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Psychometric Properties of the Coping Inventory for Stressful Situations (CISS) in Patients With Acquired Brain Injury

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Information on the psychometric properties of the Coping Inventory for Stressful Situations (CISS) in acquired brain injury (ABI) is currently unavailable. Therefore, we investigated the construct and discriminant, convergent, and divergent validity of the CISS in a Dutch adult sample with newly ABI ($N = 139$). Patients were recruited at the start of outpatient neurorehabilitation (time since diagnosis $\leq$ 4 months) or after discharge home from hospital or inpatient neurorehabilitation. The original 3-factor solution of the CISS (Task-Oriented, Emotion-Oriented, Avoidance) showed a borderline fit, which slightly improved after removal of 3 problematic items. We found borderline support for a 4-factor model. Internal consistency was good. Discriminant validity was only partial as we found a moderate correlation between the Task-Oriented and Avoidance scales. Emotion-Oriented Coping correlated strongly with the anxiety and depression subscale of the Hospital Anxiety and Depression Scale. Of the 2 scales of the Assimilative/Accommodative Coping Questionnaire, Tenacious Goal Pursuit correlated strongest with Task-Oriented Coping, whereas Flexible Goal Adjustment correlated negatively with Emotion-Oriented Coping. In summary, the psychometric properties of the CISS in patients with ABI ranged from acceptable to good. The classical 3-factor structure is appropriate, but some items might be problematic in patients with ABI. Replication of the restricted 3-factor model in larger samples is needed, together with further exploration of discriminant validity and the relationship of the CISS with other coping measures, but for now we recommend using the original CISS in patients with ABI.

Keywords: CISS, coping, brain injury, psychometrics, questionnaires

Acquired brain injury (ABI) refers to any nonprogressive injury to the brain caused after birth. The two most common forms of ABI are strokes and traumatic brain injuries (TBI). Other forms of ABI include, for example, brain tumors, encephalitis, and hypoxic encephalopathy. A growing body of evidence suggests that coping style is an important determinant of psychosocial outcome in ABI. Coping style is associated with levels of productivity, emotional stability, quality of life, and societal participation after ABI (Anson & Ponsford, 2006; Dawson, Schwartz, Winocur, & Stuss, 2007; Finset & Andersson, 2000; Wolters, Stapert, Brands, & van Heugten, 2011).

Despite its wide use, the exact meaning of the term *coping* is open to many interpretations. The definition, conceptualization, and classification of coping depend on the theoretical foundation that serves as background. From the transactional (situation-specific) perspective, coping is considered as a dynamic and

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situation-dependent process and is defined as "the person's cognitive and behavioral efforts to manage (reduce, minimize, master, or tolerate) the internal and external demands of the person–environment transaction that is appraised as taxing or exceeding the person's resources" (Folkman, Lazarus, Gruen, & DeLongis, 1986, p. 572). In the disposition-oriented view, coping is conceptualized as a personality trait or style, which assumes that people, across different situations, have preferences for certain coping styles (Schreurs, Tellegen, & Willige, 1984). Coping can also be regarded as domain-specific. In this view, coping is considered to be relatively stable across different stressors within one domain, but coping styles can differ between different domains (Ptacek & Pierce, 2003). Different instruments for measuring coping reflect different theoretical backgrounds.

In the general population, the Coping Inventory for Stressful Situations (CISS) developed by Endler and Parker (1990a) is widely used and has been reported to have excellent psychometric properties (Cook & Heppner, 1997; de Ridder & van Heck, 2004; Endler & Parker, 1994; McWilliams, Cox, & Enns, 2003). The dispositional approach was used in the development of the CISS, focusing on identification and comparison of basic coping strategies used by different individuals across different types of stressful situations (Endler & Parker, 1999).

The CISS is a 48-item instrument that distinguishes three basic coping strategies with 16 items per scale: Task-Oriented (T scale), Emotion-Oriented (E scale), and Avoidance (A scale; Endler & Parker, 1990b, 1994). Exploratory factor analysis of the 48-item inventory has shown that these three subscales correspond to separate factors. Additionally, the T, E, and A scales were factor analyzed separately. For the T and E scales, only one factor was produced. The A scale yielded two factors: a five-item Social Diversion scale and an eight-item Distraction Scale, with three items loading on both or neither factor (Endler & Parker, 1999). Some authors have found stronger support for a four-factor model (Task-Oriented, Emotion-Oriented, Distraction, and Social Diversion; Cook & Heppner, 1997; Hurt et al., 2011; McWilliams et al., 2003).

