

Abstract

Purpose: In the past, rehabilitation centers for the visually impaired used non or semi structured methods to assess rehabilitation needs of their patients. Recently, an extensive instrument, the Dutch ICF Activity Inventory (D-AI), was developed to systematically investigate rehabilitation needs of visually impaired adults and to evaluate rehabilitation outcomes. The purpose of this study was to investigate the underlying factor structure and other psychometric properties, in order to shorten and improve the D-AI.

Methods: The D-AI was administered to 241 visually impaired persons who recently enrolled at a multidisciplinary rehabilitation center. The D-AI uses graded scores to assess the importance and difficulty of 65 rehabilitation goals. For high priority goals (e.g. daily meal preparation), the difficulty of underlying tasks (e.g. read recipes, cut vegetables) was assessed. To reduce underlying task items (>950), descriptive statistics were investigated and factor analyses were performed for several goals. The internal consistency reliability and test-retest reliability of the D-AI were investigated by calculating Cronbach's alphas and Cohen's (weighted) κ 's. Finally, consensus based discussions were used to shorten and improve the D-AI.

Results: Except for one goal, factor analysis model parameters were at least reasonable. Internal consistency reliability was satisfactory (range 0.74-0.93). In total, 60% of the 65 goal importance items and 84.4% of the goal difficulty items showed moderate to almost perfect κ values (≥ 0.40). After consensus-based discussions, a new D-AI was produced, containing 48 goals and <500 tasks.

Conclusions: The analyses were an important step in the validation process of the D-AI, and to develop a more feasible assessment tool to investigate rehabilitation needs of visually impaired persons in a systematic way. The D-AI is currently implemented in all Dutch rehabilitation centers serving all visually impaired adults with various rehabilitation needs.

Introduction

Due to demographic aging, the number of people with (irreversible) visual impairments is expected to rise in the coming decades.¹⁻³ This implies increasing pressure on visual rehabilitation services,⁴ which need to be optimally organized in the near future. This was the rationale for Multidisciplinary Rehabilitation Centers for visually impaired persons (MRCs) in the Netherlands to propose a change in their future intake procedure to a more systematic approach. Moreover, with growing medical costs, the urge for efficient and evidence based care is rising. This means there is a need for well validated instruments that investigate individual rehabilitation needs in a systematic way and that are able to measure the effect of rehabilitation over time. However, to achieve the best possible quality of life, a structured approach should not ignore the individual needs of the patient. Moreover, it is essential to monitor the effect individual rehabilitation needs.

Accordingly, several vision-related quality of life questionnaires have been developed (e.g.,⁵⁻⁹). The available vision-related quality of life questionnaires can be used to measure specific domains of rehabilitation, such as mobility, adjustment, or reading/fine work and global outcomes of rehabilitation. However, they are not suitable to investigate the full range of rehabilitation needs. Moreover, many specific rehabilitation goals of patients (e.g., 'using public transport' or 'daily shopping') are not specifically represented by the constructs of these vision-related questionnaires. This makes it difficult to evaluate the effect of rehabilitation on these aspects.

Massof et al. designed the Activity Inventory (AI),¹⁰⁻¹⁴ which is an assessment tool to investigate rehabilitation goals for visually impaired persons in a systematic way. The content of the AI was specifically developed for visually impaired persons and has a hierarchical structure in which 'tasks' (specific cognitive and motor activities, e.g., 'reading a recipe') that serve a common purpose are nested under 'goals' (e.g., 'daily meal preparation').

Recently, we developed a Dutch version of the AI¹⁵⁻¹⁷ in which goals were classified by the nine 'Activity and Participation' domains of the International Classification of Functioning, Disability, and Health (ICF). The ICF was developed by the World Health Organization (WHO);¹⁸ its use in rehabilitation medicine is increasing as it provides an important international taxonomy for classifying and measuring functions, disabilities, and health with standard concepts and terminology. In addition, to increase content and face validity, the Dutch ICF Activity Inventory (D-AI) was extended using qualitative techniques (e.g., focus groups with rehabilitation professionals and visually impaired

persons) and was further improved after a pilot study. The number of goals and tasks of the D-AI increased considerably compared to the original AI.

A strength of the D-AI is its systematic character which prevents important topics, from the patient's perspective, from being overlooked.¹⁵⁻¹⁷ Using the D-AI in rehabilitation medicine is expected to more efficiently direct patients to a suitable rehabilitation trajectory. Also, comparing rehabilitation needs before, during and after rehabilitation allows to monitor the individual patient's progress, as well as to evaluate the effect of rehabilitation at group level. This is important when evaluating and improving rehabilitation programs for a better evidence-based practice. In addition, the patient-centered results from the D-AI facilitate shared decision-making and a more structured medical communication in ICF terms.¹⁵ This will improve the transparency of the rehabilitation process for clients, rehabilitation center and insurance companies. MRCs in the Netherlands indicated that they wanted to change their intake process into a more systematic approach of setting individual rehabilitation goals and to acquire a baseline measurement so that the effect of rehabilitation for individual goals can be determined with the same instrument.

Our earlier feasibility study showed that the extensive increase in content of the D-AI had substantially enlarged the assessment time up to 88.8 (\pm 41.0) minutes.¹⁷ In addition to an adaptation in its routing, the number of items in the D-AI should be reduced by selecting the most relevant and discriminating items so that MRC will be able to use the D-AI in clinical practice. Moreover, for a better interpretation of the scores, it is necessary to establish the underlying dimensions of the new D-AI, and additional measurement properties (e.g., reliability) need to be investigated. Therefore, this study aims to elucidate the underlying factor structure of the goals in the D-AI (i), to provide detailed information on its psychometric properties for individual goals (ii), and to produce a shorter version of the D-AI (iii). For these reasons the D-AI was assessed within a large sample of visually impaired persons who recently enrolled at an MRC. This study reports the results of the psychometric analyses and provides a full new version of the D-AI.

Methods

Recruitment of study population

Eligible participants were aged ≥ 18 years, with adequate command of the Dutch language, and with sufficient cognitive ability to participate in the study. All patients with a need for low-vision rehabilitation that had enrolled in the MRC were allowed to participate. Persons with low vision from any cause were eligible

and there was no restriction regarding visual performance. Although patients usually enter the MRC after referral by an ophthalmologist, patients may enroll in an MRC on their own initiative.

Consecutive patients who entered the MRC between May 2008 and January 2009 were screened for study eligibility. During that period, of the 416 eligible patients that we tried to reach, 367 were actually reached, of whom 266 (72.5%) showed an interest in this study (Figure 1). It was explained that the D-AI would be assessed in addition to the usual intake procedure at the MRC. The study protocol was approved by the Medical Ethics Committee of the VU University Medical Center Amsterdam and was consistent with the principles of the Declaration of Helsinki. All participants provided written informed consent.

Structure and content of the D-AI

Focus group discussions revealed important adaptations compared to the original AI. All goals were now classified by the nine Activity and Participation domains of the ICF.¹⁶ In addition, a 10th domain (which is not covered by the “Activities and Participation” domains of the ICF) “coping with mental (emotional) health aspects” was inserted in the questionnaire. Also, the content of the questionnaire was extended and adapted considerably. For instance, goals concerning mobility, employment, education, and interpersonal interactions/relations were added. Some specific hobby related goals like “Hunt and shoot” and “Leatherwork” from the original AI were left out, because the patient files and focus groups made it clear that these hobbies were not common. Finally, some questions were rephrased.

Based on the results of a pilot study,¹⁷ the D-AI was assessed in two parts (see Figure 2). In the first part of the D-AI (D-AI-1), the goal importance (GI) and (if GI>0) the goal difficulty (GD) of all goals were assessed. The priority score (PR=GI*GD) was calculated immediately by the computer so all goals were automatically ranked from the highest to the lowest PR to create a top priority list. In the second part of the D-AI (D-AI-2), all tasks underlying goals that had the same as or a higher priority score than the fifteenth goal of the priority list (TPL-15) were assessed.¹⁷ In this way we decreased the assessment time and increased the feasibility of the D-AI by selecting only highly relevant goals for assessment at the task level. Another adaptation concerned the addition of an extra response category (‘not applicable’) for GI questions.

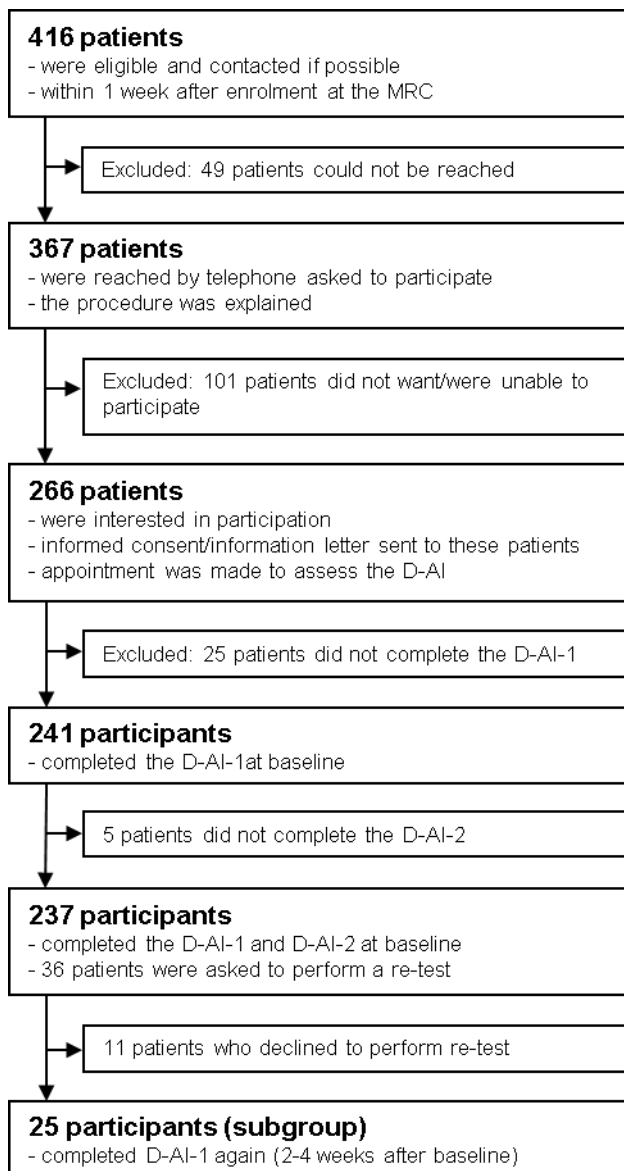
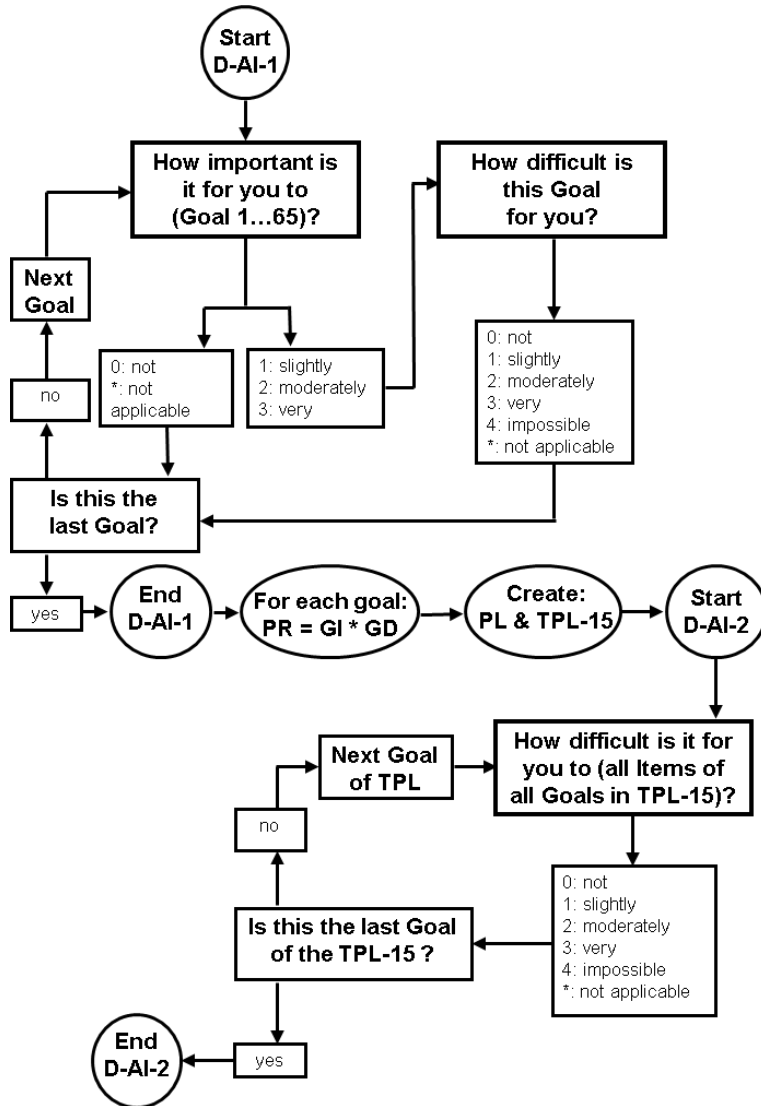


