					
<i>n</i> = 417	<i>n</i> = 193	<i>n</i> = 610	$\chi^2 = 9.659$ (3)	0.022	0.126
just right					
204 (48.9%)	101 (52.3%)	305 (50.0%)			
too complicated					
12 (2.9%)	8 (4.1%)	20 (3.3%)			
not always comprehensible					
87 (20.9%)	21 (10.9%)	108 (17.7%)			
too detailed/too long					
114 (27.3%)	63 (32.6%)	177 (29.0%)			
<i>Illiteracy</i>					
<i>n</i> = 434	<i>n</i> = 199	<i>n</i> = 633	$\chi^2 = 8.540$ (2)	0.014	0.116
yes					
21 (4.8%)	3 (1.5%)	24 (3.8%)			
No					
404 (93.1%)	196 (98.5%)	600 (94.8%)			
not determinable					
9 (2.1%)	0 (0.0%)	9 (1.4%)			

TABLE 4 Quality assessment by quantitative measures; comparison between the Turkish and German DIA-X/CIDI version 2.8

DIA-X/CIDI 2.8 Turkish MW (SD)	DIA-X/CIDI 2.8 German MW (SD)	Total MW (SD)	Test (df)	<i>p</i> Value	Cohen's <i>d</i>
<i>Interview duration (minutes)</i>					
<i>n</i> = 458	<i>n</i> = 204				
section x excluded					
118.78 (51.01)	112.57 (44.91)	116.86 (49.26)	1.57 (439.097)	0.116	0.126
<i>Non-response</i>					
<i>n</i> = 458	<i>n</i> = 204				
answer denied					
1.64 (5.29)	1.71 (5.72)	1.66 (5.42)	0.160 (363.44)	0.746	-0.013
answer not known					
9.73 (10.01)	10.19 (11.10)	9.87 (10.36)	0.740 (355.00)	0.740	-0.044
<i>Error</i>					
<i>n</i> = 165	<i>n</i> = 74				
2.10 (1.82)	2.42 (2.11)	2.20 (1.92)	1.11 (123.56)	0.173	-0.167

TABLE 5 Predictors of five different quality criteria

	(1) Overall quality section x (cx3) beta	(2) Implementation protocol sheet beta	(3) Attention protocol sheet beta	(4) Comprehension protocol sheet beta	(5) Illiteracy ^a protocol sheet beta
Model fit					
R ²	0.074	0.070	0.125	0.009	0.035
p	<0.001	<0.001	<0.001	0.111	0.030
Predictor					
CIDI version	-0.073	-0.025	-0.027	0.004	0.495
Age	0.100*	0.218***	0.234***	0.118*	
Age 18–29					1.355
Age 30–49					2.004
Educational level	-0.087	-0.100*	-0.166***	-0.029	
Educational level low					0.098*
Educational level middle					0.093*
Socio-economic status	-0.180***	-0.109*	-0.127*	-0.077	
Socio-economic status low					1.271
Socio-economic status middle					1.126
Generational status	-0.007	0.073	0.041	0.061	0.561
Mother tongue	0.080	0.010	-0.021	0.039	1.967

Note: Predictors: CIDI version (1 = Turkish/2 = German); age (1 = 18–29/2 = 30–49/3 = 50–65); educational level (1 = low/2 = medium/3 = high); socio-economic status (1 = low/2 = medium/3 = high); generational status (1 = first generation/2 = second generation); mother tongue (1 = Turkish, 2 = not exclusively Turkish). Multivariate linear regression analysis, standardized β , adjusted R²; * p < 0.05; ** p < 0.01; *** p < 0.001 for the quality criteria: overall quality (range from 1 = very good to 4 = poor); implementation quality (range from 0 = unproblematic to 2 = problematic); attention (range from 0 = followed very well to 2 = followed poorly; comprehension (0 = just right to 3 = too detailed/too long); Logistic regression analysis, Odds Ratio, Cox & Snell R²;

* p < 0.05; ** p < 0.01; *** p < 0.001 for the quality criterion: illiteracy (0 = yes/1 = no).

^aThe “not determinable” cases (see Table 3) are defined as missing values.

sources of quality and feasibility problems (Collins, 2003; Fitzgerald, Widdop, Gray, & Collins, 2009).

The bilingual lay interviewers were trained intensively in the application of both CIDI versions according to international recommendations (Wittchen & Pfister, 1997; Meyer et al., 2000) and were closely supervised throughout the data collection process [via regular supervision and frequently asked questions (FAQs)]. The interviews were promptly checked and edited after their completion. Regarding feasibility testing, it should be noted that the quality criteria investigated here were based predominantly on the subjective assessments of the interviewer, although some quantitative measures (such as interview duration, non-response and error items) were included in the analysis. An additional questioning of the participants or cognitive debriefing after the completion of the interview (e.g. regarding the comprehensibility of the question and answer categories, attention, taboo topics) would have been informative. Supplementary testing of the diagnostic criteria's objectivity reliability and validity and the inclusion of a comparative sample without a migration background (for example, in Turkey) would have been desirable; however, such testing was not possible in the present study given the available time and financial resources.

6 | CONCLUSION

The DIA-X/CIDI 2.8(TR) shows comparatively good quality and feasibility compared with the German version based on the investigated

quality criteria. The identified quality differences are strongly related to the socio-demographic characteristics age, educational level and socio-economic status. This relationship should be investigated more closely in future studies, e.g. through adaptations to the CIDI DIA-X for implementation with older individuals (Wittchen et al., 2014) or individuals with a low educational level and socio-economic status. The DIA-X/CIDI 2.8(TR) shows also good quality in the event of illiteracy if all question and answer options are read aloud. In addition, it should also be taken into consideration that the DIA-X/CIDI 2.8(TR) was administered to Turkish-language speakers living in Germany. Because language use can vary based on migration and social influences, the question remains whether this instrument is also suitable for the Turkish population residing in Turkey.

ACKNOWLEDGMENTS

This study was part of the international research project ‘Orientation of the mental health care system towards the needs of migrants with mental disorders, 2009/11–2012/10’, supported by a grant from the Volkswagen Foundation (a German non-profit organization; funding code II/84 336). The authors are grateful to the Volkswagen Foundation for funding this study. The authors also thank all of the participants and interviewers in the study, all supporters and the advisory board.

DECLARATION OF INTEREST STATEMENT

The authors have no competing interest to declare.

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How to cite this article: Dingoyan D, Mösko M, Imamoğlu Y, et al. Development and feasibility of the computerized Turkish edition of the Composite International Diagnostic Interview [DIA-X/CIDI version 2.8(TR)]. *Int J Methods Psychiatr Res*. 2017;26:e1533. <https://doi.org/10.1002/mpr.1533>