Internal reliability scores (Cronbach's alpha) of the CISS are reported to be good, ranging from .72 to .92 (Cook & Heppner, 1997; Endler & Parker, 1994, 1999; McWilliams et al., 2003; Smári & Valtysdottir, 1997). Concerning convergent and divergent validity, the Beck Depression Inventory (BDI; Beck, Steer, & Carbin, 1988) and the Depression subscale of the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) have shown significant positive correlations with the Emotion-Oriented CISS subscale (rs = .50–.61) and significant negative correlations with the Task-Oriented CISS subscale (rs = from –.20 to –.43; Endler & Parker, 1999; Flett, Blankstein, & Obertynski, 1996; Hurt et al., 2011; McWilliams et al., 2003). Diverse anxiety measures have been positively correlated with the Emotion-Oriented CISS subscale (Cosway, Endler, Sadler, & Deary, 2000; Endler & Parker, 1999; Hurt et al., 2011; McWilliams et al., 2003).

A Dutch version of the CISS scale was developed by de Ridder and van Heck (2004) and showed, in a similar fashion to the original version, a three-factor structure and good internal reliability.

Information on the internal and external validity of the CISS for use in the ABI population is currently not available. Two systematic reviews have assessed the use of coping instruments in ABI, and both showed a need for information on the psychometric properties of these instruments (Donnellan, Hevey, Hickey, & O'Neill, 2006; Wolters-Gregorio, Brands, Stapert, Verhey, & van Heugten, 2013). Only two of the reviewed studies used the CISS to measure coping behaviors (Backhaus, Ibarra, Klyce, Trexler, & Malec, 2010; Jaracz, Mielcarek, & Kozubski, 2007). Backhaus et al. (2010) showed that coping self-efficacy improved significantly in patients with TBI who received coping skills training compared with a nontreated control group. Coping styles, measured at baseline only, did not differ between groups. Jaracz et al. (2007) investigated coping in patients with poststroke fatigue to find that high levels of fatigue were associated with high use of emotion-oriented coping and low use of task-oriented coping.

Physical, cognitive, emotional, and behavioral problems are frequently present in patients with brain injury and typically have a chronic character (Dikmen, Machamer, Powell, & Temkin, 2003). Adaptation to these consequences of ABI is characterized by the simultaneous interaction of two processes: achieving maximal restoration of function and adjusting to the alterations and losses that occur in the various domains of functioning. In this process, not only coping with actual "everyday" problems is involved, which can be measured by the CISS, but also the pursuit of long-term goals. In the process of goal pursuit, persistence is needed to progress successfully. Yet the ability to (partially) disengage and adapt goals is equally important to prevent frustration when goals turn out to be unattainable (Brands, Wade, Stapert, & van Heugten, 2012).

Both tendencies, tenacity as the reflection of assimilative coping and flexibility in goal pursuit as the reflection of accommodative coping, can be measured by the Assimilative/Accommodative Coping Questionnaire (AACQ) developed by Brandtstädter and Renner (1990). So, to measure the different aspects of coping that are simultaneously involved in the process of adaptation after brain injury, the CISS and the AACQ are complementary.

As the CISS is widely used in the general population and good psychometric properties have been reported, it might be a promising instrument for use in ABI patients, in whom it has been hardly used so far. The presence of cognitive deficits and mental fatigue in this patient population make the CISS an attractive clinical instrument because of its relatively short administration time (10–15 min; Wolters-Gregorio et al., 2013). Information on the psychometric properties of the CISS in the ABI population is needed.

Therefore, the aims of this study were (a) to examine the factor structure of the CISS, (b) to study internal consistency and (c) discriminant validity, and (d) to examine the associations (convergent and divergent validity) of the CISS with the HADS and the Assimilative/Accommodative Coping Questionnaire in a sample of patients with ABI.

Method

Patients

Between January 2011 and January 2012, rehabilitation physicians and neurologists of the participating institutes (two rehabilitation centers and two hospitals in the southern region of the Netherlands) recruited consenting patients eligible for participation in this study in which coping flexibility after ABI was inves-

tigated. The patients were included consecutively upon return to the home environment, either at the start of an outpatient neurorehabilitation program or at discharge home from hospital or from an inpatient neurorehabilitation setting.

The inclusion criteria were (a) being older than age 18 years, (b) having a newly acquired, nonprogressive brain injury of any etiology confirmed by neurological or neuroimaging data, and (c) being a patient recruited at the start of an outpatient rehabilitation program: having sustained the injury in the previous 4 months.

The exclusion criteria were (a) the presence of any premorbid progressive brain disease, (b) having insufficient command of the Dutch language, and (c) lacking the ability to complete questionnaires based on clinical judgment (aphasia, severe cognitive impairment).

The medical ethics committees of Maastricht University Medical Center and all participating hospitals and rehabilitation centers approved this study. All patients gave their written informed consent.