Figure 1. Flow diagram for participation

The number of patients is shown for the different stages of the study. D-AI: Dutch ICF Activity Inventory, D-AI-1: part one of the D-AI (goal questions), D-AI-2: part two of the D-AI (task questions), MRC: Multidisciplinary Rehabilitation Center for visually impaired patients.



An example:
 If the patient reported a goal (e.g. 'personal correspondence') to be 'moderately important' (score 2), the difficulty was assessed as well. If the difficulty was rated to be 'very difficult' (score 3), this would result in priority score of 6. Suppose there were six goals with a priority score of 12, six goals with priority score of 8, and six goals with a priority score of 6, all goals with scores of 6 or higher were fully assessed at the task level (e.g. for the goal 'personal correspondence' tasks such as 'read hand-written post' or 'place your signature' were assessed). All goals with a priority score lower than 6 were not assessed at the task level.

Figure 2. Routing of the new version of the D-AI.
 PR: goal priority score, GI: goal importance score, GD: goal difficulty score, PL: priority list in which all goals are ranked from the highest to the lowest priority score, TPL-15: top-15 priority list (containing all goals with a top-15 priority score).

In this study, an updated version of the D-AI was created based on the results of the pilot study.^{15:17} This updated version of the D-AI consisted of 65 umbrella goals (plus 26 sub-goals) and 842 tasks (plus 112 tasks underlying sub-goals, plus 5 open-ended questions).

Design

Patients were recruited directly after enrolment at the MRC. Data collection took place between May 2008 and January 2009. The D-AI was assessed to the patient by the first author (J.E.B.) or by one of the 18 other assessors (all trained by J.E.B.) in addition to the usual intake procedure at the MRC. The D-AI and its routing (including the TPL-15) were programmed using Blaise Enterprise 4.7 (Heerlen, the Netherlands), so that it could easily be assessed using a computer assistive telephone interview. Depending on the patient's response to the questions of the D-AI, the computer automatically displays the following question. Supplementary information (such as living conditions, education level, employment, and co-morbidity) was collected with a written questionnaire. Additional medical information (such as visual ability and eye condition) was collected retrospectively from the patient files at the MRC.

A subgroup of 25 consecutive patients completed the D-AI-1 (at the goal level) a second time for the test-retest reliability and measurement error analyses (see Figure 1). The retest was assessed by the same interviewer and took place 2-4 weeks after the first assessment. During this period, visual ability had to be (subjectively) unchanged. These data were not included in any other analysis.

Statistical Analyses

Descriptive statistics

As the routing of the D-AI allows to skip items which are irrelevant for the patient, not all goals were assessed equally often. Descriptive statistics (i.e., means, medians, SDs, floor and ceiling effects) and the frequencies of the missing data for all items were computed using SPSS 15.0. Removing items was considered if there was a relatively high number of missing values (i.e., >50%) or floor and ceiling effects (i.e., >15% of the respondents achieved the highest or lowest possible score).¹⁹

Structure of the goals in the D-AI: Exploratory Factor Analysis

If a goal was fully assessed at the task level by at least 80 (33.2%) participants, we performed exploratory factor analysis (EFA) at the task level for that specific goal. Descriptive statistics (e.g., missing values; floor/ceiling effects) were used

to remove items from the goal before an EFA was performed in Mplus Version 5 (Muthén & Muthén). The number of factors among the remaining items was based on the eigenvalues (an indication of the proportion of total variance accounted for a factor), the inspection of the items, the factor loadings, as well as the factor content and the interpretability of the factors. Following the Kaiser criterion, we initially examined factors with eigenvalues >1 .²⁰ Items with the highest factor loading below 0.40 were considered for removal from the factor, as well as items with similar factor loadings on several factors, and those items which formed a factor with only two or less items. After an item had been deleted, a new EFA was performed. In principle, items were placed in the factor for which they had the highest factor loading. Also, all decisions (i.e., whether an item should be placed in a specific factor, or should be deleted) were based on consensus. Each factor was named after the item content of the items that loaded onto it.

It was not unlikely that the underlying factors emerging from the data would (to some extent) be correlated; therefore, we decided to use oblique (i.e., quartimin) rotation, rather than orthogonal rotation. The model parameters were estimated by applying full information maximum likelihood with robust SEs. The following descriptive measures of model fit were evaluated: the comparative fit index (CFI), root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR). The CFI examines a relative improvement comparing a model that assumes no pattern of correlation among the variables to a fit of the tested factor structure. Cut-off values of >0.95 for the CFI were considered to be good. The SRMR describes the difference between the observed and estimated correlations, and values <0.05 were considered favorable. The RMSEA is another fit index for which values <0.06 indicate a good fit.^{21;22} Cut of values following the criteria of Vandenberg and Lance²³ were considered reasonable (CFI: 0.90; SRMR: 0.10; RSMEA: 0.08).

Once a factor structure was hypothesized, additionally, CFA was performed for the same sample. CFA is the measurement component of structural equation modeling and tests how well the data fits the hypothesized factor structure.²⁴ Again CFI, SRMR and RMSEA were determined. In order to remove redundant items, we examined normalized residual correlations. Once the descriptive measures of model fit were optimized by deleting items, another EFA was performed for the scale's final form.

Internal consistency: Cronbach's α

After determining the (homogeneous) (sub-)scales for the items of all goals that were fully assessed at the task level by at least 80 participants, we calculated

Cronbach's α for each (sub-)scale separately, as a measure of internal consistency. However, as one of the response categories for all items is 'not applicable', many participants had missing data. In order to calculate Cronbach's α , we imputed the missing data (i.e., 'not applicable') of all participants for whom at least 50% of the items in the (sub-)scale was available. Participants who did not meet this criterion in the (sub-)scale under observation, were excluded. A single imputation was performed on the data, using the Expectation Maximization algorithm in SPSS 15.0. Subsequently, all imputed data were rounded to the rating options of the D-AI. Cronbach's α was then calculated for each (sub-)scale. Following Terwee et al.,¹⁹ Cronbach's α ratings between 0.70 and 0.95 were considered satisfactory. For goals that were fully assessed at the task level by less than 80 participants, the factor structure was not examined. However, to have some indication of the internal consistency of the underlying tasks, we calculated the Cronbach's α if the difficulty of the underlying tasks was rated by at least 40 participants. For tasks underlying these goals, the same imputation technique was applied. As Cronbach's α was calculated based on the items available in the D-AI, Cronbach's α was calculated without new items; however, the items deleted from the D-AI were not included in this analysis.

Reliability: test-retest

Test-retest reliability was investigated on the sub-sample of 25 patients (see Figure 1) by Cohen's κ values for GI questions and by weighted Cohen's κ values for GD questions. κ corrects for the agreement due to chance. Weighted κ is suitable for ordinal responses and considers partial agreement by weighing the disagreement according to the magnitude of the difference in the score, based on the square of the amount of discrepancy,²⁵ making it identical to the intraclass correlation coefficient.²⁶ Due to the routing structure of the D-AI, GD questions were not always assessed at both test moments. Weighted κ for the GD questions were only calculated if test-retest data for at least 10 participants were available. (Weighted) κ values were calculated in Stata 11.2 (StataCorp LP, College Station, TX). Following Landis & Koch,²⁷ κ values >0.40 are considered as moderate and >0.60 as substantial. To have more insight into the underlying data, we also analyzed the observed agreement (% , not corrected for chance).

Shorter version of the D-AI using consensus-based discussions

To produce a new, shorter version of the D-AI, the results of the above analyses were used as input for consensus-based discussions between Janna E. Bruijning and Ruth M.A. van Nispen. Also, comments of patients and assessors collected during or after the interviews, were considered. Some items (goals as well as

tasks) were deleted, rephrased or merged with similar items. The wordings of goal questions were rephrased if (weighted) $\kappa < 0.4$ and (simultaneously) the observed agreement $< 75\%$, or if the feedback indicated to do so. In case there was any doubt whether an item should be released or not, the item was kept in the D-AI. In addition, a few new items were included in the new D-AI.

Results

Study population

Figure 1 shows the flow of the study population. Table 1 shows the reasons for non-participation and drop-out, as well as the patient characteristics. Participants who completed the study at baseline ($n=241$) showed a significant difference from the non-participants plus drop-outs together ($n=126$) on age and gender, with the participant group being younger and including relatively more males. There was no difference in visual acuity and the % age-related macular degeneration.

Descriptive statistics

Table 2 shows for how many participants each goal turned out to have a priority score ≥ 1 , and how often each goal was part of the TPL-15.¹⁷ Mean GI and GD scores (if applicable), as well as priority scores are given. Of the participants answering underlying task questions of goals, 182 (19.0%) items were 'not applicable' for $\geq 50\%$ of these participants (varying number caused by routing).

