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Measuring self-determination in Norwegian students: adaptation and validation of the AIR Self-Determination Scale

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ABSTRACT

This study describes the adaptation and validation of the American Institute for Research (AIR) Self-Determination Scale for use in Norwegian research and education. The study contributes to the field by enabling reliable assessment of self-determination of Norwegian students with intellectual disability. The operational equivalence of the construct of self-determination in American and Norwegian culture were examined. The article further describes the adaptations that were made to the scale to ensure its fitness for intended use. Psychometric reliability (Cronbach's α and test-retest reliability) was tested on 121 students, and the underlying structure of the scale was examined by means of principal component analysis. The adapted version of the questionnaire (AIR-S-NOR) shows respectable psychometric properties. Suggestions for how the AIR-S-NOR can be used in future research and educational practices are presented.

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Adaptation; validation; AIR Self-Determination Scale; equivalence; intellectual disability

Introduction

Self-determination is a psychological construct that refers to self- (versus other-) caused action, suggesting that self-determined people are people that act volitionally, based on their own free will (Wehmeyer, Shogren, Little, and Lopez 2017). Self-determination is considered an important educational outcome for all students, and the construct may especially hold promise as a means to conceptualise functioning in persons with intellectual disability. Internationally, promoting self-determination for students with intellectual disability is considered best educational practice, with levels of self-determination being positively correlated with desirable post-school outcomes, such as independent living, employment, financial independence, and larger potential for social integration and community access (Nota et al. 2007; Shogren, Wehmeyer, Palmer, Rifenbark et al. 2015; Wehmeyer and Palmer 2003). Self-determination is considered a significant quality of life predictor, especially with respect to personal development and personal fulfilment (Lachapelle et al. 2005; McDougall, Evans, and Baldwin 2010). Lack of opportunities for self-determination has been associated with a higher prevalence of mental disorders and maladaptive behaviour in persons with intellectual disability (Clark et al. 2004).

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Whilst self-determination has received considerable international attention in educational research and practice during the last two decades, most of the assessment tools for this construct are developed in the US. With increasing interest for finding interventions to improve the self-determination of Norwegian students with intellectual disability, the availability of a validated self-determination instrument is a prerequisite when the effect of such interventions is to be evaluated. The aim of this study was therefore to perform an adaptation and validation of the American Institute for Research (AIR) Self-Determination Scale (Wolman et al. 1994).

Purpose of the study

Validated measures of self-determination are widely used in international research, but so far none of these have been adapted and validated for use in Norway. With increasing focus on improving self-determination for persons with intellectual disability in Norway, the need for a reliable measure for self-determination arises. Because of linguistic and cultural differences, merely translating an assessment tool may not be sufficient. Instead, an adaptation process that follows carefully described steps is necessary. The purpose of this study is to perform an adaptation of the AIR Self-Determination Scale, and to evaluate the psychometric properties of this adapted instrument. The validation study is part of a larger study that aims to evaluate the effects of a self-determination intervention for Norwegian students with intellectual disability.

The AIR Self-Determination Scale

The AIR Self-Determination Scale measures students' levels of self-determination by means of a student self-report, an educator form and a parent form. In this article, the adaptation and validation of the student form (AIR-S) is presented. This focus on self-report is in line with the agentic perspective of the concept of self-determination.

The AIR Self-Determination Scale is based on Mithaug's (1993) self-regulation theory that explains how people regulate their thoughts, feelings, and actions in order to attain goals that define themselves as self-determining persons. Wolman et al. (1994) describe self-determined people as people 'who know and can express their own needs, interests, and abilities'. Choice-making, goal-setting, planning, and self-regulation are important elements in Wolman et al.'s (1994) understanding of self-determination, and they emphasise the interaction between capacities and opportunities for the development of basic self-determination skills. Challenges that form a just-right match between capacity (i.e. a person's knowledge, abilities and perceptions) and opportunities provided by the environment will be pursued, and this will lead to the development of self-determination (ibid.).