Measures

Coping Inventory for Stressful Situations (CISS). The CISS is a 48-item instrument used to measure three basic coping strategies with 16 items per scale: Task-Oriented (T), Emotion-Oriented (E), and Avoidance (A; Endler & Parker, 1990a, 1994). The Avoidance Scale contains two subscales: Distraction (D) and Social Diversion (SD). Items are scored on a 5-point Likert scale (from 1 = *not at all* to 5 = *very much*). Scores for all items per scale are summed to form scale scores; higher scores indicate a greater use of that particular coping strategy. We used the Dutch version of the CISS that was developed by de Ridder and van Heck (2004) and has been validated in healthy adults and students. Internal consistency scores (Cronbach's alphas) were good, ranging from .75 to .88. Factor analysis revealed a three-factor structure (Task, Emotion, Avoidance). Discriminant validity was shown to be sufficient for the three main scales with nonsignificant or low correlations (rs $< .25$). Correlations between the Avoidance subscales (Social Diversion and Distraction) were higher but sufficiently low to distinguish two separate subscales (rs = .36–.46). Test–retest reliability was measured over a period of 6 weeks, and test–retest correlations were found to be high (rs = .78–.90), except for the Distraction subscale that showed a lower value (r = .66).

The Assimilative/Accommodative Coping Questionnaire (AACQ). The AACQ measures the dispositions of tenacity and flexibility. The Flexibility scale (Flexible Goal Adjustment, or FGA) consists of facets of accommodative processes related to disengagement, reorientation, and acceptance. The tenacity scale (Tenacious Goal Pursuit, or TGP) refers to assimilative tendencies: maintaining a chosen course of action, even under difficulty or increasing the valence of blocked goal perspectives. Both scales, TGP and FGA, consist of 15 items, measured on 5-point scales (from 0 = *completely agree* to 4 = *completely disagree*). Mean scores are calculated for each subscale, and higher scores indicate better use of that particular coping strategy. The internal consistency of both scales has been found good (FGA: Cronbach's α = .83; TGP: Cronbach's α = .80) as was the discriminant validity between the two scales (r = .06, *ns*; Brandtstädter & Renner, 1990). We used the Dutch translation (Aben & Busschbach, 2009) of the original German version of the questionnaire (Brandtstädter & Renner, 1990). This translation was done in a formal way and consisted of several independent forward (by the two German-speaking native Dutch researchers) and backward translations (by two native German researchers speaking Dutch fluently) and a check on comprehension by three lay subjects (Aben & Busschbach, 2009). An informally translated Dutch version has been used in stroke (Darlington et al., 2007, 2009). There is no information available on the psychometric properties of any of the Dutch versions.

Hospital Anxiety and Depression Scale (HADS). The HADS is a 14-item self-report measure with two subscales: Anxiety and Depression (Zigmond & Snaith, 1983). Items are scored on a 4-point scale. Subscale scores range from 0 to 21; higher scores indicate a greater amount of complaints. The HADS is widely used in patients with traumatic brain injury (Schönberger & Ponsford, 2010) and stroke (Sagen et al., 2009). A Dutch version was validated by Spinhoven et al. (1997) in adults, older adults, general practice patients, general medical outpatients with unexplained medical symptoms, and psychiatric outpatients. Internal consistency of the Dutch version showed to be good with Cronbach's alphas for the total scale and subscales ranging from .71 to .90. Factor analysis revealed that the two-factor solution was superior to a single factor model although subscale intercorrelations appeared to be high (rs = .42–.73). Test–retest correlations, measured over a period of 3 weeks, were high (rs = .86–.91).

Modified Frenchay Activities Index (Modi-FAI). The FAI is a 15-item measure, developed for stroke patients, assessing the frequency of performance of activities such as housekeeping, recreation, transportation, and work during the last 3–6 months (Holbrook & Skilbeck, 1983). The FAI has also been used in TBI patients (van Baalen et al., 2006). We used the Dutch adapted version, Modi-FAI, which covers a period of 4 weeks with categories adapted correspondingly (Post & de Witte, 2003). Items are scored on a 4-point scale (from 0 to 3), and all scores are added to form a total score ranging from 0 to 45. Higher scores indicate a higher level of activity. The Dutch version has been validated in patients with stroke and older adults (>65 years; Schuling, de Haan, Limburg, & Groenier, 1993). Schuling et al. (1993) reported good internal consistency of the total scale with Cronbach's alphas ranging from .78 to .87. They found, as expected, a substantial convergent relation with the Barthel ADL Index (Wade & Collin, 1988), which measures activities of daily living (r = .66). Interrater reliability was found to be good (r = .90; Post & de Witte, 2003).