Factor structure

Table 2 shows that for 14 goals we investigated the factor structure at the task level ($n \geq 80$) representing a total of 114 items. The mean (absolute) factor loading was 0.691, with five (4.4%) items having factor loadings ≤ 0.4 . These items were included in the factor structure because the model fit of the EFA showed an acceptable solution. For half of the goals, EFA model parameters (for the new

Table 1. Basic characteristics of the participants, non-participants and drop-outs.

Characteristic	Specification	Participants (n=241)*	Non-participants (n=101)*	Drop-outs (n=25)*
Age, Yr	Mean (\pm SD) \dagger	68.4 (\pm 13.6) \ddagger	74.1 (\pm 14.0)	75.5 (\pm 12.3)
	Age of men (mean \pm SD)	67.3 (\pm 13.1)	70.5 (\pm 16.2)	75.8 (\pm 5.5)
	Age of women (mean \pm SD)	69.4 (\pm 14.0)	76.1 (\pm 12.2)	75.4 (\pm 13.9)
Gender	Male \dagger	107 (44.4%) \ddagger	36 (35.6%)	6 (24%)
Eye condition (multiple options possible)	Age-related macular degeneration \dagger	111 (46.1%)	47 (46.5%)	16 (64.0%)
	Cataract	54 (22.4%)	17 (16.8%)	7 (28.0%)
	Glaucoma	26 (10.8%)	7 (6.9%)	2 (8.0%)
	Diabetic retinopathy	23 (9.5%)	6 (5.9%)	1 (4.0%)
	Optical atrophy/neurological problem	19 (7.9%)	2 (2.0%)	0 (0.0%)
	Vascular occlusion	8 (3.3%)	5 (5.0%)	1 (4.0%)
	Myopathy/amblyopia	24 (10.0%)	7 (6.9%)	2 (8.0%)
	Retinal detachment	8 (3.3%)	4 (4.0%)	1 (4.0%)
	Retinitis pigmentosa	20 (8.3%)	6 (5.9%)	0 (0.0%)
	Cornea diseases	13 (5.4%)	6 (5.9%)	0 (0.0%)
	Brain-related visual field loss (e.g., after stroke)	11 (4.6%)	5 (5.0%)	1 (4.0%)
	Other	22 (9.1%)	8 (7.9%)	3 (12.0%)
	More than one eye condition (max. 4)	87 (36.1%)	32 (31.7%)	9 (36.0%)
	Unknown	11 (4.6%)	12 (11.9%)	2 (8.0%)
Visual Functioning (as reported in patient file)	Visual Acuity (better eye): Logmar (Mean (\pm SD)) \dagger	0.77 (\pm 0.84)	0.63 (\pm 0.55)	0.80 (\pm 1.08)
	≥ 0.3	114 (50.4%)	50 (52.6%)	11 (50.0%)
	≥ 0.05 and < 0.3	89 (39.4%)	38 (40.0%)	9 (40.9%)
	≥ 0 and < 0.05	23 (10.2%)	7 (7.4%)	2 (9.1%)
	Substantial visual field loss	90 (37.3%)	18 (17.8%)	9 (36%)
	Metamorphopsia	56 (23.2%)	Data not collected	Data not collected
	Difficulty with contrasts/lights	9 (3.7%)	Data not collected	Data not collected
	Other (e.g., diplopia)	19 (7.9%)	Data not collected	Data not collected
Co-morbidity	Self-reported	173 (73.9%)	Data not collected	Data not collected
Education	In years (median [IQR])	10 [9;12]	Data not collected	Data not collected

Employment (multiple options possible)	Employed	42 (18.2%)	Data not collected	Data not collected
	Volunteering	32 (13.9%)	Data not collected	Data not collected
	Not employed or volunteering	157 (68.0%)	Data not collected	Data not collected
Living condition	Living alone (e.g., no partner, divorced, widow(er))	83 (35.8%)	Data not collected	Data not collected
	Living together (e.g., with partner or family)	149 (64.2%)	Data not collected	Data not collected
Residence	Independent	212 (91.0%)	Data not collected	Data not collected
	In nursing home	5 (2.1%)	Data not collected	Data not collected
	Semi-independent	16 (6.9%)	Data not collected	Data not collected
Reasons for non-participation/drop-out (multiple options possible)	No time/too busy	n.a.	7 (6.9%)	4 (16.0%)
	Not interested/did not want to participate	n.a.	17 (16.8%)	4 (16.0%)
	Too much of a burden	n.a.	30 (29.7%)	0 (0.0%)
	Problems with hearing	n.a.	8 (7.9%)	0 (0.0%)
	Health related problems (physical and mental)	n.a.	27 (26.7%)	9 (36.0%)
	Seemed to be cognitive unable	n.a.	5 (5.0%)	4 (16.0%)
	Wants contact with MRC first	n.a.	10 (9.9%)	0 (0.0%)
	Content of the additional questionnaire	n.a.	0 (0.0%)	3 (12.0%)
Unknown	n.a.	0 (0.0%)	5 (20.0%)	

*Unless stated otherwise, data are the number of participants and percentages based on the number of patients for whom data were available.

†A statistical test was performed between participants versus nonparticipants and dropouts (together).

‡p < 0.05.

n, number of participants; IQR, interquartile range; n.a., not applicable.

factor structure) were good, and for only one goal was none of the EFA model parameters at least reasonable.

Internal consistency

Cronbach's α was determined for 42 (sub-)scales that were also included in the new D-AI ($n \geq 40$). For $n \geq 80$, the values ranged from 0.738 to 0.929, and for $40 \leq n < 80$ from 0.749 to 0.939, suggesting a sufficient to high internal consistency (Table 2).

Test-retest reliability for goals

Table 2 presents the results of the test-retest reliability analyses. In total, 39 (60.0%) of the 65 GI items and 38 (84.4%) of the 45 calculated GD items ($n \geq 40$) showed moderate to almost perfect κ values (≥ 0.40). On inspection, 20 (30.8%) of these GI items and 45 (100%) of these GD items had an observed agreement of $\geq 80\%$. The exact formulation of 23 goals (plus 4 sub-goals) was (slightly) rephrased based on the κ values, the observed agreement, and the available feedback (Table 2).

Consensus-based adaptations

Based on the results of the above analyses and feedback from patients and assessors, consensus-based adaptations were made to the questionnaire. Usually, a combination of reasons stood at the basis of a consensus-based decision to release items from the D-AI. The new, shorter D-AI which was produced retains the nine 'Activity and Participation' domains of the ICF and one additional domain called 'Mental aspects', together with 48 goals, 7 sub-goals and 467 tasks, and 51 sub-tasks.

Goal level

In Table 2, the (sub-)goals printed bold are those included in the new D-AI. Thirteen goals were excluded as a separate goal, but (partly) transferred to other goals. For example, 'attending meetings' and 'using a computer at work' were deleted as goals but included as new task items underlying the goal 'Working activities' as these goals were only applicable to few. Moreover, many tasks nested under these goals were reported to overlap with other goals (e.g., with 'using a computer at home' which, in turn, was slightly rephrased as 'Using a computer'). Due to many 'not applicable' ratings, a similar adaptation was applied to the goal 'Guide dog care', which is now nested as a task underneath 'Pet care'. Three times, several goals were merged into a new goal (see Table 2); the three goals 'Interaction with partner/family/relatives and friends' and their

underlying tasks were merged into the new goal 'Interaction with loved ones', 'Riding a (motorized) bike/moped/scooter' and 'Driving a car/vehicle for disabled persons' were combined in a similar way. Several patients indicated that these goals and underlying tasks were quite similar as they largely relied on the same tasks. Patients indicated this to be frustrating to answer. The goal 'Making ends meet' was reported to be 'too personal' by many patients, moreover, consensus discussions revealed that this could better be discussed by a social worker as an external factor. The goal 'Performing in public' was only applicable to a selective group of patients (see Table 2) and was therefore released as a goal. Moreover, it was reasoned that this topic was captured by the goal 'Personal communication'. One new umbrella goal ('Recreational/leisure time') was added, which encompasses eight (sub-)goals that were previously included as goals. All former sub-goals, e.g., 'going to the theater',¹⁷ that were included in the D-AI are now included as tasks underlying the new sub-goals (e.g., 'Attending cultural events'). In this way the number of items was reduced in order to decrease the administration time. Finally, the goal questions 'Handle feelings' and 'Acceptance' were reported to be similar and were therefore merged as 'Emotional aspects' with two sub-scales.

Task level

It was decided to remove some items from the D-AI that were 'not applicable' to many participants and/or items with high floor or ceiling effects, e.g., 'drinking without spilling' (goal: 'Eating and drinking') which was 'not difficult' for 15 (68.2%) of the 22 patients in whom the goal was fully assessed at the task level. Examples for the goal 'Personal health care' are the task 'taking your blood pressure' which was reported to be 'not applicable' for 20 (54.1%) and 'not difficult' for eight (21.6%) of the 37 patients, or the task 'dialyzing' which was 'not applicable' for 36 (97.3%) and 'not difficult' for 1 (2.7%) of the same participants. It was discussed that these items were very specific and that it would be more useful to formulate this more generally. Therefore the task 'perform medical technical tasks' was inserted as a new task, replacing several others. Also, some items were deleted or merged with other items because it was reported that the interpretation was similar, or that they showed similar difficulty scores for the same person: e.g., 'avoiding bumping into things/other people' (goal: 'Physical activity/sports'). In addition, some items were reported to be unclear and were therefore deleted or rephrased: for example, 'following a Dutch TV program' was changed to 'following a TV program in a familiar language' (goal: 'Watching TV'). Table 2 shows what changes were made to the D-AI at the task level. The Appendix shows all current goals and tasks included in the D-AI.