The AIR-S consists of 24 statements rated on a five-point Likert scale (ranging from *never* to *always*), with subscales for capacity and opportunity. The capacity subscale consists of two indexes, namely 'Things I do', which asks about self-determined behaviour, and 'How I feel', which asks about students' feelings when performing these self-determined behaviours. The opportunity subscale also consists of two indexes, i.e. students' perceptions of opportunities for self-determined behaviour at school and at home. Each index consists of six items that relate to basic self-determination skills: identifying strengths and weaknesses, setting goals and planning for goal attainment, self-management and self-regulating.

For the AIR-S, the capacity and opportunity subscales can be combined to calculate a higher-order self-determination score, and research has shown a strong correlation between the two subscales¹ on this form: $r = .73$ (Shogren et al. 2008). The questionnaire also includes three open-ended questions, about a goal the student is currently working on, his or her plan to achieve that goal, and the progress towards goal achievement. Students with special needs may require certain adaptations to the scale and its administration to be able to provide a self-report (Wolman et al. 1994).

Wolman et al. (1994) tested the reliability and validity of the scale, and found a Cronbach's α of .92 and adequate validity. Shogren et al. (2008) and Chou et al. (2015) confirmed the use of the AIR Self-Determination Scale as a viable tool for assessing self-determination in students with disabilities. However, it should be noted that the AIR-S is not a normative scale. It is not standardised by age levels, and therefore, it cannot be used for diagnostic purposes, nor does it have a predictive validity.

Guidelines for cross-cultural adaptation of questionnaires

The aim of cross-cultural adaptation of a questionnaire is to achieve equivalence between the original instrument and the adapted version (Epstein, Santo, and Guillemin 2015). In a review of guidelines for cross-cultural adaptations, Epstein, Santo, and Guillemin (2015) identified 31 different guidelines for this adaptation process, but no evidence of a gold standard emerged. Although no specific method can be recommended, the process should at least involve an adequate methodological strategy for adaptation of the instrument, criteria for analysing the quality and equivalence of the translation, and techniques for evaluating the psychometric properties of the adapted instrument (ibid.). Following the review by Epstein, Santo, and Guillemin (2015), Herdman, Fox-Rushby, and Badia (1998) provide the most comprehensive framework for investigating cross-cultural equivalence. This framework describes six types of equivalence that need to be considered in the adaptation process: conceptual, item, semantic, operational, measurement and functional equivalence. In this study, this model of equivalence was used as the methodological framework in the adaptation and validation of the AIR-S.

Conceptual equivalence of self-determination

Conceptual equivalence deals with how a certain complex construct is conceptualised in the source and target culture, and it should be investigated before any adaptation of the questionnaire is initiated to ensure relevance of the instrument for the target population (Herdman, Fox-Rushby, and Badia 1998).

Self-determination has by some researchers been described as an Anglo-American middle- and upper middle-class concept, and a typical value of US mainstream culture that emphasises independence (Turnbull and Turnbull 1998). This perspective implies that the concept of self-determination is culture-bound, and that it can only be interpreted within the Anglo-American culture that promotes independence and individuality. Other researchers found evidence of a culture-sensitive approach, which assumes that self-determination occurs across cultures, but that cross-cultural variation may exist (Leake and Boone 2007; Ohtake and Wehmeyer 2004). This culture-sensitive approach postulates the need to establish the degree to which the concept of self-determination is interpreted in the same way

across different cultures. In this study, conceptual equivalence was examined by exploring influential disability research and literature concerning the construct of self-determination in the source culture (US) and the target culture (Norway). During the process of examining conceptual equivalence, attention was paid to the extent to which the subscales and the items that make up the AIR-S, are present in the disability research and literature on self-determination in both cultures.