Procedure

At the start of outpatient rehabilitation or at discharge from hospital or inpatient rehabilitation, eligible patients were invited to participate in the study by their rehabilitation physician or neurologist. After obtaining consent, the first author or a research assistant interviewed all participants by telephone. The telephone interview took place when patients had been at home for at least 2–6 weeks. They were asked about the three most stressful problems or situations—attributed by them to their brain injury—that they had encountered during the previous 2 weeks. As a second part of the telephone interview, the patients completed the modified FAI.

For each of the three problems listed during the interview, a separate CISS questionnaire was prepared in which the instruction

for completion was made specific: "How much do you engage in these types of activities when you are confronted with . . . [one of the three problems mentioned]." So this procedure resulted in three problem-specific CISS questionnaires per participant, which were sent to each participant by post, along with the HADS and the Assimilative/Accommodative Coping Questionnaire. If a participant preferred a live interview or needed assistance to complete the questionnaires, a face-to-face interview with the research assistant was arranged ($n = 19$, 14% of the cases). The three brain-injury-specific problems mentioned by each participant were categorized based on type of impairment: physical, cognitive, emotional, behavioral, communication, and other. Categorization was done by the research assistant and verified by the first author.

Demographic data and lesion characteristics (gender, level of educational attainment, date of birth, date of brain injury, and type of lesion) were collected from the medical files.

Data Analysis

In order to determine patient characteristics, we carried out independent sample *t* tests to investigate differences in CISS subscale scores between our study sample and the Dutch norm group of working adults (de Ridder & van Heck, 2004) and to compare means between men and women for all CISS subscale scores and for scores on AACQ, HADS, and Modi-FAI. Alpha level was set at .05 (two-sided) for all analyses.

Level of educational attainment was classified according to a three-level system often used in the Netherlands: primary education (low), junior vocational training (medium), and senior vocational or academic training (high), corresponding to 8.6 ± 1.9, 11.4 ± 2.5, and 15.2 ± 3.3 years of full-time education (De Bie, 1987).

The CISS completed for the first problem was used in all analyses reported in this article. The CISS results for the second and third problem were not included in the analyses to avoid the problem of intercorrelation, as these measurements were not collected independently.

In order to determine the construct validity of the theoretical three and four-factor model of coping proposed in the original CISS, we performed confirmatory factor analyses using Mplus Version 6.12. For the three-factor solution, three continuous latent variables were regressed on the 48 CISS items, as suggested by Endler (1990b). For the four-factor solution, four latent variables were regressed on 45 items (three items do not contribute: Item 2, 23, 32) as suggested by Cook and Heppner (1997). Model fit was assessed by the root-mean-square error of approximation (RMSEA) ranging from 0 to 1 ($\leq .05$ indicates good fit; $\leq .08$ indicates acceptable fit), the comparative fit index (CFI) ranging from 0 to 1 ($\geq .95$ indicates good fit; $\geq .90$ indicates acceptable fit), and the Tucker–Lewis Index (TLI) ranging from 0 to 1 ($\geq .95$ indicates good fit; $\geq .90$ indicates acceptable fit). Modification indices were inspected to explore item cross-loadings (items loading on more than one factor) and residual interitem and interfactor correlations. Since CISS items form an ordinal scale, a mean- and variance-corrected weighted least squares estimator was used.

The internal consistency of the scale was assessed using Cronbach's alpha. Pearson's correlations were used to examine discriminant validity and to examine convergent and divergent validity by correlating the CISS with the Assimilative/Accommodative Coping Questionnaire and the Hospital Anxiety and Depression Scale (HADS), respectively. Alpha level was set at 0.05 (two-sided) for all analyses. All analyses, except the confirmatory factor analysis, were performed using SPSS 20 for Mac.

Results

Of the 190 patients asked to participate, 148 (78%) consented and fulfilled all criteria. For this particular study, we only used data of the patients who completed the CISS for the first problem ($N = 139$). Table 1 shows demographic and injury-related characteristics of the study sample. Most participants had suffered a stroke (81%), and 65% of the study sample were men.

In Table 2, descriptive statistics for all study variables are displayed, and all CISS scale scores have been compared with those of a Dutch norm group composed of 386 working adults with a mean age of 40 years ($SD = 9.5$; de Ridder & van Heck, 2004). Compared with the total norm group, our total sample of patients with ABI made significantly less use of all coping strategies (Table 2). Only HADS Anxiety and Modi-FAI scores showed significant differences between women and men in our sample, $t(135) = 2.09$, $p = .04$, and $t(137) = 3.79$, $p < .001$, respectively. No significant differences were found in CISS subscale scores between women and men (Table 2). Mean HADS Anxiety and Depression scores were below cutoff score (score ≥ 8 is an indication for the presence of depression or anxiety; Table 2).