Table 2. Results of descriptive statistics, test-retest reliability, factor structure, internal consistency and content of the new D-AI

Activity and Participation domains of ICF number. Goal -(sub)scales	Goal: GI & GD		Goal: PR		Test-retest				
	Mean GI score (n)	Mean GD score (n)	n with PR* score ≥ 1	n with PR* score in TPL-15 (n without pp who answered n.a. to all underlying tasks)	Mean PR* score (241pp)	GI K (n=25)	GI % agreement (n=25)	GD weighted K (n)	GD % agreement (n)
1. Reading	2.9 (240)	2.1 (237)	214	177 (177)	5.8	0.47	92	0.54 (24)	93 (24)
1. Writing	2.6 (228)	1.9 (221)	185	139 (139)	4.5	0.46	72	0.80 (23)	97 (23)
1. Watching TV	2.3 (241)	1.8 (228)	195	131 (131)	4.1	0.57	76	0.69 (24)	95 (24)
-Dutch TV									
-Reading involved with TV									
-Watching TV images									
2. Personal administration	2.5 (181)	1.8 (165)	126	96 (96)	3.2	0.49	72	0.71 (15)	95 (15)
2. Following a schedule	2.7 (225)	0.8 (217)	90	53 (53)	1.9	0.24	68	0.59 (23)	92 (23)
3. Using computer	2.2 (159)	1.7 (127)	96	76 (71)	2.4	0.53	68	0.96 (12)	99 (12)
3. Personal correspondence	2.7 (214)	1.6 (205)	148	113 (113)	3.7	0.35	68	0.92 (18)	98 (18)
3. Using telephone	2.8 (237)	0.8 (232)	87	54 (54)	2.1	0.00	92	0.13 (24)	83 (24)
4. Mobility at home	2.9 (238)	0.8 (237)	94	58 (58)	2.1	0.00	92	0.81 (24)	95 (24)
4. Mobility inside (not at home)	2.6 (228)	1.4 (221)	145	98 (98)	3.4	0.03	64	0.82 (23)	94 (23)
4. Mobility outdoors (walking)	2.8 (229)	1.3 (225)	135	95 (93)	3.4	0.44	84	0.58 (22)	88 (22)
-Walk around safely									
-Assess own safety									
-Find route									
-Road users									
4. Riding a (motorized)bike/moped/scooter									
4. Driving car/ vehicle for disabled persons									
4. Using public transportation	2.2 (179)	1.6 (148)	104	74 (72)	2.6	0.64	76	0.91 (13)	98 (13)
4. Riding a bike	2.3 (118)	1.4 (102)	67	48 (42)	1.5	0.62	76	0.56 (11)	89 (11)
4. Riding a motorised bike/moped/scooter	0.9 (44)	2.2 (13)	11	7 (5)	0.3	0.59	84	n.a. (1)	n.a. (1)
4. Driving a car	2.1 (70)	2.0 (47)	36	33 (22)	1.0	0.68	84	n.a. (5)	n.a. (5)
4. Driving a vehicle for disabled persons	1.1 (51)	1.7 (20)	14	8 (6)	0.4	0.44	84	n.a. (1)	n.a. (1)
5. Dressing	2.9 (233)	0.6 (229)	67	38 (38)	1.6	-0.09	84	0.68 (25)	95 (25)
5. Personal hygiene	2.8 (228)	0.7 (219)	82	42 (42)	1.8	0.21	88	0.61 (23)	93 (23)
5. Personal health care/medication	2.8 (210)	0.6 (199)	65	37 (37)	1.4	0.20	72	0.68 (20)	95 (20)
5. Eating and drinking	2.9 (232)	0.3 (229)	43	22 (22)	0.9	1.00	100	0.64 (25)	93 (25)
5. Using a public toilet	2.6 (213)	0.8 (200)	81	53 (40)	1.7	0.03	72	0.33 (21)	84 (21)
6. Cleaning and tidying up	2.6 (187)	1.2 (170)	99	61 (61)	2.1	0.27	56	0.69 (12)	93 (12)
6. Doing laundry	2.6 (164)	0.6 (152)	56	24 (23)	1.1	0.85	92	0.62 (14)	95 (14)
6. Doing chores at home	1.8 (154)	1.9 (112)	96	66 (60)	2.2	0.37	52	n.a. (9)	n.a. (9)
6. Mending clothes	1.9 (148)	2.4 (111)	100	78 (73)	2.8	0.54	72	n.a. (7)	n.a. (7)
6. Paying and withdrawing money	2.7 (207)	1.5 (196)	123	98 (96)	3.3	0.38	60	0.22 (13)	87 (13)
-Cash money									
-Paying with bank cards or via internet									
6. Daily shopping	2.6 (188)	1.3 (172)	103	80 (80)	2.6	0.74	84	0.70 (13)	91 (13)
-Find the right products									
-Find way in shopping store									
-Reading involved with shopping									
6. Shopping (not groceries)	2.0 (198)	1.5 (162)	104	63 (62)	2.6	0.39	52	0.66 (13)	92 (13)
6. Daily meal preparation	2.6 (182)	1.3 (172)	67	34 (34)	1.4	0.64	80	0.36 (14)	93 (14)
6. Health care for an adult	2.5 (67)	1.3 (55)	36	21 (10)	0.8	0.59	80	n.a. (3)	n.a. (3)
6. (Grand) child care	2.5 (109)	0.9 (97)	47	27 (26)	1.0	0.54	76	n.a. (4)	n.a. (4)
6. Pet care	2.0 (88)	0.5 (63)	17	7 (6)	0.4	0.56	76	n.a. (7)	n.a. (7)
6. Guide dog care	1.3 (30)	0.5 (11)	4	2 (1)	0.1	0.63	92	n.a. (0)	n.a. (0)

Bold: included in new D-AI
Normal: not included in new D-AI
Italic: goal question rephrased

Factor analyses					Internal consistency	Old	New D-AI	
Eigenvalues for n≥80	Factor loadings for n≥80 [range]	EFA CFI for n≥80	EFA RMSEA for n≥80	EFA SRMR for n≥80	n for whom at least 50% of the items in (sub)scale was available, for n≥40.	Cronbach's α for n≥40 (n _{item})	n _{item} in old D-AI	n _{item} in new D-AI (plus n _{item} added to the (confirmed) (sub)scale
5.9;1.3;0.9	0.203 – 0.840	0.982	0.032	0.055	175	0.901 (13)	19	13 (1)
2.9;0.8	0.498 – 0.900	0.977	0.080	0.043	137	0.844 (5)	6	5
4.8;1.5;1.1;0.7		1.000	0.000	0.021			18	
	0.343 – 1.011				130	0.807 (3)		3
	-0.782 – -0.452				122	0.822 (4)		3 (1)
	0.800 – 0.939				127	0.911 (3)		4
5.1;0.9	0.507 – 0.792	0.875	0.124	0.063	95	0.908 (9)	11	9
					52	0.793 (5)	6	5
					62	0.883 (13)	25	13
3.1;0.9	0.427 – 0.841	1.000	0.000	0.044	113	0.825 (6)	8	6 (1)
					40	0.770 (5)	7	5
					57	0.834 (7)	11	7
3.7;0.7	0.594 – 0.898	0.986	0.053	0.041	97	0.879 (6)	11	6 (4)
5.9;2.3;1.4;1.0		0.921	0.097	0.043			28	
	0.432 – 0.934				91	0.820 (6)		2 (4)
	-0.754 – -0.495				84	0.793 (4)		4
	0.672 – 0.929				87	0.826 (3)		3
	0.573 – 0.766				91	0.819 (3)		3
								14
								17
					63	0.899 (13)	18	15
					40	0.934 (13)	17	
					n.a.	n.a.	17	
					n.a.	n.a.	25	
					n.a.	n.a.	24	
					n.a.	n.a.	13	8
					42	0.823 (7)	16	10
					n.a.	n.a.	24	14
					n.a.	n.a.	14	10
					n.a.	n.a.	8	
					56	0.934 (16)	16	17
					n.a.		9	7
					53	0.896 (9)	11	10
2.8;1.3;0.7		1.000	0.000	0.052	71	0.911 (6)	6	6
							10	
	0.413 – 0.835				96	0.745 (3)		3
	0.528 – 0.966				78	0.804 (3)		3
4.6;1.9;1.0;0.8		1.000	0.000	0.028			28	
	0.172 – 1.253				76	0.739 (3)		3 (1)
	0.681 – 0.937				77	0.829 (3)		3 (1)
	0.769 – 0.974				79	0.929 (4)		4 (1)
					58	0.876 (5)	5	5
					n.a.		28	20
					n.a.		21	6
					n.a.		15	9
					n.a.		12	7
					n.a.		10	

Table 2 (continued)

Activity and Participation domains of ICF number. Goal -(sub)scales	Goal: GI & GD		Goal: PR		Test-retest				
	Mean GI score (n)	Mean GD score (n)	n with PR* score ≥1	n with PR* score in TPL-15 (n without pp who answered n.a. to all underlying tasks)	Mean PR* score (241pp)	GI K (n=25)	GI % agreement (n=25)	GD weighted K (n)	GD % agreement (n)
Bold: included in new D-AI Normal: not included in new D-AI <i>Italic:</i> goal question rephrased									
7. Personal communication	2.8 (240)	0.6 (233)	80	42 (42)	1.6	0.29	84	0.65 (23)	94 (23)
<i>7. Relation with loved ones</i>									
7. Interaction with colleagues	2.5 (92)	0.4 (80)	23	8 (8)	0.4	0.74	84	n.a. (8)	n.a. (8)
7. Interaction with strangers	2.0 (227)	0.7 (195)	74	32 (32)	1.3	0.55	72	0.47 (22)	89 (22)
7. Interaction with partner	2.9 (162)	0.3 (156)	33	13 (12)	0.5	0.84	92	0.12 (15)	85 (15)
7. Interaction with family	2.9 (180)	0.2 (180)	28	9 (7)	0.4	0.51	84	0.26 (18)	92 (18)
7. Interaction with relatives and friends	2.9 (235)	0.4 (234)	57	24 (23)	1.1	0.49	96	0.53 (24)	94 (24)
8. Managing finance	2.6 (191)	1.2 (177)	98	60 (59)	2.3	0.77	88	0.62 (15)	93 (15)
8. Regulatory and information	2.7 (239)	1.3 (224)	132	97 (96)	3.5	0.11	72	0.53 (22)	90 (22)
-concerning organizations									
-concerning eyes & vision									
8. Education	1.3 (120)	2.0 (60)	52	34 (31)	1.2	0.44	64	n.a. (4)	n.a. (4)
8. Applying for a job	0.9 (92)	1.9 (30)	23	15 (12)	0.6	0.55	76	n.a. (3)	n.a. (3)
8. Working activities	2.4 (96)	1.2 (82)	50	36 (32)	1.2	0.58	76	n.a. (7)	n.a. (7)
8. Accessibility at work	2.6 (71)	0.6 (63)	23	15 (15)	0.5	0.63	80	n.a. (5)	n.a. (5)
8. Making ends meet	2.7 (214)	0.7 (197)	75	46 (44)	1.7	0.15	76	0.21 (19)	87 (19)
8. Using computer at work	2.2 (49)	1.6 (35)	29	23 (15)	0.7	0.53	80	n.a. (3)	n.a. (3)
8. Attending meetings	2.1 (65)	1.0 (55)	30	15 (14)	1.6	0.44	72	n.a. (3)	n.a. (3)
9. Following the news	2.7 (240)	0.9 (234)	105	76 (76)	2.4	0.56	84	0.58 (25)	88 (25)
9. Having visitors	2.6 (217)	1.1 (210)	118	70 (70)	2.6	0.36	68	0.55 (18)	89 (18)
9. Social events	2.4 (221)	1.2 (205)	115	65 (65)	2.5	0.00	48	0.74 (19)	95 (19)
9. Dining out	1.9 (221)	1.0 (180)	87	44 (43)	1.8	0.34	52	0.69 (18)	94 (18)
9. Holiday and trips	2.2 (184)	1.8 (150)	114	84 (80)	3.0	0.21	44	n.a. (9)	n.a. (9)
-Vacation planning									
-Focusing on details									
-Observing surroundings									
9. Physical activity/sports	2.4 (224)	1.1 (201)	105	89 (67)	2.4	0.35	68	0.75 (20)	95 (20)
9. Recreational/leisure time									
a. Gardening	2.1 (191)	1.0 (159)	84	45 (37)	1.7	0.35	68	0.75 (11)	95 (11)
b. Playing instrument/singing	1.0 (122)	1.5 (43)	26	19 (16)	0.7	0.35	68	0.75 (7)	95 (7)
c. Intellectual activities	1.2 (165)	1.5 (85)	63	36 (33)	1.2	0.39	56	n.a. (6)	n.a. (6)
d. Cultural or other events	1.6 (187)	1.5 (130)	92	64 (59)	1.8	0.33	48	0.97 (10)	99 (10)
e. Playing games	1.5 (208)	1.5 (139)	94	69 (60)	1.8	0.43	56	0.89 (16)	98 (16)
f. Creative activities	1.9 (188)	2.0 (131)	111	96 (71)	2.8	0.59	72	0.41 (15)	89 (15)
g. Hobbies and crafts	0.9 (131)	1.8 (53)	46	36 (36)	0.9	0.44	60	n.a. (5)	n.a. (5)
9. Performing in public	0.9 (121)	1.1 (45)	24	13 (8)	0.5	0.41	60	n.a. (4)	n.a. (4)
10. Emotional life & acceptance									
-Emotional life	2.6 (238)	1.4 (227)	155	107 (107)	3.6	0.86	96	0.60 (23)	87 (23)
-Acceptance	2.7 (234)	1.6 (231)	174	141 (141)	4.4	0.56	84	0.58 (24)	93 (24)
10. Feeling fit	2.9 (240)	1.4 (236)	159	115 (115)	3.8	0.00	96	0.81 (25)	97 (25)