In the US, the field of self-determination for persons with disabilities has largely been dominated by the work of Wehmeyer and colleagues, first with the Functional Model of Self-Determination (Wehmeyer, Kelchner, and Richards 1996), which then, after several iterations, resulted in Causal Agency Theory (Shogren, Wehmeyer, Palmer, Forber-Pratt et al. 2015). These iterations indicate that conceptualising self-determination is not a static process, but that the conceptualisation is impacted by changes in time, changes in context, and changes in our understanding of human behaviour and disability (Shogren, Wehmeyer, Palmer, Forber-Pratt et al. 2015). The current understanding of self-determination has to a large extent been influenced by the discipline of positive psychology, where self-determination is a central construct, and by a strengths-based understanding of disability, which focuses on the improvement of the person–environment fit (*ibid.*). Causal Agency Theory intends to explain *how* people become self-determined, i.e. by learning, practicing and refining skills that are considered component elements of self-determination, such as 'learning to make choices and express preferences, solve problems, engage in making decisions, set and attain goals, self-manage and self-regulate action, self-advocate, and acquire self-awareness and self-knowledge' (Shogren, Wehmeyer, Palmer, Forber-Pratt et al. 2015, 259, 260). Acquisition of these component skills is thought to build the foundations for self-determination, as it enables the expression of the essential characteristics of self-determination, namely volitional action, agentic action and action-control beliefs (Palmer, Wehmeyer, and Shogren 2017). Despite the different theoretical perspective on self-determination, the component elements of self-determination as described in Causal Agency Theory overlap to a large extent with the specific item content of the AIR Self-Determination Scale. As Shogren et al. (2008) suggest, the AIR Self-Determination Scale may be measuring the precursors to the development of the essential characteristics of self-determined behaviour that are described in Causal Agency Theory.

Reeve (2002) states that self-determination is about freely initiated action that arises from within one's self, and he identifies three essential qualities in the experience of self-determination: internal perceived locus of causality, volition and perceived choice. The essential qualities of internal locus of control and volition seem to tap into causal agency and volitional action, as in the definition of self-determination by Shogren, Wehmeyer, Palmer, Forber-Pratt et al. (2015).

Field and Hoffman (1994:164) defined self-determination as 'the ability to identify and achieve goals based on a foundation of knowing and valuing oneself'. This definition identifies five components that are thought to lead to self-determination, namely know yourself, value yourself, plan, act and experience outcomes, and learn. As with the previously mentioned definitions of self-determination, goal setting, planning and evaluating are key elements in the definition of Field and Hoffman.

While several more definitions of self-determination have emerged over time in the US, and these definitions vary in perspective and purpose, Field et al. (1998) found that the definitions are essentially consistent and complementary.

In Norway, research and literature on self-determination is less comprehensive, but several leading authors within the disability field have tried to conceptualise the construct, often relying on American definitions. Ellingsen (2007) asks whether self-determination is all about deciding for oneself as the Norwegian word for self-determination may suggest ('selvbestemmelse'), and he discusses challenges in personal decision-making for persons with intellectual disability. Further, Ellingsen's understanding of self-determination encompasses making choices based on personal preferences and a plan for what one wants to achieve. Ellingsen emphasises that becoming self-determined is a process.

Lorentzen (2007) mentions the importance of acting with intent in his discussion of self-determination, and he distinguishes between self-determination, other-determination, and a natural and healthy dependence on others. For Lorentzen, social context is important for the development of self-determination, and he emphasises the need for meaningful and supportive relations with trusted others as a prerequisite for self-determination. Thus, the opportunities for self-determination provided by the environment are essential in this understanding. Lorentzen also discusses self-determination as self-realisation, where a person is considered to have a certain potential that can be developed or not, and here, making choices based on personal preferences plays an important role.

Sagen and Ytterhus (2014) based their self-determination research on a civil rights perspective, and focused on active agency, goal orientation, participation, decision-making, choice-making, self-regulated learning and self-advocacy in their understanding of self-determination. In their research, Sagen and Ytterhus looked especially into how the school environment promotes self-determination in students with intellectual disability, and by taking this perspective, they highlight the importance of opportunities provided by the environment over individual capacity.