Construct Validity: Confirmatory Factor Analysis

All items significantly loaded onto their hypothesized factors at $p < .001$ in both the three- and four-factor models. Fit indices provided acceptable (RMSEA) to borderline (CFI and TLI) support for the classical three-factor model (Table 3). Inspection of standardized factor loadings showed that these were low (i.e., $< .40$) for Items 3 and 11 (both loading on Avoidance) and Item 6 (loading on Task). Despite significant associations, the factors explained little of the items' variances. We therefore tested a restricted model that excluded

Table 1
Patient Characteristics

Variable	*M*	*SD*	*f*	%
Age (years)	55	12		
Time since injury (weeks)	12.8	8.7		
Male gender			90	64.7
Educational level				
Low			39	28.1
Medium			57	41.0
High			43	30.9
Type of lesion				
Infarction			91	65.5
Subarachnoid hemorrhage			10	7.2
Intracerebral hemorrhage			9	6.5
Diffuse vascular lesions			2	1.4
Traumatic brain injury			12	8.6
Anoxic encephalopathy			3	2.2
Tumor benign			5	3.6
Meningitis/encephalitis			1	0.7
Other			6	4.3

Note. $N = 139$.

Table 2
Descriptive Statistics of All Clinical Variables

Variable	Acquired brain injury group					Norm group		Comparison norm group − Acquired brain injury group		
	M	*SD*	*t*[a]	*p*	*d*	*M*	*SD*	*t*	*p*	*d*
Coping Inventory for Stressful Situations										
Task-Oriented Scale										
Male	49.66	10.55	0.48	.63[b]	0.08	59.80	8.39	9.76[c]	<.001	1.06
Female	50.57	11.03				60.92	8.94	7.28[d]	<.001	1.03
Total	49.98	10.69				60.31	8.65	12.30[e]	<.001	1.06
Emotion-Oriented Scale										
Male	33.40	13.32	1.67	.10[b]	0.30	36.70	10.14	2.60[c]	.01	0.28
Female	37.22	11.94				40.21	10.76	1.78[d]	.08	0.26
Total	34.75	12.93				38.29	10.52	3.47[e]	<.001	0.30
Avoidance Scale										
Male	38.29	12.39	1.20	.23[b]	0.21	46.62	9.76	6.88[c]	<.001	0.75
Female	40.88	11.82				48.23	9.68	4.78[d]	<.001	0.68
Total	39.20	12.21				45.16	10.11	6.10[e]	<.001	0.53
Distraction subscale										
Male	17.71	6.37	1.53	.13[b]	0.27	19.13	5.88	2.02[c]	.04	0.23
Female	19.45	6.52				21.91	5.75	2.72[d]	.01	0.40
Total	18.32	6.45				20.39	5.98	3.67[e]	<.001	0.33
Social Diversion subscale										
Male	12.79	5.05	1.01	.31[b]	0.18	15.18	4.00	4.82[c]	<.001	0.52
Female	13.63	4.00				17.34	4.25	5.72[d]	<.001	0.90
Total	13.10	4.71				16.16	4.25	7.59[e]	<.001	0.68
Modified Frenchay Activities Index										
Male	17.83	6.91	3.79	<.001[b]	0.69					
Female	22.31	6.14								
Total	19.41	6.96								
Assimilative/Accommodative Coping Questionnaire										
Flexible Goal Adjustment										
Male	2.51	0.59	−1.49	.24[b]	−0.27					
Female	2.36	0.53								
Total	2.46	0.57								
Tenacious Goal Pursuit										
Male	2.41	0.64	−0.91	.36[b]	−0.17					
Female	2.30	0.63								
Total	2.37	0.63								
Hospital Anxiety and Depression Scale										
Anxiety subscale										
Male	5.49	4.09	2.09	.04[f]	0.38					
Female	6.96	3.69								
Total	6.01	4.00								
Depression subscale										
Male	5.74	4.60	0.42	.67[f]	0.09					
Female	6.10	3.63								
Total	5.85	4.26								

Note. Distraction and Social Diversion subscales are from the Avoidance Scale (Coping Inventory for Stressful Situations).
[a] Comparison female − male. [b] $df = 137$. [c] $df = 462$. [d] $df = 356$. [e] $df = 820$. [f] $df = 135$.

the three problematic items. This model showed acceptable model fit (Table 3). In addition, fit indices provided borderline support for the four-factor model (Table 3). Table 4 shows the standardized factor loadings for all the models.

