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### **Development of the Dutch ICF Activity Inventory: Investigating and evaluating rehabilitation needs of visually impaired adults**

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# Chapter 8

## Implementation and application of the D-AI



## **Abstract**

This study tests the feasibility and interpretability of the Dutch ICF Activity Inventory (D-AI) for the intake in a 'shared decision-making' process to create a rehabilitation plan. In addition, Dutch Multidisciplinary Rehabilitation Centers (MRCs) wanted to have better insight into the needs of different patient groups, the process to determine the content of the rehabilitation plan, the effectiveness of the interventions, and the use of the D-AI in clinical practice. An implementation pilot was started and initial experiences were evaluated. Moreover, observational data of the larger validation study were presented to the MRCs. Although patients and intakers were mostly positive about the shared decision-making process, intakers were sometimes more critical. Remarks were evaluated and, if possible, used to improve the D-AI and its role in the intake process. Based on the results of the implementation pilot, the two Dutch MRCs (i.e., Royal Dutch Visio and Bartiméus) started a nationwide implementation trajectory to use the D-AI in their standard intake process.

## Implementation and application of the D-AI

This chapter describes the main findings of a pilot implementation study and reports preliminary results from a larger implementation study. Results and experiences are discussed, and possible solutions are presented as an example of how acquired data can be used for evaluative purposes. In addition, other applications of the Dutch ICF Activity Inventory (D-AI) based on data collected in the larger validation study are addressed, i.e., an implementation study in two Multidisciplinary Rehabilitation Centers (MRCs) and experiences with the D-AI by an optometric service in the VU University Medical Center.

### Implementation pilot

Already during the project it appeared that the two Dutch MRCs were interested in using the research version of the D-AI (and not to wait for an improved version) to perform a pilot study on how to implement the instrument to improve their care processes. Therefore, in 2009 the Steering committee of the InZicht Society funded an implementation study (during the main project) to speed up the implementation process. A small implementation pilot study was conducted to enable intakers to gain experience with the D-AI and with the 'shared decision-making' process to create a rehabilitation plan for any individual patient on the information obtained with the D-AI. The purpose was to test the feasibility and interpretability of the D-AI in the intake process in Royal Dutch Visio and Bartiméus.

Bartiméus participated with two intakers who assessed the D-AI (the version used in the validation study) among five patients. In addition, Royal Dutch Visio took part with three intakers and 15 patients. All patients were recently enrolled at the MRC. An appointment was made to assess the D-AI-1 (questions at the goal level) by telephone (using a computer-assisted telephone Interview). At the end of the interview, a priority list was printed in which all goals were ranked from the highest to the lowest priority score. Then, another appointment was made for a 'shared decision-making conversation' by telephone (Royal Dutch Visio) or face-to-face (Bartiméus) in order to create a rehabilitation plan. The priority list was used as input for this conversation and discussed in light of the whole 'International Classification of Functioning, Disability and Health (ICF)' framework.<sup>1</sup> Subsequently, but only for relevant goals, the D-AI-2 (questions at the task level) was assessed to obtain a more detailed overview of the type of problems (tasks) the patient experiences at the start of rehabilitation.

Afterwards, evaluation forms were filled out by intakers and patients (in a telephone interview by the intaker) to evaluate the intake with the D-AI. Patients

were asked closed questions such as: “To what extent did the topics represent the problems that you experience in your daily life?”; “Was it difficult to choose the most appropriate response option?”; “To what extent are you satisfied with the way we investigated your requests/needs?”; “To what extent are you satisfied with the length of time the interview took?”. In addition, intakers were encouraged to formulate comments based on their own experiences. These comments were explained and discussed with the researchers to improve the intake process with the D-AI. Based on this qualitative information, the researchers formulated additional recommendations.

All patients (with the exception of one) were positive about the intake process performed to investigate their rehabilitation needs. All patients reported that the time required was not too long, and all felt that the topics included in the D-AI represented the problems they experienced. However, 50% indicated that it was not always easy to choose an appropriate response option. It should be noted that these results may have been influenced by the fact that the evaluation was assessed by the intaker who administered the D-AI.