Although none of the Norwegian authors provide their own clear-cut definition of self-determination, many of the aspects that are present in their discussions of the construct are also found in the American definitions of self-determination, and there is substantial overlap with the items on the AIR-S. Component elements of self-determination, such as goal-setting, planning, expressing personal preferences, choice-making, decision-making and self-advocacy, are found in the self-determination definitions of both cultures. However, the Norwegian understanding of self-determination seems to underscore the importance of a supportive environment that provides opportunities for self-determination more so than the American perspective, which may be more dominated by a focus on individual capacity for self-determination. This Norwegian emphasis on environmental opportunities is in line with the relative understanding of disability that is common in the Scandinavian countries.

This brief investigation of the conceptual equivalence of self-determination in American and Norwegian culture suggests that there are many similarities in how the concept is understood, and the component elements of self-determination that are assessed with the AIR-S are considered relevant for the understanding of the construct in both cultures. The AIR-S enables assessment of both individual capacity and opportunity, thus uniting the different perspectives on self-determination that may exist across both cultures.

Item equivalence

Item equivalence refers to whether items representing a certain concept are comparable and adequate across cultures, as the relevance of some items may vary across cultures.

Sagen and Ytterhus (2014) found in their study that self-determination for Norwegian students with intellectual disability was mostly limited to making choices. Garrels (2016) found that 40% of the Norwegian students did not feel encouraged to set goals for themselves at school, and 60% of the students had not learned how to make plans for goal attainment. These findings suggest that Norwegian students may have limited experience with the items in the AIR-S, and the relevance of goal-setting, planning and problem-solving may not be self-evident for them. However, since increased self-determination is a political and educational goal in Norway (cf. Educational Act 1998; White Paper Number 17 2016), but no instructional materials or assessment tools are currently available, all items from the original AIR-S were retained in the adapted version. To make the items more accessible for the students and to improve item equivalence in the adapted version of the AIR-S, examples were provided for each item.

Semantic equivalence: translation procedure

Semantic equivalence deals with the correctness of the translation of the measurement tool. In this validation study, standard procedures for translation were followed. The AIR-S was translated into Norwegian by a philologist with knowledge of both the respective languages and the research field, followed by a back translation by a native English speaker who had no a priori knowledge of the intent and concepts underlying the instrument. This unawareness of intentions contributes to eliminating bias and expectations in the translation (Guillemin, Bombardier, and Beaton 1993). Small adjustments were then made to the first translation to maximise semantic equivalence.

Operational equivalence

Operational equivalence deals with ensuring that the measurement methods in each culture correspond with each other. Even though Likert scales are commonly used in Norway, the five-point Likert scale of the original questionnaire was changed into a four-point scale, keeping the response alternatives 'always', 'often', 'rarely' and 'never'. This adaptation was based on an analysis of research literature on the use of Likert scaling with children, suggesting that young children and possibly children with intellectual disability tend to answer at the extreme ends of Likert scales, especially when presented with more subjective statements, as in the AIR-S (Chambers and Johnston 2002). With a four-point scale, a two-step response procedure could be used, where students are first helped to identify whether their answer tends towards 'always' or 'never', followed by a second question to determine whether it is e.g. 'never never' or 'almost never'. This way of providing only two response options at a time may lead to more accurate ratings (ibid.). However, these changes to the response format of the questionnaire do have implications for cross-cultural research, as is discussed later in this article.

Pilot study and resulting adaptations

After the investigation of item, semantic and operational equivalence, cognitive interviews with 12 elementary and lower secondary school students (five typically developing, seven

with special needs) were performed. This pilot study led to six additional adaptations of the instrument:

- (1) The AIR-S contained three double-barrelled items. For example, the first item of the 'Things I do'-index asks about both strengths and needs ('I know what I need, what I like, and what I'm good at'), while the second item asks about goal-setting and thinking of strengths when setting goals ('I set goals to get what I want or need. I think about what I am good at when I do this'). As it could happen that students know their strengths but not their needs, or that they set goals without considering their strengths, these items were split into two separate items. This resulted in three extra items (Cap2, Cap4 and Cap10). These changes led to a total of eight questions for the index 'What I do', seven questions for the index 'How I feel', and an unaltered six questions for the index 'What happens at school'. A presentation of the original items and the adapted version of the scale is available via hyperlink.
- (2) To ease administration, the index 'Opportunities at home' was removed, so that the questionnaire would take no longer than 30 min to answer. Earthman et al. (1999) suggest the use of abbreviated surveys for target groups that may have difficulties answering questionnaires, such as persons with intellectual disability.
- (3) As students with intellectual disability seemed to have difficulties understanding some of the more abstract questions, visual support was provided for the items and the response scale. The visual support for the response alternatives consisted of pie charts and word pictures that students could point at when giving their response. The visual support for the questions consisted of pictures of the main concepts in each question, e.g. a picture of a plan or of a teacher listening. Visual support is considered a useful support for students to focus their attention (Nilsson et al. 2015).
- (4) Following recommendations from Earthman et al. (1999), five practice statements were developed for training before starting on the actual questionnaire. These practice statements function as an introduction for children on how to use Likert scales, and include simple statements such as 'I eat chocolate for breakfast' and 'I sleep well at night'.
- (5) When going through the student form with children with intellectual disability, the questionnaire items were rephrased into an interrogative format, as this made for easier understanding with the participants.
- (6) The distinction between the indexes 'What I do' and 'How I feel' was difficult to grasp for some of the students with intellectual disability. This issue was solved by alternating the order in which the questions were asked, where each question from the index 'What I do' was immediately followed by the corresponding question from the 'How I feel' index, thus clarifying the difference to the students. For example, when students were asked whether they make plans to achieve their goals ('What I do'-index), this question was immediately followed by the question whether they enjoy making plans to achieve their goals ('How I feel'-index).

These alterations to the AIR-S student form led to a modified version with 21 questions, hereafter named AIR-S-NOR, where scores can range from 21 to 84. A user-guide in Norwegian for how to administer the questionnaire can be obtained from the first author.

Measurement equivalence: psychometric reliability and validity of the AIR-S-NOR

Participants

The AIR-S-NOR was tested on 87 typically developing students and 34 students with intellectual disability (49% male; Mean age = 12.3, SD = 1.57). To obtain this sample, 22 schools in Eastern Norway were chosen randomly and invited to participate. Nine schools agreed to participate, and written parental consent was gained for all participants. Typically developing students filled out the AIR-S-NOR in their classrooms under guidance of the first researcher. Students with intellectual disability needed more scaffolding to be able to answer the questionnaire, and therefore, individual interviews were used. Sixty-four students (42 typically developing) filled out the instrument again after approximately two weeks to evaluate test-retest reliability.

Method

All data were analysed using SPSS version 24. Missing data were at 1.7%. Missing values were substituted with the mean value of the respective index for the participants in question.

Before the psychometric reliability of the AIR-S-NOR was assessed, histograms were used to check for normal distribution for the total sample, the sample of typically developing students and the sample of students with intellectual disability. This revealed that the distribution of the total self-determination score was not the same across categories of developmental characteristics. Whilst the total sample and the typically developing students had a normal distribution of self-determination levels, students with intellectual disability did not. This had implications for further data analysis, and differences between the two samples were examined.

Psychometric reliability of the AIR-S-NOR was assessed by calculating Cronbach's alpha for the total scale, the capacity subscale and the opportunity subscale. Separate alphas were calculated for the sample of typically developing students, students with intellectual disability, and the total sample. For test-retest reliability, Pearson's r was calculated for the normally distributed total sample ($n = 64$) and for the typically developing students ($n = 42$), and Spearman's rho for the students with intellectual disability ($n = 22$). Correlations between the capacity and opportunity subscale were also examined. The validity of the questionnaire was examined by means of principal component analysis (PCA). Because of the small sample size, PCA was performed for the total sample only.