Internal Consistency

The subscales in the original three-factor model (Task, Emotion, Avoidance) showed good internal reliability with Cronbach's alphas varying between .88 and .92 (Table 5). For the restricted three-factor model, results were similar (Table 5).

Discriminant Validity

In Table 6, intersubscale correlations are presented. Intersubscale correlations were low between Task and Emotion and Avoidance and Emotion. Task was moderately correlated with Avoidance ($r = .51$, $p \leq .001$). Intersubscale correlations were strong among Avoidance, Distraction, and Social Diversion.

Convergent and Divergent Validity

For the Task Scale, a stronger positive correlation was found with Tenacious Goal Pursuit ($r = .34$, $p < .005$) compared with

Table 3
Confirmatory Factor Analysis (Model Fit Indices) of the Coping Inventory for Stressful Situations

Variable	RMSEA	CFI	TLI	Overall
Three-factor model	.062	.894	.889	Borderline
Restricted three-factor model[a]	.061	.910	.906	Acceptable
Four-factor model[b]	.063	.903	.898	Borderline

Note. RMSEA = root-mean-square error of approximation (good fit < .05; acceptable < .08); CFI = comparative fit index (good fit > .95; acceptable > .90); TLI = Tucker–Lewis Index (good fit > .95; acceptable > .90).
[a] Items 3, 6, and 11 removed. [b] Items 3, 23, and 32 removed.

Flexible Goal Adjustment ($r = .19$, $p < .05$; Table 7). For the Emotion Scale, the strongest negative correlation was found with FGA ($r = –.51$, $p < .005$; Table 7). Strong significant positive correlations were found between the Emotion Scale and both the HADS Depression and Anxiety subscales (Table 7).

Discussion

In the present study, we evaluated the psychometric properties of the CISS in a sample of patients with ABI. The construct validity of the CISS in ABI patients was acceptable and suggested that the CISS measures the same three coping styles that have been reported before in different populations: Task-Oriented, Emotion-Oriented, and Avoidance coping (Cosway et al., 2000; de Ridder & van Heck, 2004; Endler & Parker, 1999; McWilliams et al., 2003). The confirmatory factor analysis, however, slightly favored a restricted three-factor model and a more complex four-factor model.

So far, only a limited number of studies have investigated the factor structure of the CISS. In the normal population and in patients with depression, exploratory factor analysis has confirmed the original three-factor solution (Cosway et al., 2000; de Ridder & van Heck, 2004; McWilliams et al., 2003). Confirmatory factor analysis performed on the CISS in the normal population and in patients with Parkinson's disease, however, showed results slightly in favor of the four-factor model (Cook & Heppner, 1997; Hurt et al., 2011; Rafnsson, Smári, Windle, Mears, & Endler, 2006). In the Parkinson's disease sample, the strongest model-fit indices were found for a restricted four-factor solution in which Items 11, 44, and 48 were removed (Hurt et al., 2011). These and our findings suggest that the CISS has a replicable factor structure. Together with the high internal consistency (Cronbach's αs = .88–.92), the CISS might thus be regarded to have good internal validity in an ABI population.

In our restricted three-factor model, Items 3 and 11 (Avoidance) and Item 6 (Task) were removed because of their low standardized factor loadings, suggesting that they contributed relatively little to the stability of the factor. The content and specific wording of these items might play a role in this. Item 11 refers to sleep, a strategy that often is influenced by ABI itself, as mental fatigue is a very common complaint after ABI. The wording of Items 3 (which refers to the respondent's thinking of the good times he or she has had) and 6 (which refers to the respondent's relying on his or her own judgment) is more abstract than that of most other items of the CISS. The cognitive problems that are characteristic for ABI may interfere with understanding and interpretation of these questions. Also the fact that we chose a situation-specific approach (asking for the coping strategies a person used for a specific problem

Table 4
Standardized Factor Loadings of the Coping Inventory for Stressful Situations (CISS): Three- and Four-Factor Solutions

	Model									
	Three-factor			Restricted three-factor[a]			Four-factor[b]			
CISS item	T	E	A	T	E	A	T	E	D	SD
1	.47			.47			.47			
2	.57			.57			.57			
6	**.36**			/////			.36			
10	.72			.72			.72			
15	.46			.47			.46			
21	.59			.58			.59			
24	.60			.60			.60			
26	.72			.72			.72			
27	.54			.55			.55			
36	.64			.65			.64			
39	.50			.49			.49			
41	.62			.62			.61			
42	.70			.70			.70			
43	.78			.78			.77			
46	.69			.69			.68			
47	.68			.68			.69			
5		.70			.70			.70		
7		.65			.64			.65		
8		.61			.61			.62		
13		.75			.75			.75		
14		.90			.89			.90		
16		.57			.57			.57		
17		.73			.73			.73		
19		.80			.80			.80		
22		.77			.77			.78		
25		.78			.78			.78		
28		.71			.71			.71		
30		.81			.81			.81		
33		.53			.53			.52		
34		.72			.72			.71		
38		.82			.82			.82		
45		.83			.83			.83		
3			**.30**			/////			/////	/////
4			.69			.69				.70
9			.61			.61			.61	
11			**.39**			/////			.46	
12			.84			.84			.86	
18			.86			.86			.88	
20			.82			.82			.85	
23			.74			.75			/////	/////
29			.79			.80				.80
31			.71			.71				.75
32			.56			.56			/////	/////
35			.69			.68				.72
37			.81			.81				.85
40			.65			.66			.66	
44			.64			.64			.67	
48			.56			.56			.60	