Bold, included in new D-AI; normal, not included in new D-AI; italics, goal question rephrased.

*If it was impossible to calculate a priority score (because of “missing value” or the answer category “not applicable”), the score was set to 0.

nitem, number of items; n, number of participants; GI, goal importance; GD, goal difficulty; PR, priority score (for goals being not applicable, the score was set to 0); TPL-15, top 15 priority list (containing all goals with a top 15 priority score; see Bruijning et al.^{15,17}); EFA, exploratory factor analysis; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean residual; n.a., not applicable (e.g., not enough participants available for analysis or item/goal not included in the new D-AI).

Factor analyses					Internal consistency	Old	New D-AI	
Eigenvalues for n≥80	Factor loadings for n≥80 [range]	EFA CFI for n≥80	EFA RMSEA for n≥80	EFA SRMR for n≥80	n for whom at least 50% of the items in (sub)scale was available, for n≥40.	Cronbach's α for n≥40 (n _{item})	n _{item} in old D-AI	n _{item} in new D-AI (plus n _{item} added to the (confirmed) (sub)scale
					42	0.749 (8)	16	8
					n.a.		15	9
					n.a.		6	10
					n.a.		8	4
					n.a.		7	
					n.a.		4	
4.2;0.8		0.998	0.089	0.021	56	0.939 (8)	13	9
	0.689 – 1.066				87	0.914 (3)	9	3
	0.507 – 0.964				90	0.738 (3)		3
					n.a.		12	12
					n.a.		5	5
					n.a.		14	19
					n.a.		9	6
					n.a.	n.a.	4	
					n.a.		24	
					n.a.		11	
					74	0.827 (7)	16	7
					66	0.839 (9)	16	9
					65	0.812 (13)	30	13
					42	0.900 (16)	19	16
4.7;1.6;1.2;0.6		0.974	0.069	0.037			14	
	0.594 – 0.930				68	0.857 (4)		4
	0.641 – 0.881				72	0.867 (3)		3
	0.547 – 0.949				76	0.828 (3)		3
					67		8	5
					-		12	7
					-		4	4
					-		11	8
					-		5	10
					-		2	6
					-		1	6
					-		6	10
					n.a.		4	
3.7;0.9	0.387 – 0.819	0.969	0.059	0.050	99	0.863 (7)	11	7
2.9;1.0	0.204 – 0.868	0.985	0.034	0.048	139	0.746 (7)	18	7
4.4;0.9	0.483 – 0.817	0.966	0.053	0.049	114	0.870 (9)	11	9

Discussion

This study aimed to gain insight into the underlying factor structure of the goals in the D-AI, to provide more information on the psychometric properties of the instrument, and produce a shorter version of the D-AI.

In contrast to the original AI where factor analysis was performed on all tasks underlying all goals,¹³ we believed it to be useful to treat every list of tasks underlying goals as separate measurement instruments. Due to our different routing, for every patient a specific selection of high priority goals was and will be assessed at the task level. Information at the goal level provides insight into the needs of the patient to be able to participate in society (e.g., the patient wanted to be able to do the daily shopping). Information at the task level can be helpful in creating a specific rehabilitation plan as this provides insight in what aspects must be tackled to be able to perform the goal, and to monitor different aspects of rehabilitation for this goal. To give an example, the goal 'Daily shopping' revealed three different factors: 'find your way', 'find the right product', and 'reading involved with shopping'. It is possible that a participant indicated that tasks within the factor 'find your way' are easier than tasks underlying the factor 'reading involved with shopping'. Each factor (based on shared traits/visual functions), provides more detailed information on the kind of rehabilitation needed. In this case, prescribing optical aids would probably be more appropriate than mobility training to be able to reach the umbrella goal of 'Daily shopping'. Compared to individual tasks, a factor structure allows for a more reliable and stable measure to monitor change over time for a selection of high priority goals from the patient's perspective. Therefore, identifying the factor structure and the internal consistency contributed to a more robust and feasible version of the D-AI.

As the effect of rehabilitation should be measured at the goal level, a good test-retest reliability of GI and GD questions is essential for effect measurements as well. As can be seen in Table 2, for most goals, the Cohen's (weighed) κ for GI and GD was moderate to almost perfect. However, for some goals, test-retest reliability was not sufficient. In order to improve the test-retest reliability, the formulation of these goals was studied and rephrased after consensus discussions. The new formulations are shown in the Appendix (note that this is not an official forward-backward translation).

Study limitations

The sample size of the study was limited. Due to the routing structure of the D-AI, GD questions were not always assessed at both test moments, so the sample size was not sufficient to calculate κ values for GD questions of all goals.

Moreover, due to the routing, not all the goals were assessed at the task level equally often. We performed factor analyses in relatively small samples ($n \geq 80$). Although the minimum number of participants needed for factor analysis is still under discussion,^{28;29} often $n > 100$ respondents is used and sometimes ten respondents per item as a rule of thumb.²⁹ In this developmental phase of the D-AI, we expected that EFAs in this relatively small study population would provide enough information to make a first shift to reduce the number of items and to identify the global factor structure of the tasks underlying each goal. Using this criterion we were still able to perform factor analyses for only fourteen goals. In addition, EFA of task items underlying seven goals (50%) did not reach the cut-off values for a good model fit; however, the factor structures of six goals showed a reasonable fit following the criteria of Vandenberg and Lance (CFI: 0.90; SRMR: 0.10; RSMEA: 0.08).²³ In this developmental stage of the D-AI, we suggest that this liberal criterion is suitable. The high internal consistency measures within the (sub)scales support this decision.²⁹

Despite the fact that the factor structure of the AI had been investigated before by Massof et al.,¹³ EFA seemed to be more appropriate than confirmatory factor analyses (CFA). First, the D-AI was not only translated but also extended and adapted considerably. Moreover, the D-AI was assessed in a new patient population.³⁰ Finally, in contrast to that of Massof et al.,¹³ we wanted to investigate the factor structure of tasks within separate goals, instead of over all goals. However, in addition to the EFA, we performed CFA in the same sample as the EFA. The results of the CFAs were not reported as the analyses cannot be interpreted as such. Nevertheless, CFAs are useful in revising and refining an instrument and its factor structure.²⁴ By using CFAs, we were able to detect item pairs which measured a similar concept in order to select the best item. For instance, 'reading small print' and 'reading normal print' revealed similar scores (and high normalized residual correlations). The decision which item was excluded depended on which item showed the best model fit and on consensus discussions. For these reasons, it was decided to delete 'reading normal print' from the questionnaire.

Occasionally we had to compromise between two conflicting aims of this study, that is developing an instrument with strong psychometric properties, and developing a feasible instrument which can be used to investigate a broad range of individual rehabilitation needs to develop an individual rehabilitation plan. For example, following our criteria, factor analyses showed that a specific item (e.g., 'using a daisy player') should be deleted. However, consensus discussions revealed that this specific task could not be removed from the D-AI because it was essential to be able to perform this task in order to perform the umbrella

goal, or because many people reported this task to be very difficult and indicated to need rehabilitation on this specific task. In these kind of cases, the item was left inside the (sub)scale if the model fit was satisfying. If the model fit of the EFA was not satisfying, the item was included but not in the factor structure (e.g., 'using a remote control' (goal: 'Watching TV'), see Appendix).

Finally, care should be taken about assuming that the psychometric properties apply on a one-on-one basis to the new D-AI. This is because some tasks and goals have been merged, added or rephrased based on the results of the above analyses.

Additional studies

The hypothesized factor structure (based on the results of the EFA) should be tested using confirmative factor analyses in a new study population in the near future. In addition, future studies should explore and confirm the factor structure and additional psychometric properties for each goal and its underlying items for the new D-AI in a new (larger) sample. Moreover, longitudinal data may provide more information on the longitudinal validity (e.g., the ability of the D-AI to measure change over time). Subsequently, it is also important to establish which goals and tasks are particularly problematic for specific patient groups.

As was done by Massof et al.,¹³ it would theoretically be interesting to explore the factor structure of the new D-AI, not only for each goal separately, but also for the items overall. In creating a rehabilitation plan, this may provide more insight into the underlying traits/visual abilities that appear to be problematic in several goals for a particular patient. This might make it easier to understand which shared traits/visual abilities cause rehabilitation needs for several goals, e.g., "reading-related" items or "mobility-related" items.¹³ Moreover, when much larger databanks are available, we will apply item response models principles as they provide a useful method of scoring, taking into account the ordinal ratings of the items.³¹⁻³⁸ Since, unidimensionality and local independence are important assumptions made in these models, this is a logical consecutive step in the validation process of the D-AI which enables to predict the performance of a person accurately, i.e., the person's parameter or disability.^{39,40} In addition, this will enable differential item functioning analysis. This new version of the D-AI should be seen as an intermediate step in the further development of the D-AI.

For feasibility reasons, we split the D-AI in two parts and used the TPL-15 as a new routing to determine which goals had to be fully assessed at the task level in the D-AI-2. As we suggested before,¹⁷ the priority list (e.g., TPL-15) might serve as input for a feedback conversation after assessing D-AI-1.