Results

Total self-determination scores ranged from 38 to 84 for the total sample ($M = 63.5$, $SD = 9.60$). The mean score for typically developing students was 64.6 ($SD = 9.42$), and for students with intellectual disability it was 60.8 ($SD = 9.67$). A Mann-Whitney U Test revealed a small but significant difference in the total level of self-determination of typically developing students ($Md = 64$, $n = 87$) and students with intellectual disability ($Md = 59.5$, $n = 34$), $U = 1112$, $z = -2.118$, $p = .034$, $r = .19$. This indicates that students with intellectual disability show lower levels of self-determination than their typically developing peers.

For reliability measures, Cronbach's alpha for the AIR-S-NOR as a whole and for the capacity and opportunity subscales were calculated. Reliability was investigated for the whole sample, and for the samples of typically developing students and students with intellectual disability separately. The results show good to very good reliability, with values ranging between .75 and .89. (see Table 1). These values are slightly lower than what Wolman et al. (1994) found for the total scale, $\alpha = .92$.

Test-retest correlations were calculated for the total scale of the AIR-S-NOR and for the subscales, using Pearson's r for the normally distributed total sample and sample of typically developing students, and Spearman's rho for the students with intellectual disability. Test-retest correlation ranged from .79 to .86. These good to excellent values indicate adequate test-retest reliability (Table 1).

The relationship between the capacity subscale and the opportunity subscale was also assessed. Shogren et al. (2008) found in their study a strong correlation between these subscales of the AIR-S ($r = .73$). In the present study, more moderate correlations between the subscales were found for the total sample ($r = .44$), for the sample of typically developing students ($r = .46$), and for the sample of students with intellectual disability ($r = .40$).

Before initiating PCA, the suitability of the data for factor analysis was examined. Inspection of the correlation matrix showed the presence of many coefficients of .3 and above. Bartlett's Test of Sphericity was highly significant ($p = .000$), and the Kaiser-Meyer-Olkin value was .824, supporting the factorability of the matrix. These findings indicated that the data from the AIR-S-NOR could be subjected to PCA.

PCA revealed the presence of six components with eigenvalues exceeding 1, explaining 29.80, 11.04, 6.18, 5.91, 4.97 and 4.78% of the variance, respectively. Inspection of the screeplot showed a clear break after the second component, suggesting the extraction of two components for further investigation. Parallel Analysis, calculated with the Monte Carlo PCA program, gave only two components with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size (21 items x 121 participants). The component matrix also indicated that most of the items loaded on the first and second component, with few items loading on components 3, 4, 5 and 6. These findings from the Parallel Analysis and the component matrix supported the decision from the screeplot to retain a two-component solution for further investigation, and therefore, a two-component solution was forced in SPSS.

Table 1. Cronbach's α and test-retest correlation.

	Cronbach's α	Pearson's r /Spearman's rho for test-retest reliability
<i>Total score AIR-S-NOR</i>		
Total sample	.87	.86
Typically developing	.89	.86
Intellectual disability	.82	.86
<i>Capacity subscale</i>		
Total sample	.86	.82
Typically developing	.88	.83
Intellectual disability	.80	.84
<i>Opportunity subscale</i>		
Total sample	.82	.79
Typically developing	.85	.77
Intellectual disability	.75	.80

The two-component solution explained a total of 40.84% of the variance, compared with over 62% explained by the six-component solution. Component 1 contributed 29.80% and component 2 contributed 11.04%. There was a moderate negative correlation between the two factors ($r = -.308$), so the Oblimin rotation solution was performed to aid in the interpretation of these two components. The pattern matrix provided by the Oblimin rotation showed a very clear two-component solution, where all the items on component 1 are capacity items, and all but one of the items on component 2 are opportunity items. The Cap8 item loaded moderately ($-.32$) and inappropriately onto the opportunity component, but it still loaded more strongly ($.55$) on the capacity component. The structure matrix showed strong correlations between most of the capacity items and component 1, and between opportunity items and component 2, indicating a good discrimination between the factors (Table 2). For the capacity component, the lowest factor loading for capacity items was $.36$ for the Cap2 item, which was still higher than the highest loading (Opp3, loading at $.33$) on the capacity component of an opportunity item. The opportunity component also showed good discrimination, with the lowest loading opportunity item (Opp1, loading at $-.61$) still loading higher than the highest loading capacity item on the opportunity component (Cap8, loading at $-.49$).