Intakers were also mostly positive, as reflected in these statements: “A strong point of the D-AI is that all domains in daily life are discussed with the client. Therefore, the intaker cannot forget an important domain.”; “Clients were mostly satisfied and felt they were taken seriously by the detailed enquiry on all life domains.”; “Patients didn’t think the intake was too long.”; “We were a bit wary about administering the structured questionnaire, but with these clients we experienced that a conversation is maintained which is really pleasant.”; “Some of the detailed questions in the D-AI-2 were highly clarifying and sometimes real ‘eye openers’”; “The D-AI provides a good framework”; “The D-AI provides a clear view of the impairments and needs of the patient.” and “Psychosocial aspects of the patient showed up earlier by assessing the D-AI.”

However, intakers were sometimes more critical. For instance, one intaker indicated that: “In the usual intake structure, the client had more space to ‘tell his story’ than in the D-AI.”. A possible solution might be to make the order in which the goals are assessed flexible, so that the patient is more likely to ‘tell his story’. In this way, the conversation will better match the feelings of the patient and will follow the natural flow of the conversation. However, it is important that (in the end) all questions have been assessed to prevent topics from being overlooked. Therefore, we suggest that the D-AI should be programmed in such a way that all goals need to be assessed before closure. Furthermore, some intakers indicated that it may be more feasible to know the percentage of questions that has already been assessed (e.g., “During the assessment we had no clue as to how many questions were still to come.”), and it may be more

practical to structure the overview of priority scores in several ways (e.g., by ICF domain) by simply clicking a button. These recommendations to further improve the feasibility of the D-AI may be solved by simple ICT adjustments.

As the pilot study was performed using the D-AI research version with 65 goals, many challenges were already settled/incorporated in the shorter D-AI which has only 48 goals. The following feedback statements from intakers support the adaptations that were made in the newer version of the D-AI (Bruijning et al., submitted, Chapter 5): *“Depending on the needs of the patient, assessment of the D-AI takes a lot of time.”*, *“It’s a long questionnaire.”* and *“Asking so many questions may be boring. Patients may drop out.”* (i.e., the D-AI was shortened); *“Some questions were not clear, i.e., ‘Interaction with partner.’”* (i.e., this question was rephrased in the new D-AI); *“Some questions seem redundant because of the difficulty level: if reading large print is impossible, reading small print is probably also impossible.”* (i.e., the order of these questions was changed to make them more acceptable); and; *“...there are many questions about sports and creativity at the goal level. This seems out of balance. One goal question should be enough.”* (i.e., one new umbrella goal was formulated: ‘Recreational activities’).

Some remarks could not be (fully) solved or this was not desirable. For example: *“For some items the answer was somewhere in between (e.g., ‘moderately important/difficult’ and ‘not important/difficult’). There is too much space in between the response categories.”* Initially, the original Activity Inventory (AI) scored both the importance of goals and the difficulty of goals and tasks on a 5-point scale. However, previous analyses by Massof et al. suggested that patients make coarse discriminations in the importance of activities, and that patients could not discriminate between the number of response options.<sup>2</sup> Therefore, later versions of the AI scored the importance on a 4-point scale. For difficulty scores, a 5-point score seemed most appropriate and adding more response options was not desirable.<sup>2</sup> Therefore, it was decided not to change the number of response categories for difficulty questions. Another example: *“D-AI-2 has many double questions, e.g., ‘reading’ related tasks under the goal ‘Reading’, as well as under ‘Correspondence’”*. Although many double items were deleted from the D-AI (e.g., after factor analyses, see Chapter 4), it was not desirable to avoid all doubling, as some goals do have the same underlying tasks, and (due to the routing structure) tasks underneath not all goals will necessarily be assessed at the task level. Additionally, it was mentioned that *“the topic ‘Contact with other visually impaired persons (peers)’ was not available in the D-AI”*. However, because this is usually an example of the content of rehabilitation, this was not included in the D-AI. Other remarks were related to