However, it is uncertain whether the priority score actually reflects the perceived priority to include the goal in the rehabilitation plan. Moreover, other concepts contribute to selecting the most relevant goals for rehabilitation. In developing the actual rehabilitation plan, apart from the rehabilitation needs at the Activity and Participation level, all other aspects of the ICF scheme (i.e., general health condition, external factors, personal factors, body functions) should be taken into account. Therefore, the importance of a specific goal itself (rated by the patient) can be different from the importance to include this goal in the rehabilitation plan. For example, after realizing that being able to do the 'Daily shopping' would hold a complex and intense rehabilitation trajectory and that what can be expected as a result of it is low, the patient may prefer to focus on another (less important) goal which is easier to accomplish. Instead of using a TPL-15 as input for a feedback conversation, future studies should also focus on the possibility to only assess the GD questions in the D-AI-1. Subsequently, an overview of the ranked difficulty scores may serve as input for a feedback conversation in which the importance to include a specific goal in the rehabilitation plan is weighed in light of the whole ICF scheme (i.e., general health condition, external factors, personal factors, body functions) in order to assess the D-AI and to create a balanced rehabilitation plan. In this light, it is also interesting to note that the GI and GD test-retest reliability measures were not consistent for the same goals, despite the fact that both questions are similar (except for the word 'important' and 'difficult'). Although, this might be because for the GI questions a κ (based on the personal opinion of the participant) was calculated and for the GD questions a weighted κ (based on an underlying trait (visual ability)), it is also possible that interpretation of the GI questions is more variable or less stable than that of the GD questions. This indicates that the exact context in which the importance of goals will be assessed should be changed or specified. It might be interesting to change the exact formulation of the GI questions into "How important is [goal] for you to *include in the rehabilitation plan*", after discussing the possibilities of rehabilitation based on the difficulty scores of the goals and in light of the ICF scheme. Care should be taken that this process actually is patient-centered. It is the job of the rehabilitation professional (e.g., intaker) to fully inform the patient about all possibilities and expectations, so that the patient can make a well balanced choice. We suggest that the rehabilitation professional should note down for each goal why it is or is not decided to be part of the rehabilitation plan in order to justify the choices made and to better guarantee that this process is patient-centered. Moreover, in this way, it is clear from the beginning for which goals the difficulty score should be evaluated over time in order to measure the effect of rehabilitation in terms of a decrease in the difficulty score for these

goals. At this moment we are performing a longitudinal study to assess the usefulness of the D-AI for evaluating the effect of rehabilitation.

In conclusion, this study elucidated the underlying factor structure of several goals in the D-AI, provided detailed information on psychometric properties for individual goals, and produced a shorter version of the D-AI. These were important steps in the validation process of the D-AI, and in the process to develop a feasible assessment tool to investigate rehabilitation needs and evaluate outcomes of rehabilitation of visually impaired persons. Descriptive statistics, exploratory factor analyses, internal consistency and test-retest reliability measures were assessed, and feedback (from patients and assessors) was collected. These results were discussed until consensus was reached in order to develop a new, shorter version of the D-AI.

Clinical implications

At this moment, MRCs in the Netherlands have started an implementation trajectory to use the improved D-AI as part of their standard intake procedure to assess possible rehabilitation needs from the patient's perspective. In addition, optometrists in the VU University Medical Center have integrated the D-AI-1 as a screening instrument to help optometrists to prescribe the most suitable assistive device, as the type of device may depend on the context in which a patient wants to perform a specific task. Moreover, patients with more complex rehabilitation needs can easily be referred to MRCs as it provides important information about relevant participation domains from the patient's perspective. Moreover, it is expected that assessing the D-AI will help to structure the intake procedure and better evaluate the results of rehabilitation.

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Appendix. The new version of the D-AI

Legend:

x.x. (bold):	Goal (and number)
x.x.y.:	Subscale within goal
<i>Task (italic):</i>	this item is included in goal, but not part of factor structure
<u>Task (underlined):</u>	new item within this goal (after baseline analyses)
<u><i>Task (italic & underlined):</i></u>	new item within this goal, but not part of the factor structure
"Text in quotes":	instruction for the patient.

Explantation:

Goal questions: How *important* is it for you to [...] ?

How *difficult* is it for you to [...] ?

Task questions: How *difficult* is it for you to [...] ?

Note that this is not an official (back) translation

DOMAIN 1: learning and applying knowledge

Goal questions: How *important/difficult* is it for you to be able to read?

1.1. difficulty of tasks: 'Reading'

1. read small print (e.g. medicine labels or footnotes)
 2. read large print (e.g. headlines)
 3. read colored text or text on a colored background
 4. recognize symbols (e.g. washing instructions on items of clothing)
 5. find information in a table or index
 6. read text on a computer (i.e. a usual internet site)
 7. read your own handwriting
 8. read someone else's handwriting
 9. continuously read for more than 30 minutes
 10. provide the right light level for reading
 11. recognize objects on postcards or pictures
 12. read text or seeing pictures on a card, blackboard or projection screen
 13. use a Daisy-player
 14. *read text in Braille*
-

Goal questions: How *important/difficult* is it for you to be able to write?

1.2. difficulty of tasks: 'Writing'

1. write a text (e.g. shopping list)
 2. type a text
 3. place your signature
 4. write inside the lines
 5. fill in forms
-

Goal questions: How *important/difficult* is it for you to be able to watch TV?

1.3. difficulty of tasks: 'Watching TV'

1.3.a. Watching a program in a familiar language

1. follow a TV program in a familiar language
 2. follow a film in a familiar language
 3. follow the news or news programs
-

1.3.b. Reading and near distance tasks for watching TV

4. read subtitles
 5. use teletext/ceefaxes
 6. read the TV guide
 7. control video, dvd, or other devices
 8. *use a remote control*
-

1.3.c. Watching TV images

9. distinguish different personalities on TV
 10. recognize facial expressions
 11. recognize body language
-

DOMAIN 2: general tasks and demands

Goal questions: How *important/difficult* is it for you to be able to take care of your personal administration without someone else's assistance?

2.1. difficulty of tasks: 'Personal administration'

1. read hand-written post
2. read typed or printed post
3. read footnotes or small letters
4. distinguish mail from advertisements
5. write or type letters
6. fill in official forms, such as tax forms
7. place your signature
8. write down contact details, such as addresses and phone numbers
9. operate office equipment, such as the copier, printer, scanner

Goal questions: How *important/difficult* is it for you to follow a schedule without someone else's assistance (e.g. getting to your appointment in time)?

2.2. difficulty of tasks: 'Following a schedule'

1. read appointments in your agenda or calendar
 2. write down appointments in your agenda or calendar
 3. see the time on a clock
 4. see the time on a watch
 5. set an alarm clock
-

DOMAIN 3: communication

Goal questions: How *important/difficult* is it for you to be able to use a computer without someone else's assistance?

3.1. difficulty of tasks: 'Using a computer'

1. read a computer screen
 2. read a computer keyboard
 3. use a mouse (e.g. clicking, selecting)
 4. control a computer by keyboard shortcuts
 5. use a word processor
 6. watch digital pictures
 7. use the internet
 8. use an email program
 9. play computer games
 10. avoid discomfort in neck or eyes when using the computer (e.g. eye strain)
 11. use a computer-controlled Braille display
 12. use speech software
 13. use a screen magnifier program
-

Goal questions: How *important/difficult* is it for you to be able to take care of your personal correspondence without someone else's assistance?

3.2. difficulty of tasks: 'Personal correspondence'

1. read hand-written post
 2. read typed or printed post
 3. use an email program
 4. write letters or post cards
 5. place your signature
 6. recognize objects on postcards or pictures
 7. *manage contact details, such as addresses and phone numbers*
-

Goal questions: How *important/difficult* is it for you to be able to use your telephone without someone else's assistance?

3.3. difficulty of tasks: 'Using a telephone'

1. look up and manage telephone numbers
 2. dial/key in a telephone number
 3. use a cell phone
 4. send text messages
 5. use special applications of your cell phone
-

DOMAIN 4: mobility

Goal questions: How *important/difficult* is it for you to be able to move around in your home, without someone else's assistance?

4.1. difficulty of tasks: 'Mobility at home'

1. orientate at home
 2. walk around safely, without bumping into things (e.g. furniture, doors)
 3. walk around safely, without tripping over things (e.g. doorsteps)
 4. orientate in poor light
 5. find your way in very bright light (e.g. glare)
 6. find handles and handrails
 7. walk up and down the stairs safely
-

Goal questions: How *important/difficult* is it for you to be able to move around indoors in an unfamiliar surrounding, without someone else's assistance?

4.2. difficulty of tasks: 'Mobility indoors'

1. walk around safely, without bumping into things (e.g. furniture, doors)
 2. walk around safely, without tripping over things (e.g. doorsteps)
 3. orientate in poor light
 4. find your way in very bright light (e.g. glare of lamps)
 5. find handles and handrails
 6. walk up and down the stairs safely
 7. *use an escalator or elevator*
 8. *orientate and find your way when visiting someone*
 9. *orientate and find your way in a store or hospital*
 10. *find a public toilet*
-

Goal questions: How *important/difficult* is it for you to be able to move/walk around outdoors without someone else's assistance?

4.3. difficulty of tasks: 'Mobility outdoors (walking)'

4.3.a. Assess own safety

1. ask help from passengers
 2. assess your own safety
 3. ask help in organizing a trip
 4. go outside being identifiable as a person with low vision
-

4.3.b. Find route

5. read traffic signs
 6. read directions and street signs
 7. read (road) maps
-

4.3.c. Road users

8. notice other road users (e.g. cyclists, cars)
 9. be able to recognize the speed of other road users (e.g. cyclists, cars)
 10. notice roadblocks in time
-

4.3.d. Walk around safely

11. get somewhere without getting too tired
 12. find your way in very bright light (e.g. glare of car lights or the sun)
-

13. orientate and find your way in poor light
 14. walk around safely without hitting overhanging things (e.g. branches)
 15. walk around safely without bumping into, tripping over, or stepping off something
 16. cross the street safely
-

Goal questions: How *important/difficult* is it for you to be able to ride a bicycle, motorized bike, moped or scooter?

4.4. difficulty of tasks: 'Ride a bicycle (or motorized bike, moped, scooter etc.)'

1. find a suitable route
 2. avoid obstacles, such as bollards
 3. avoid overhanging things, such as branches
 4. notice other road users in time (e.g. pedestrians, cyclists, cars)
 5. estimate the speed of other road users (e.g. pedestrians, cyclists, cars)
 6. notice roadblocks in time
 7. read traffic signs (e.g. stop signs, speed signs)
 8. identify traffic lights
 9. cross the street safely
 10. anticipate to road users that do not follow the rules (e.g. by changing speed)
 11. bike in poor light
 12. bike in very bright light (e.g. due to glare of car lights or the sun)
 13. notice lane indications and bicycle paths
 14. refueling
-

Goal questions: How *important/difficult* is it for you to be able to drive a car or vehicle for disabled persons?