To avoid double-barrelled items in the AIR-S-NOR, three items from the AIR-S capacity subscale were split up in two separate items each, resulting in three new items: Cap2, Cap4 and Cap10. However, upon investigation, two of these new items (Cap2 and Cap10) loaded the lowest on the capacity component, and they had low values on the corrected item total correlation ($.27$ and $.26$, respectively). On the other hand, the Cap4 item loaded very high on the capacity component, and it had a moderate value on the corrected item total correlation ($.46$). Therefore, PCA with Oblimin rotation was repeated with the Cap2 and Cap10 items removed. This resulted in a 19-item scale, with 13 capacity items and six opportunity

Table 2. Pattern and structure matrix for PCA with Oblimin rotation of two factor solution.

Item	Pattern coefficients		Structure coefficients		Communalities
	Component 1	Component 2	Component 1	Component 2	
Cap5	.709	.080	.684	-.138	.473
Cap11	.706	.142	.662	-.075	.456
Cap4	.687	.095	.658	-.117	.441
Cap12	.660	-.049	.676	-.252	.458
Cap15	.647	-.170	.699	-.369	.514
Cap3	.589	-.181	.644	-.362	.445
Cap8	.553	-.317	.651	-.488	.515
Cap6	.537	-.260	.617	-.426	.442
Cap13	.503	-.185	.560	-.340	.345
Cap7	.487	-.246	.563	-.396	.372
Cap1	.484	-.189	.425	.040	.213
Cap9	.454	-.242	.529	-.382	.332
Cap14	.415	-.024	.423	-.152	.179
Cap10	.405	.063	.386	-.062	.152
Cap2	.359	.008	.357	-.103	.127
Opp6	-.127	-.789	.116	-.749	.576
Opp2	-.067	-.787	.175	-.766	.591
Opp5	.045	-.747	.276	-.761	.581
Opp4	.100	-.667	.305	-.698	.496
Opp3	.134	-.650	.335	-.692	.495
Opp1	.047	-.592	.229	-.606	.370

Note: Bolded items indicate major loadings for each item.

items. The pattern matrix showed a very similar separation of the capacity and opportunity subscales, as with the 21-item scale. All items loaded above .42 on their respective components, but the Cap8 item showed again some loading (.304) on the opportunity component. The components correlated moderately ($r = .32$). The capacity subscale without the Cap2 and Cap10 items had a Cronbach alpha value of .86, which was the same value as when the items were included. Given this result, the authors decided to retain Cap2 and Cap10 in the AIR-S-NOR.

Overall, the results of this analysis support the bi-dimensionality of the AIR-S-NOR, as Shogren et al. (2008) and Chou et al. (2015) also found for the AIR-S.

Functional equivalence

Functional equivalence can be regarded as the sum of conceptual equivalence, item equivalence, semantic equivalence, operational equivalence and measurement equivalence, and it refers to the degree to which a questionnaire does what it is intended to do in both the source culture and the target culture (Herdman, Fox-Rushby, and Badia 1998). The study presented in this article indicates that there is good conceptual, semantic and measurement equivalence between the AIR-S and the AIR-S-NOR. Item equivalence may be slightly lower due to the limited experience that many Norwegian students have with practising the component skills of self-determination.

The change from a five-point to a four-point Likert scale as well as the adaptations to double-barrelled items decrease the operational equivalence between the AIR-S and AIR-S-NOR, and these alterations may make cross-cultural comparisons difficult. Total scores obtained from the AIR-S-NOR will not automatically compare to results obtained from studies with the AIR-S.

However, the high measurement equivalence indicates that the AIR-S-NOR is a reliable assessment tool for measuring self-determination in Norwegian students, and so, this study may provide an important contribution to the disability research field in Norway.