the fact that the D-AI does not investigate other aspects of the ICF scheme. For example, it was reported that the topic “Lighting” was not included in the D-AI. However, this topic does not represent a need at the ‘Activity and Participation’ level and was therefore not included in the D-AI. ‘Lighting’ could be seen as an ‘External factor’ (of the ICF scheme) and should therefore be assessed in addition to the D-AI. It was also stated that: *“For patients with several impairments it’s difficult to decide whether the goals were actually difficult due to the visual impairment or perhaps due to other physical impairments”*. This statement should not lead to adaptation of the D-AI, but does highlight the need to discuss the results of the D-AI in relation to the full ICF framework. It may be useful to also develop a more structured assessment of these other aspects. Another point raised was: *“The initial help request of the patient did not have the highest priority score, but the patient only wanted to focus on this goal. Was assessment of the D-AI superfluous?”* It is possible that the D-AI was superfluous to investigate the needs of this particular patient; however, this will not be the case for all patients. Moreover, the standard assessment of the D-AI immediately after enrolment is needed to monitor the patient over time. In addition, it was stated that: *“The priority list sometimes puts the intaker on the wrong track as it does not match the help request of the patient”*. This statement also underscores the importance of discussing the results in light of the ICF model and not to formulate a rehabilitation plan based on D-AI scores alone. However, to systematically investigate the needs of the patient, making a broad overview may be a necessary step in the shared-decision making process and should not be marked as ‘the wrong track’. Moreover, in the two latter statements it remains unclear how the ‘help request of the patient’ was defined and whether this was in fact from the patient’s perspective. Another point was: *“Reporting needs some change... the D-AI does not completely match the Visio ICF structure”*. An example that was given was that the goals ‘Reading’ and ‘Writing’ may better match the domain ‘Communication’. However, by organizing the D-AI goals in the ICF domains (Chapter 2), feedback and consensus-based discussions revealed that the goal ‘Personal correspondence’ (which covers tasks related to reading and writing) indeed matches the domain ‘Communication’, and that the goals ‘Reading’ and ‘Writing’ themselves did not. In addition, at the time of the pilot study, MRCs were planning to better link their rehabilitation programs in light of the ICF domains. Therefore, it was decided not to rearrange the classification of goals in the D-AI. Finally, one intaker reported that *“Some questions were irrelevant for specific subgroups. For example ‘doing chores’ should only be asked of women. The ICT should account for this”*. This statement illustrates how the (preconceived) ideas of some intakers may bring the assessment of needs

from the patient's perspective into jeopardy. This was in fact interpreted as a confirmation of the additional value of the D-AI and should, therefore, not lead to any changes.

## **Start of a nationwide implementation trajectory**

As part of the fusion in 2010 of 'Royal Visio' and 'Sensis' (now: 'Royal Dutch Visio'), the 'Client services department' (i.e., registration and intake) was reorganized. Simultaneously, Royal Dutch Visio built software and started a nationwide implementation trajectory for the D-AI.

Because at that time the shortened D-AI was not yet available, the D-AI version with 65 goals was again used for the next implementation step, in which a group of intakers was asked to use the first part of the D-AI (questions at the goal level; D-AI-1) in the intake procedure. Royal Dutch Visio built a web-based application (on the intranet) to assess the D-AI-1 among patients during the intake phase. In addition, in 2011, an evaluation of Royal Dutch Visio was attended by the researchers; this revealed some important challenges. It appeared that the software did not yet require intakers to assess all the needs. The result was that not all intakers actually assessed all goals. This hampers a more objective way to assess the full range of rehabilitation needs from the patient's perspective. In addition, some intakers used the D-AI merely to structure the information provided by the patients and then made their own interpretation of the responses. Again, this increases the risk that the responses are not predominantly from the patient's perspective. Moreover, this hampers a reliable baseline measure and inhibits a proper evaluation over time. These experiences highlight the need for proper training and a clear understanding of the additional value of the D-AI.

## **Current implementation trajectory**

Based on the preliminary implementation results, both Royal Dutch Visio and Bartiméus decided to further implement the D-AI as part of their usual intake procedure. At that time, because the new (shortened) D-AI with 48 goals was available, the new D-AI was used for this purpose. However, there are small differences between the exact procedures and the place of the D-AI in the intake.

At this moment, Royal Dutch Visio is assessing the new shorter version of the D-AI-1 by telephone immediately after enrolment. However, patients with a request for the prescription of a simple assistive device (e.g., patients usually re-entering the MRC) and patients who are not capable to assess the D-AI (e.g., with acquired brain damage) follow a different trajectory. Royal Dutch Visio



decided to only assess the D-AI-difficulty questions of the goals. After this first assessment, the difficulty scores of individual goals are then used as input for the 'Research and Diagnostics' phase. This phase also consists of a 'Visual Function Examination' (if necessary) and consideration of other medical information, environmental conditions and personal preferences. Moreover, the D-AI-2 will be implemented in the near future to gain a more detailed overview of problematic tasks in order to find a suitable rehabilitation intervention. This 'Research and Diagnostics' phase ends with a rehabilitation plan based on the results of the D-AI and the other aspects of the ICF scheme, formulated in terms of D-AI goals by the intaker and patient together. In the future, the D-AI will also be assessed for evaluation purposes.