4.5. difficulty of tasks: 'Drive a car or vehicle for disabled persons'

1. find a suitable route
 2. notice pedestrians in time
 3. notice cyclists in time
 4. notice other motorized road users in time
 5. estimate the speed of other road users (e.g. be able to recognize whether a car is driving or standing still on the roadside)
 6. read traffic signs (e.g. stop signs, speed signs)
 7. read directions and street signs
 8. read (road) maps
 9. anticipate road users that do not follow the rules (e.g. by changing speed)
 10. change and feeding into lane
 11. keep the correct distance from the vehicle in front of you
 12. read the dashboard (e.g. fuel gauge, speedometer)
 13. notice lane indications (e.g. lines, arrows)
 14. park in a parking place
 15. drive at night or in twilight
 16. drive in very bright light (e.g. due to glare of car lights or the sun)
 17. refueling
-

Goal questions: How *important/difficult* is it for you to be able to use public transportation?

4.6. difficulty of tasks: 'Using public transportation'

-
1. get somewhere without getting too tired
 2. travel fearless by public transport
 3. travel in a familiar environment
 4. travel in an unfamiliar environment
 5. buy a ticket
 6. get through turnstiles
 7. find a suitable route by public transport
 8. recognize the right line (e.g. bus)
 9. find the right track or platform
 10. make a transfer
 11. recognize the right stop
 12. mount and dismount (e.g. by footboards)
 13. find out about jams and redirections
 14. read departure and arrival times
 15. use public transport chip card
-

DOMAIN 5: self-care

Goal questions: How *important/difficult* is it for you to be able to dress yourself without someone else's assistance?

5.1. difficulty of tasks: 'Dressing'

1. recognize the color of your cloths
 2. find clothing items in the cupboard
 3. select matching clothing items
 4. tie your shoelaces and fasten zippers, buttons, buckles or hooks
 5. notice stains or dirty spots
 6. notice damaged spots (e.g. missing buttons, wear spots)
 7. assess your appearance (e.g. looking in the mirror)
 8. find matching jewelry or accessories
-

Goal questions: How *important/difficult* is it for you to be able to take care of your personal hygiene, without someone else's assistance?

5.2. difficulty of tasks: 'Personal hygiene'

1. take care of your contact lenses or glasses
 2. take care for nails of hands and feet (e.g. filing and clipping nails)
 3. take care of your teeth
 4. find and distinguish soap, shampoo or other care products
 5. do your hair
 6. do your facial care (e.g. shaving or applying make-up)
 7. get in and out of bed safely
 8. prevent from falling in the bath or shower
 9. use the toilet
 10. use a public toilet
-

Goal questions: How *important/difficult* is it for you to be able to look after your own health?

5.3. difficulty of tasks: 'Personal healthcare/medication'

1. distinguish between medications, such as pills or capsules
 2. read the instruction leaflet of the medicine
 3. read medicine labels, such as names, expiration date, dose
 4. find the expiration date of the medicine
 5. measure small amounts of liquid medication
 6. use eye drops
 7. measure body weight
 8. use a thermometer
 9. perform medical technical tasks
 10. check the skin for sores, wounds, spots etc.
 11. wound care
 12. change batteries for electronic devices (e.g. hearing aid, shaver)
 13. read nutritional information on food packaging (e.g. check ingredients in relation to your diet)
 14. manage doctor and hospital visits
-

Goal questions: How *important/difficult* is it for you to be able to eat and drink without someone else's assistance?

5.4. difficulty of tasks: 'Eating and drinking'

1. lay the table
 2. judg whether a product is not over its date (e.g. read 'best before' date)
 3. brag food
 4. add sugar, salt, pepper or other herbs
 5. find the food on your plate
 6. cut the food on your plate
 7. eat without dropping your food
 8. pour drink without spilling
 9. avoid overturning your drink
 10. tidy up spilled food and drinks
-

DOMAIN 6: domestic life

Goal questions: How *important/difficult* is it for you to clean and tidy up the house, without someone else's assistance?

6.1. difficulty of tasks: 'Cleaning and tidying up'

1. tidy up the house
 2. distinguish between clean and dirty dishes
 3. do the dishes
 4. clean the sink
 5. waste separation
 6. bring out the garbage
 7. judge if cleaning is needed
 8. measure the amount of cleaning agent
 9. clean the floors (e.g. vacuum or mop)
 10. dust or polish the house
 11. make or change beds
 12. clean windows
 13. clean the toilet
 14. clean sanitary (e.g. sink, shower or bath)
 15. clean the table
 16. water and take care of plants
 17. read and set the thermostat
-

Goal questions: How *important/difficult* is it for you to do the laundry without someone else's assistance?

6.2. difficulty of tasks: 'Doing laundry'

1. notice stains or dirty spots
 2. operate the washing machine or tumble dryer (e.g. setting the right program)
 3. read the washing instructions on clothing items
 4. iron your clothes
 5. sort clothes per person or distinguishing between different colors)
 6. read the labels of laundry detergent or cleaning products
 7. measure out laundry detergent or other cleaning products
-

Goal questions: How *important/difficult* is it for you to do chores at home without someone else's assistance?

6.3. difficulty of tasks: 'Doing chores at home'

1. identify screws, nails, bolts or nuts
 2. hammer a nail
 3. tighten a screw
 4. drill holes
 5. change or repairing switching stops
 6. read out measuring rods and rulers
 7. read diagrams and blueprints
 8. read manuals and instructions
 9. paint the house
 10. carry out general maintenance tasks around the home (e.g. washing the windows, hanging a paint, pasting a bicycle tire)
-

Goal questions: How *important/difficult* is it for you to mend your clothes?

6.4. difficulty of tasks: 'Mend Clothes'

1. repair clothes
 2. mend clothes
 3. thread a needle
 4. hem
 5. sew a button
 6. use a sewing machine
-

Goal questions: How *important/difficult* is it for you to withdraw money and pay, without someone else's assistance?

6.5. difficulty of tasks: 'Pay and withdraw money'

- 6.5.a. Cash money
1. distinguish coins
 2. distinguish notes
 3. count change and identify money
- 6.5.b. Use bank card or online payments
4. withdraw money from an ATM
 5. pay with plastic
 6. pay online
-

Goal questions: How *important/difficult* is it for you to do your daily shopping, without someone else's assistance?

6.6. difficulty of tasks: 'Daily shopping'

- 6.6.a. Find the right products
1. have an overview of the products in your own fridge and storage cupboard
 2. find particular products in the shop (for occasional use)
 3. find new products or packages
 4. *Find products that you use frequently in the shop*
- 6.6.b. Find your way
5. find your way in a shopping mall
 6. find your way and walking around in a shop
 7. bring your groceries to your home
 8. *ask help from store personnel or customers*
- 6.6.c. Reading involved with shopping
9. weigh products and recognizing images, icons or numbers
 10. find and reading the prices
 11. find and reading the 'best before' date
 12. read nutritional information and labels on food packaging
 13. *Pay your groceries*
-

Goal questions: How *important/difficult* is it for you to shop (other than groceries) without someone else's assistance?

6.7. difficulty of tasks: 'Shopping (other than groceries)'

1. find products in shops where you only are once in a while
 2. find cloths (e.g. find the right size and color)
 3. find electronic equipment (e.g. easy to use or clear contrasts)
-

4. find presents for others
5. find suitable things for in your own home (e.g. furniture)

Goal questions: How *important/difficult* is it for you to prepare your daily meal, without someone else's assistance?

6.8. difficulty of tasks: 'Daily meal preparation'

1. make coffee or tea
2. follow recipes
3. find the right ingredients
4. identify products (e.g. distinguishing between chicken and ground beef)
5. read the instructions on the labels
6. weigh ingredients (e.g. flour)
7. measure liquids (e.g. milk)
8. pour liquids
9. judge whether a product is not expired (e.g. reading 'best before' date)
10. wash vegetables
11. cut the food (e.g. vegetables or meat)
12. peel potatoes
13. add salt, pepper or herbs
14. check if the food is browning or ready
15. use a kitchen timer
16. pour off pans
17. operate the cooker or stove
18. prevent of getting yourself hurt (e.g. burning or cutting yourself)
19. operate electronic kitchen equipment (e.g. microwave, oven, mixer)
20. cook a wide variety of recipes

Goal questions: How *important/difficult* is it for you to provide an adult with health care without someone else's assistance?

6.9. difficulty of tasks: 'Health care for an adult'

1. help the person in your care get dressed
2. wash the person in your care
3. supervise the person in your care
4. arrange transportation for the person in your care (e.g. for going to the hospital)
5. move the person in your care (e.g. transfer from the bed to the wheelchair or give support when walking)
6. take care of medical technical tasks for the person in your care

Goal questions: How *important/difficult* is it for you to look after young (grand)children, without someone else's assistance?

6.10. difficulty of tasks: '(Grand) child care'

1. dress children
2. feed children
3. recognize a child in your care
4. supervise a child in your care (e.g. avoid dangerous situations, such as crossing the street safely or putting things in their mouth)
5. recognize the needs of a child in your care
6. bring children somewhere
7. help with homework
8. read to children

9. play games with children

Goal questions: How *important/difficult* is it for you to take care of your pet or guide dog without someone else's assistance?

6.11. difficulty of tasks: 'Pet care'

1. feed the pet
 2. take the pet for a walk (e.g. walk the dog)
 3. clean up after the pet (e.g. cleaning the litter box)
 4. check for ticks and fleas
 5. notice if your pet is ill
 6. find your pet
 7. take care of your pet's health
-

DOMAIN 7: interpersonal interactions and relationships

Goal questions: How *important/difficult* is it for you to be able to communicate with people?

7.1. difficulty of tasks: 'Personal communication'

1. recognize people
 2. recognize voices
 3. notice body language and gestures
 4. notice expressions
 5. recognize someone who is walking towards you
 6. make contact
 7. introduce yourself
 8. take part in a group discussion
-

Goal question: How *important* is your visual impairment in your relation to your loved ones?

Goal question: How *difficult* is your relation with your loved ones because of your visual impairment?

7.2. difficulty of tasks: 'Relation loved ones'

1. deal with changing roles and relationships because of your visual impairment
 2. deal with stress because of your visual impairment
 3. explain loved ones what you can and cannot see
 4. deal with incomprehension from loved ones
 5. remain independent (e.g. doing things without being dependent on your loved ones)
 6. recognize the needs of your loved ones
 7. do things together with your loved ones
 8. maintain contact with your loved ones
 9. change responsibilities because of your visual impairment (e.g. cooking, managing finance)
-

Goal question: How *important* is your visual impairment in relation to your colleagues?

Goal question: How *difficult* is the relation with your colleagues because of your visual impairment?

7.3. difficulty of tasks: 'Interaction with colleagues'

1. be open about your visual impairment
 2. explain people at work what you can and cannot see
 3. deal with incomprehension from colleagues because of your visual impairment
 4. deal with incomprehension from your manager because of your visual impairment
 5. mark your limits
 6. dare to ask for help
 7. deal with changing responsibilities and work relations
 8. be able to present yourself in formal contacts
 9. attend meetings
 10. attend social events with colleagues
-

Goal question: How *important* is your visual impairment in your relation to people you don't know?

Goal question: How *difficult* is your relation with people you don't know because of your visual impairment?