Note. Standardized factor loadings < .40 are indicated in bold. CISS = Coping Inventory for Stressful Situations; T = Task-Oriented Scale (CISS); E = Emotion-Oriented Scale (CISS); A = Avoidance Scale (CISS); D = Distraction subscale of Avoidance Scale (CISS); SD = Social Diversion subscale of Avoidance Scale (CISS); ///// = removed.
[a] Items 3, 6, and 11 removed. [b] Items 3, 23, and 32 removed.

Table 5
Internal Consistency (Cronbach's α) of the Coping Inventory for Stressful Situations (CISS) Factors

Variable	T	E	A	D	SD
Three-factor model	.88	.92	.90		
Restricted three-factor model	.88	.92	.91		
Four-factor model	.88	.92		.82	.83

Note. T = Task-Oriented Scale (CISS); E = Emotion-Oriented Scale (CISS); A = Avoidance Scale (CISS); D = Distraction subscale of Avoidance Scale (CISS); SD = Social Diversion subscale of Avoidance Scale (CISS).

related to brain injury) might have reinforced the preference for less abstract formulated strategies.

Earlier studies have also provided evidence for inconsistency of these items. In patients with depression, exploratory factor analysis of the CISS showed that Item 3 did not saliently load on Avoidance but on Task, and Item 11 did not load on any factor (McWilliams et al., 2003). In patients with Parkinson's disease, construct validity of the CISS was examined using interitem correlations, which was low for Item 11, indicating item redundancy (Briggs, 1986; Hurt et al., 2011). However, our study results need to be confirmed in larger ABI samples before recommendations can be made concerning the use of an adapted version of the CISS in the ABI population. Given the relatively modest difference in model fit for the restricted three-factor model and the more complex four-factor model, it seems reasonable to apply Occam's razor and stick with the more parsimonious classical three-factor solution when using the CISS in the ABI population. Our findings also suggest that the factors arise from the items included and are intrinsic to the questionnaire and are not specific to an ABI population.

Our findings concerning discriminant validity are in certain aspects different from the original findings by Endler and Parker (1999) and studies published since (de Ridder & van Heck, 2004; Hurt et al., 2011; Rafnsson, Smári, Windle, Mears, & Endler, 2006). Correlations between Task and Avoidance are generally reported to be low. In our ABI population, a moderate correlation was found ($r = .51$), which indicates that the CISS is only partially effective in discriminating between these major coping styles. We found high correlations between Avoidance and Distraction and Avoidance and Social Diversion, which correspond to earlier findings. However, the correlation between Distraction and Social Diversion is markedly higher than usually reported ($r = .73$), suggesting that these subscales measure more or less the same dimension, which again is in line with a three-factor model.

Table 6
Coping Inventory for Stressful Situations: Inter-Subscale Correlations

	CISS subscale			
Variable	E	A	D	SD
T	.17*	.51**	.38**	.52**
E		.29**	.35**	.21*
A			.93**	.90**
D				.73**

Note. CISS = Coping Inventory for Stressful Situations; T = Task-Oriented Scale (CISS); E = Emotion-Oriented Scale (CISS); A = Avoidance Scale (CISS); D = Distraction subscale of Avoidance Scale (CISS); SD = Social Diversion subscale of Avoidance Scale (CISS).
* $p < .05$. ** $p \leq .001$.

Table 7
Correlations Between Coping Inventory for Stressful Situations Subscales and the Subscales of the Assimilative/Accommodative Coping Questionnaire and Subscales of the Hospital Anxiety and Depression Scale

	CISS subscale				
Variable	T	E	A	D	SD
Flexible Goal Adjustment subscale	.19*	−.51**	.16	.08	.15
Tenacious Goal Pursuit subscale	.34**	−.25**	.11	.04	.18
Hospital Anxiety and Depression Scale–Anxiety subscale	.05	.73***	.09	.14	.04
Hospital Anxiety and Depression Scale–Depression subscale	−.09	.56***	−.27	.01	−.01

Note. Flexible Goal Adjustment and Tenacious Goal Pursuit are subscales of the Assimilative/Accommodative Coping Questionnaire. CISS = Coping Inventory for Stressful Situations; T = Task-Oriented Scale (CISS); E = Emotion-Oriented Scale (CISS); A = Avoidance Scale (CISS); D = Distraction subscale of Avoidance Scale (CISS); SD = Social Diversion subscale of Avoidance scale (CISS).
* $p < .05$. ** $p < .005$. *** $p < .001$.