In May 2012, Bartiméus also started an implementation trajectory. They not only test the use of the new D-AI-1 in their standard intake process, but also the use of the D-AI-2. Immediately after enrolment, a telephone appointment is made to assess the D-AI-1 and (similar to Royal Dutch Visio) they only assess the difficulty of the goals. Then, another appointment is made to perform a Visual Function Examination. Subsequently, as part of the same appointment, the list of goal difficulty scores is used as input to discuss the possible rehabilitation content in light of the other ICF components. The more detailed assessment of the D-AI at the task level (D-AI-2) takes place for goals that will be part of the rehabilitation plan and/or in case a better insight into problematic tasks is needed to create a plan. Therefore, Bartiméus recently linked all rehabilitation products to specific tasks so that 'difficult' tasks of relevant goals will be linked automatically to rehabilitation products. Bartiméus has decided to ask only whether the underlying tasks are 'difficult' or 'not difficult' using a checklist. An advantage of a checklist is that it allows an intaker to arrive faster at a detailed rehabilitation plan. However, in this way, evaluation of task difficulty expressed as a change in scale scores is not possible. Bartiméus is carefully collecting experiences in order to evaluate this approach.

Bartiméus and Royal Dutch Visio are in contact with each other to exchange experiences. The lessons learned from the implementation studies will be used for further implementation of the D-AI. Both have indicated that they would like to continue involving the developers of the D-AI in this process.

## **Use of the D-AI for policymakers and as research input**

In addition to the qualitative improvement of the intake that was an aim when implementing the D-AI, another important reason for Royal Dutch Visio and

Bartiméus to implement the D-AI was to be more transparent about their processes and results. MRCs and insurance companies wanted to have better insight into the needs of different patient groups, the process to determine the content of the rehabilitation plan, and the effectiveness of the interventions. For this reason, observational data were presented to the MRCs. A qualitative summary of these findings is presented.

### **Investigating rehabilitation needs**

As an example, baseline data collected in the large validation study (Chapter 4), revealed that high priority goals (priority = goal importance score \* goal difficulty score) sometimes differed between several subgroups (Table 1). Analyzing the priority of goals separately for men and women, and for visually impaired persons aged 18-55 years and 55 years and over, revealed interesting differences. Overall, goals in the domains “Learning and applying knowledge” and “(Coping) with mental aspects” revealed high priority scores in each sub-population. However, younger patients had lower priority scores for “Mobility indoors” and “Mobility outdoors” compared to their older peers, and higher priority scores for “Using public transportation” (Table 1). In addition, “Watching TV” was present in the top 10 of priority scores for patients aged over 55 years, but not for patients aged 18-55 years. In contrast, “Using a computer” was listed in the top 10 only by the younger subgroup. This is in line with the exponential increase of computer use which is (partly) replacing the use of television; this shift in priority scores will probably also transfer to the elderly in the future. Studying gender differences revealed higher priority scores for “Mending clothes” for female patients and “Doing chores at home”. Although no statistical tests were performed for these analyses, the results support the use of a structured assessment of rehabilitation needs for, e.g., policymakers of MRCs. Results of prognostic studies on the prevalence and incidence of specific patient groups (e.g., eye condition, co-morbidity) can be linked to an expected increase or decrease in specific rehabilitation needs, in order to adjust future capacity or to stimulate research in certain fields.

In addition, given the fact that Royal Dutch Visio and Bartiméus are currently testing the use of the D-AI-1 with difficulty scores only, it would be interesting to compare top difficulty scores as well. Table 2 shows that top importance and top difficulty scoring lists also revealed different patterns for several subgroups. However, the interpretation of these results is more complicated as the response category ‘not applicable’ and the routing of the D-AI may have biased the results; the importance ranking neglects the ‘not applicable’

responses and difficulty scores were only assessed for goals that were of at least some importance.