Discussion

The aim of this study was to perform an adaptation and validation of the AIR-S for use in Norwegian research and educational contexts. A critical analysis of equivalence indicates that the AIR-S-NOR provides a reliable way of assessing students' level of self-determination. Self-determination for persons with intellectual disability has received considerable attention over the years in Norway. However, reliable measures to assess self-determination were so far not available in Norwegian. This study contributes to filling this gap by adapting and validating the AIR-S-NOR, but further work is needed to make a variety of assessment tools available in Norway, so that the construct's full complexity can be measured.

Whilst the original AIR-S has been used in a number of international research studies where students with learning disabilities, developmental disability or intellectual disability completed the scale (e.g. Shogren et al. 2008), little information was provided in these studies on how the self-assessment of the students was administered, and which kind of scaffolding was given to help students complete the assessment. In the user-guide to the original AIR-S, some adaptations for students with special needs are suggested, such as reading aloud the statements to the students and providing them with examples. However, our pilot study

showed that this was not sufficient support for Norwegian students with intellectual disability, as they struggled especially with the items on the capacity index, which require skills in abstract reasoning and self-reflection. Therefore, we opted for structured interviews with extra scaffolding. This scaffolding included giving visual support, rephrasing statements into an interrogative format, splitting up double-barrelled questions, providing examples, practicing using the Likert-scale, and alternating between questions from the 'What I do' and 'How I feel' indexes. As this support seemed necessary to get reliable answers from the students, it is in place to wonder whether this may be due to students' lack of experience with practicing self-determined behaviour and with talking about abstract skills such as planning and goal achievement.

Implications for practice and future research

International research has consistently shown that levels of self-determination correlate positively with improved post-school outcomes (Shogren, Wehmeyer, Palmer, Rifenbark et al. 2015), and therefore, schools do wisely in teaching their students component skills of self-determined behaviour. With a reliable assessment tool for self-determination now being available in Norway, researchers and teachers will have the possibility to evaluate the effect of interventions aimed at improving students' levels of self-determination. Access to a proper measurement instrument may also aid teachers in operationalising the complex construct of self-determination into specific teachable skills. Teachers may also wish to engage in discussions with their students to explore perceived capacity and opportunity for self-determined behaviour, and the relationship between these two components.

Limitations of the study

The small sample size sets limitations to the statistical findings in this study. Exploratory and confirmatory factor analysis could not be performed, but PCA supports the structure of the scale. Data analysis showed a small but significant difference in self-determination level between typically developing students and students with intellectual disability, but a type-I error cannot be ruled out. Alterations to the scale may make cross-cultural comparison of scores difficult, and researchers should proceed with caution when wanting to undertake such studies. Also, this study did not investigate the sensitivity of the scale to assess the effect of self-determination interventions, and further research is required here.

An important aspect to consider with the study is the different *modi operandi* for the data collection with typically developing students and those with intellectual disability. Whilst the typically developing students filled out the AIR-S-NOR by themselves under the guidance of the first researcher, the students with intellectual disability got more substantial support using visual support in an interview situation. The provision of this support for the sample of students with intellectual disability but not for the typically developing students may have affected the students' answers, as there may be stronger social bias in interview situations. However, social bias usually leads to more positive answers, whilst the students that were interviewed scored significantly lower than the ones that answered by survey.

Conclusion

Based on a model of equivalence, AIR-S-NOR is considered a reliable measurement for students' capacity and opportunity for self-determination, thus opening up for its use in Norwegian educational and research practices. The AIR-S-NOR shows respectable psychometric properties. Due to the adaptations that were made in the instruments, researchers should proceed with care when using the AIR-S-NOR in comparative studies. When using self-reports with students with intellectual disability, sufficient scaffolding as described in this article should be provided to enable students to answer the questions appropriately.

Note

1. The index 'Opportunities at home' was removed from the Opportunity subscale in this research.

Disclosure statement

No potential conflict of interest was reported by the authors.

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