The correlations between the CISS and the Assimilative/Accommodative Coping Questionnaire were consistent with theoretical predictions. For the Task Scale, a stronger positive correlation was found with Tenacious Goal Pursuit ($r = .34$) compared with Flexible Goal Adjustment ($r = .19$). TGP refers to actively adjusting circumstances to personal preferences and, as such, a greater involvement of task-oriented strategies is expected compared with FGA, where the focus is on accepting consequences and adjusting goals. For the Emotion Scale, the strongest negative correlation was found with FGA ($r = –.51$) compared with TGP. This is expected, as the Emotion Scale contains many negatively formulated emotions, which are oppositional to issues of acceptance and reorientation. Intercorrelations of the CISS subscales with the HADS followed expected patterns (Hurt et al., 2011). The HADS Depression and Anxiety subscales showed high positive correlations with the Emotion subscale of the CISS.

Several other findings in this study are worth mentioning. Compared with the normal population, our study sample of patients with ABI differs in some coping characteristics. They make less use of all coping strategies than a working adult norm group. Similar results are found in people with Parkinson's disease and multiple sclerosis (de Ridder & van Heck, 2004; Hurt et al., 2011). No gender differences in use of any coping style were detected in this ABI sample. Generally, in healthy people, men and women use task-oriented strategies equally as much, but women make greater use of other strategies. In ABI, Herrmann et al. (2000) reported no gender differences, whereas Wolters et al. (2011) found greater use of palliative strategies and seeking of social support in women.

Our choice not to limit inclusion criteria for this study to one specific diagnosis was to increase generalizability and recognize that severity and type of brain injury do not influence coping

(Anson & Ponsford, 2006; Curran, Ponsford, & Crowe, 2000; Finset & Andersson, 2000; Herrmann et al., 2000). We think our study sample is representative of the population of ABI patients who return home after discharge, not requiring long-term residential care.

The sample size of our study ($N = 139$) might be considered as low for confirmatory factor analysis, and this has to be acknowledged as a weakness of this study. However, the reported fit indices such as the CFI are known to be relatively unaffected by sample size (Gagné & Hancock, 2006). In addition, it has been shown that even in samples as small as 50 confirmatory factor analysis behaves well if factor loadings are reasonably high and the number of variables per factor is sufficiently high (Marsh, Hau, Balla, & Grayson, 1998), as is the case in this study.

A further limitation of this study is the fact that we did not use the original instruction of the 48-item CISS (how to deal with a difficult, upsetting situation, which is not further specified). Instead, we used a situation-specific instruction (how to deal with a *specific* problem). Originally, to suit a situation-specific approach Endler and Parker (1999) developed the CISS–SSC (CISS Situation-Specific Coping) by extracting 21 items out of the original version with seven items per scale (Task, Emotion, Avoidance). Confirmatory factor analysis of the CISS–SSC showed a three-factor structure. Cohan, Jang, and Stein (2006) suggested a four-factor structure for the CISS–SSC. In their study, they used the general instruction (which is the standard instruction on the 48-item CISS) instead of the original situation-specific instruction of the CISS–SSC (Cohan et al., 2006). The consistent finding of a three- to four-factor structure across studies using various versions of the questionnaire (either the CISS–SSC or the 48-item CISS) suggests that these versions are measuring the same underlying construct.

We did not investigate test–retest reliability because the subject of coping (a specific situation or problem) in our study is not stable over time. Over the course of 6 weeks, the timeframe that is classically used to investigate test–retest reliability of the CISS, we expected that several problems or situations initially denoted as stressful would have changed or been appraised differently.

Conclusions

The present study provides important new insights into the psychometric properties of the CISS in the ABI population. We found expected associations with other measurement instruments (AACQ and HADS) and good internal consistency. Discriminant validity seems only partially sufficient as we found a moderate correlation between the Task and Avoidance subscale. The classical three-factor structure is appropriate, but some items might be problematic in patients with ABI. However, replication of a restricted three-factor model in larger ABI samples is needed, together with further exploration of discriminant validity and the relationship of the CISS with other coping measures. Hence, for now, we recommend using the original CISS in the ABI population.

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