Table 1. Top 10 priority list (at baseline) for the total study population (n=241) and for the subgroups: age 18-55 years (n=37), age ≥ 55 years (n=204), men (n=107) and women (n=134).

rank	Total study population (n=241)	Priority score Mean (SD)
1	Reading	5.8 (3.3)
2	Writing	4.5 (3.6)
3	Acceptance	4.4 (3.4)
4	Watching TV	4.1 (3.1)
5	Feeling fit	3.8 (3.5)
6	Personal correspondence	3.7 (3.8)
7	Handle feelings	3.6 (3.4)
8	Regulatory and Information	3.5 (3.7)
9	Mobility outdoors	3.4 (3.7)
10	Mobility indoors	3.4 (3.6)

  

rank	Age 18-55 years (n=37)	Priority score Mean (SD)	rank	Age 55 and over years (n=204)	Priority score Mean (SD)
1	Reading	5.3 (3.5)	1	Reading	5.9 (3.2)
2	Writing	4.4 (3.4)	2	Writing	4.5 (3.6)
3	Acceptance	4.1 (3.1)	3	Acceptance	4.4 (3.5)
4	Personal correspondence	4.1 (3.5)	4	Watching TV	4.2 (3.1)
5	Using computer	4.1 (3.5)	5	Feeling fit	4.0 (3.6)
6	Regulatory and Information	3.9 (3.2)	6	Personal correspondence	3.7 (3.9)
7	Dealing with money	3.9 (3.7)	7	Handle feelings	3.6 (3.4)
8	Holiday and trips	3.6 (3.6)	8	Mobility outdoors	3.4 (3.8)
9	Using public transportation	3.6 (3.6)	9	Mobility indoors	3.4 (3.7)
10	Personal administration	3.5 (3.4)	10	Regulatory and Information	3.4 (3.8)

  

rank	Men (n=107)	Priority score Mean (SD)	rank	Women (n=134)	Priority score Mean (SD)
1	Reading	6.1 (3.2)	1	Reading	5.6 (3.3)
2	Writing	4.2 (3.4)	2	Writing	4.7 (3.7)
3	Acceptance	4.1 (3.6)	3	Acceptance	4.6 (3.3)
4	Watching TV	3.7 (3.1)	4	Watching TV	4.4 (3.0)
5	Feeling fit	3.6 (3.4)	5	Personal correspondence	4.3 (4.0)
6	Regulatory and Information	3.5 (3.7)	6	Mending clothes	4.3 (4.4)
7	Handle feelings	3.5 (3.4)	7	Feeling fit	4.0 (3.5)
8	Mobility outdoors	3.1 (3.3)	8	Dealing with money	4.0 (4.3)
9	Doing chores at home	3.1 (3.6)	9	Mobility indoors	3.7 (3.8)
10	Personal correspondence	3.0 (3.5)	10	Handle feelings	3.7 (3.4)

SD: Standard deviation

**Evaluating rehabilitation needs over time**

MRCs may be interested to have a global impression of the effects of rehabilitation during the course of rehabilitation. Therefore, (similar to Chapter 6 and Chapter 7) linear mixed models were used to determine longitudinal rehabilitation outcomes for all goals of the D-AI after four and twelve months. Goals that were excluded from the D-AI based on the baseline analyses (Chapter 5) were not further analyzed over time. The results may be interpreted as an example of how to evaluate rehabilitation outcomes, especially with respect to change in difficulty scores at the group level.

*Importance of goals over time*

Table 3 shows that the importance of most goals was stable over time. However, the importance score of the goals 'Using public transportation', 'Recognition and communication', 'Interaction with colleagues', and 'Sports' was significantly higher ( $p < 0.05$ ) 4 and/or 12 months after baseline, whereas the importance score of 'Cleaning and tidying up', 'Holidays and trips', and 'Creative activities' showed a significant decrease ( $p < 0.05$ ) between baseline and 4 and/or 12 months. A possible explanation for the higher or lower importance scores may be that, as a result of rehabilitation, the patient is able to participate more in society, making other goals more or less relevant. For example: as a result of rehabilitation a patient may experience less difficulty in reading and using a computer, which enables him to find a new job. Subsequently, the patient needs to use public transport to go to work and needs to interact with his new colleagues. However, as these data were not corrected for any possible confounders, they may also be changed due to other factors, such as death of a partner. Finally, it cannot be excluded that the scores were subject to measurement error.