7.4. difficulty of tasks: 'Interaction with strangers'

1. make contact to strangers
 2. explain to strangers that you have a visual impairment
 3. deal with miscomprehension because of your visual impairment
 4. deal with annoying behavior from strangers
-

DOMAIN 8: major life areas

Goal questions: How *important/difficult* is it for you to manage your finance without someone else's assistance?

8.1. difficulty of tasks: 'Manage finance'

1. Read bank accounts
 2. withdraw money
 3. transfer money
 4. fill in a tax return
 5. read bills and giros
 6. fill in authorizations
 7. place your signature
 8. use internet banking
 9. control your financial situation (i.e. make ends meet)
-

Goal questions: How *important/difficult* is it for you to get information (e.g. regulatory or information concerning your eye condition) without someone else's assistance?

8.2. difficulty of tasks: 'Regulatory and information'

8.2.a. Information from organizations

1. find the right organization or authority
 2. find accessible information
 3. be informed about regulatory from various organizations (e.g. concerning insurance or public transport)
-

8.2.b. Information concerning your eye condition/visual impairment

4. find information about your eye condition
 5. be informed about your rights and obligations as a visually impaired person (e.g. legislation concerning visually impaired persons)
 6. be informed about developments in assistive devices or facilities for visually impaired persons
-

Goal questions: How *important/difficult* is it for you to be able to follow education or courses?

8.3. difficulty of tasks: 'Education'

1. get at the site of your education (e.g. arrange and use (public) transport)
 2. find a suitable education or course
 3. follow lessons or study groups
 4. read text or see pictures on a card, blackboard, or projection screen
 5. get educational material in the right 'reading' form
 6. read study books and material
 7. get study material of a special (job) field in the right 'reading' form
 8. take the minutes or notes
 9. make assignments or papers
 10. keep up with the lessons
 11. manage to get extra time for educational tasks
 12. make exams
-

Goal questions: How *important/difficult* is it for you to find a suitable job or volunteer work

8.4. difficulty of tasks: 'Apply for a job'

1. find suitable vacancies
 2. be informed about work related regulatory for visually impaired persons
 3. write a letter of application
 4. have a job interview
 5. be open about you visual impairment to your potential employer
-

Goal questions: How *important/difficult* is it for you to be able perform daily activities at your current work (paid job or volunteer work)?

8.5. difficulty of tasks: 'Working activities'

1. learn new information
 2. learn new skills
 3. finish your working activities in time
 4. notice and read your working calendar
 5. store and find files and other items?
 6. stay focused on your work activities
 7. be able to perform challenging work activities
 8. judge which tasks you are able or unable to perform
 9. be informed about recent developments and changes at work
 10. operate office equipment, such as the copier, printer, scanner
 11. read prints at work
 12. provide the right light level for reading at work
 13. avoid getting eye strain at work
 14. sustain your work activities (during the day)
 15. use a computer at work
 16. recognize your colleagues at work
 17. notice expressions, gestures or body language
 18. attend a meeting or gathering
 19. take the minutes or notes
-

Goal questions: How *important/difficult* is it for you to be able to move around and to use facilities at your current work?

8.6. difficulty of tasks: 'Accessibility at work'

1. orientate and find your way at work
 2. walk around safely, without bumping into or tripping over things
 3. find handles or handrails
 4. walk the stairs up and down safely
 5. use the canteen at work
 6. notice and read information such as posters, manuals or panels
-

DOMAIN 9: community, social and civic life

Goal questions: How *important/difficult* is it for you to follow the news?

9.1. difficulty of tasks: 'Following the news'

1. read weather reports
 2. read articles in the paper
 3. find the right (news) article in a magazine or newspaper
 4. read magazines
 5. find a specific frequency or program on the radio
 6. follow the news or news programs on the radio
 7. follow the news or news programs on TV
-

Goal questions: How *important/difficult* is it for you to have visitors?

9.2. difficulty of tasks: 'Having visitors'

1. make coffee or tea
 2. pour liquids without spilling
 3. take milk and sugar without spilling
 4. avoid knocking over glass, cups or bottles
 5. serve dinner and present food
 6. take snacks (e.g. take crackers from a plate or cookies from a box)
 7. cook special dishes
 8. cook for a number of persons
 9. distinguish between clean and dirty dishes
-

Goal questions: How *important/difficult* is it for you to attend social events (e.g. visit someone or a party)?

9.3. difficulty of tasks: 'Social events'

1. get at a site of the social event (e.g. arranging and using (public) transport)
 2. go to a social event spontaneously
 3. approach someone
 4. make contact to other people
 5. find someone to talk with
 6. recognize people
 7. notice non-verbal signs, such as expressions, gestures and body language
 8. choose appropriate clothes for a special occasion
 9. participate in a group discussion
 10. take snacks (e.g. taking crackers from a plate or cookies from a box)
 11. find the toilet in an unknown area
 12. orientate and find your way in poor light
 13. enjoy a visit, party or social event
-

Goal questions: How *important/difficult* is it for you to go out for a meal?

9.4. difficulty of tasks: 'Dining out'

1. find a suitable restaurant
 2. get at the restaurant (e.g. arrange and use (public) transport)
 3. read the hand-held menu
 4. read the overhead menu
 5. find your way in the restaurant
 6. orientate and find your way in poor light
 7. pick a suitable place to sit
-

8. get the attention of the waiter or waitress
9. notice expressions, gestures or body language of the person with whom you are sharing the meal
10. pour liquid without spilling
11. avoid knocking over glass, cups or bottles
12. add sugar, salt, pepper and herbs
13. find the food on the plate
14. find objects on the dining-room table
15. read the bill
16. pay the bill

Goal questions: How *important/difficult* is it for you to go on holiday or to make a day trip?

9.5. difficulty of tasks: 'Holiday and trips'

9.5.a. Planning vacation

1. get at your destination (e.g. arrange and use (public) transport)
 2. arrange and use transport abroad
 3. consider and plan trips
 4. book a holiday
-

9.5.b. Focus on details

5. read brochures
 6. see the displays or read the signs describing the objects exhibited (e.g. in a museum)
 7. use a camera
-

9.5.c. Observe the surroundings

8. observe places of interest
 9. observe the surroundings (e.g. wild life, special buildings)
 10. deal with and find your way in very bright light such as sun glare
-

Goal questions: How *important/difficult* is it for you to perform physical activities or to participate in sports?

9.6. 'Physical activity and/or sports'

"Please tick relevant sports"

- walk
 - jog or run
 - bike or cycle race
 - swim
 - go to the gym (e.g. fitness, aerobics) or do strength training
 - play ball or racket sports
 - dance
 - fish
 - other, i.e.: ...
-

9.6. difficulty of tasks: 'Physical activity and/or sports'

1. get at the sports site (e.g. arrange and use (public) transport)
2. be open and to inform others about your visual impairment
3. walk around safely, without bumping into other persons or things

4. see exercise instructor and follow his/her movements
5. find back your clothes in the dressing room

Goal questions: How *important/difficult* is it for you to fill your leisure/recreational time, for example by hobby's?

9.7. 'Recreational/leisure time management'

"Please tick recreational activities"

- gardening
 - make music
 - intellectual activities (e.g. participating in book clubs, discussion groups, or lectures)
 - cultural and other events, such as going to the theater, cinema, museum or sport events)
 - play games
 - creative activities
 - hobbies and crafts
 - other, i.e.: ...
-

9.7.a. difficulty of tasks: 'Gardening/taking care of plants'

1. mow a lawn
 2. identify plants and weeds
 3. prune branches, shrubs and plants
 4. rake and weed
 5. plant or pot plants or trees
 6. inspect plants
 7. read garden products
-

9.7.b. difficulty of tasks: 'Playing instrument or singing'

1. read sheet music
 2. read song texts
 3. see directions of the director or other musicians
 4. play an instrument
-

9.7.c. difficulty of tasks: 'Intellectual activities (e.g. participating in a book club, following lectures)'

1. get at the site of the intellectual activity (e.g. arranging and using (public) transport)
 2. read literature
 3. read magazines
 4. get reading material in the right 'reading' form
 5. participate in courses
 6. notice non-verbal signs from other group members
 7. participate in a discussion
 8. follow lectures and/or presentation
-

9.7.d. difficulty of tasks: 'Cultural or other events (e.g. theater, film, museum of sport events)'

1. go to the theater
2. go to the cinema

3. visit a museum
4. attend sport events
5. seek for events
6. get at the site of the event (e.g. arrange and use (public) transport)
7. find your way and walk around at the event
8. find your way in poor light
9. read the program
10. follow what happens

9.7.e. difficulty of tasks: 'Playing games'

1. motion or see a game partner
2. read the instructions
3. read play cards
4. see board games
5. fill in (cross) word puzzles
6. play computer games

9.7.f. difficulty of tasks: 'Creative activities (e.g. drawing, collecting, handcrafting, taking pictures)'

1. make sculptures
2. paint or draw
3. craft or model
4. take or edit pictures
5. collect things (e.g. stamps)
6. do handcraft (e.g. sewing and embroidering)

9.7.g. difficulty of tasks: 'Hobbies and crafts'

1. do woodcraft /carpentry
2. do metalwork
3. perform electricity related activities
4. do chores for home improvement
5. read manuals and instructions
6. use electronic (hand) tools
7. use hand tools
8. work according to a pattern
9. read diagrams and blueprints (e.g. pictures, figures or graphs)
10. read out measuring rods and rulers

9.7.h. difficulty of tasks: Other, ...

...

DOMAIN: Coping with mental (emotional) health aspects

Goal questions: How *important/difficult* is it for you to handle your emotional life concerning your visual impairment?

10.1. difficulty of tasks: 'Emotional life and acceptance'

10.1.a. Emotional life

1. deal with feelings of loneliness
 2. deal with gloomy or sad feelings
 3. deal with frustration, anger or despair
 4. deal with feelings of anxiety
 5. deal with stress
 6. deal with feelings of inferiority
 7. enjoy joint activities
-

10.1.b. Acceptance

8. be open about your visual impairment with strangers (or in an unfamiliar place)
 9. be open about your visual impairment with acquaintances (or in a familiar place)
 10. deal with incomprehension from others because of your visual impairment
 11. explain others what you can and cannot see
 12. dare to ask for help from persons you know
 13. deny help from persons you know
 14. deal with changing roles and relationships because of your visual impairment (with people close to you)
-

Goal questions: Some visually impaired persons experience problems with fatigue, concentration, burden, balance your energy levels. How *important/difficult* is this theme for you?

10.2. difficulty of tasks: 'Feeling fit'

1. sustain your daily activities during the day, such as shopping, cooking or arranging things.
 2. finish your daily activities in time
 3. get somewhere without getting too tired
 4. stay focused and concentrated
 5. perform your daily activities without suffering from discomfort in the eyes (e.g. eye strain)
 6. perform your daily activities without suffering from other symptoms (such as neck, back or head)
 7. balance your energy during the day (e.g. so that you have some energy left at the end of the day)
 8. do things in your spare time (such as hobbies or social contacts)
 9. keep a day and night rhythm
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