*Difficulty of goals over time*

Table 3 shows that the difficulty score of 19 (sub)goals was significantly ( $p < 0.05$ ) lower 4 and/or 12 months post-baseline. Overall, looking at the type of interventions applied (described in Chapters 5 and Chapter 6), it is plausible that the decrease in difficulty on at least some goals might be (partly) due to the rehabilitation intervention. However, the results should be interpreted with caution (for the reasons described in Chapters 5 and Chapter 6). The most important limitations relate to the study design (i.e., it is not an Randomized Controlled Trial) and the possible influence of confounders (e.g., decrease in visual acuity or an increase in co-morbidity). In addition, it was assumed that the D-AI would be responsive to change. It should be further explored to what extent longitudinal data are informative to monitor change over time; for example, it is

Table 2. Top 10 importance and difficulty lists (at baseline) for the total study population (n=241) and for subgroups: age 18-55 years (n=37), age ≥55 years (n=204), men (n=107) and women (n=134).

rank	Total study population (n=241)	n	GI score Mean	Total study population (n=241)	n	GD score Mean (SD)
1	Eating and drinking	232	2.9 (0.3)	Mending clothes	111	2.4 (1.3)
2	Interaction with partner	162	2.9 (0.4)	Reading	237	2.1 (1.1)
3	Mobility at home	238	2.9 (0.3)	Education	60	2.0 (1.1)
4	Feeling fit	240	2.9 (0.4)	Creative activities	131	2.0 (1.2)
5	Dressing	233	2.9 (0.4)	Driving a car	47	2.0 (1.5)
6	Reading	240	2.9 (0.4)	Applying for a job	30	1.9 (1.4)
7	Using telephone	237	2.8 (0.5)	Doing chores at home	112	1.9 (1.2)
8	Mobility outdoors	229	2.8 (0.5)	Writing	221	1.9 (1.2)
9	Personal hygiene	228	2.8 (0.5)	Hobbies and crafts	53	1.8 (1.2)
10	Personal health care	210	2.8 (0.5)	Holidays and trips	150	1.8 (1.4)
<b>Age 18-55 years (n=37)</b>				<b>Age 18-55 years (n=37)</b>		
1	Interaction with partner	30	3.0 (0.0)	Driving a car	11	2.9 (1.1)
2	Recognition and communication	37	3.0 (0.2)	Applying for a job	17	2.2 (1.2)
3	Accessibility at work	20	3.0 (0.2)	Mending clothes	19	2.2 (1.1)
4	Mobility at home	36	2.9 (0.3)	Creative activities	21	2.1 (0.9)
5	Eating and drinking	36	2.9 (0.3)	Education	22	2.1 (1.1)
6	Feeling fit	36	2.9 (0.4)	Reading	36	1.9 (1.2)
7	Personal hygiene	36	2.9 (0.5)	Personal administration	30	1.9 (1.2)
8	Mobility outdoors	35	2.9 (0.6)	Writing	37	1.9 (1.2)
9	Using telephone	37	2.8 (0.6)	Doing chores at home	24	1.8 (1.2)
10	Following a schedule	37	2.8 (0.6)	Hobbies and crafts	11	1.8 (0.4)

rank	Total study population (n=241)	n	GI score Mean	Total study population (n=241)	n	GD score Mean (SD)
<b>Age ≥55 years (n=204)</b>			<b>Age ≥55 years (n=204)</b>			
1	Eating and drinking	196	2.9 (0.3)	Mending clothes	92	2.4 (1.3)
2	Mobility at home	202	2.9 (0.3)	Reading	201	2.1 (1.0)
3	Interaction with partner	132	2.9 (0.5)	Education	38	2.0 (1.1)
4	Feeling fit	204	2.9 (0.4)	Doing chores at home	88	1.9 (1.2)
5	Dressing	197	2.9 (0.4)	Creative activities	110	1.9 (1.3)
6	Reading	203	2.9 (0.4)	Writing	184	1.9 (1.2)
7	Using telephone	200	2.8 (0.5)	Hobbies and crafts	42	1.8 (1.3)
8	Personal health care	178	2.8 (0.5)	Holidays and trips	117	1.8 (1.5)
9	Mobility outdoors	194	2.8 (0.5)	Watching TV	193	1.8 (1.0)
10	Personal hygiene	192	2.8 (0.5)	Personal administration	135	1.8 (1.3)
<b>Men (n=107)</b>			<b>Men (n=107)</b>			
1	Interaction with partner	89	2.9 (0.3)	Reading	105	2.1 (1.0)
2	Eating and drinking	103	2.9 (0.3)	Education	26	2.1 (1.1)
3	Mobility at home	106	2.9 (0.3)	Mending clothes	20	2.0 (1.3)
4	Felling fit	107	2.9 (0.3)	Hobbies and crafts	43	2.0 (1.1)
5	Reading	106	2.8 (0.5)	Doing chores at home	67	1.9 (1.1)
6	Accessibility at work	39	2.8 (0.5)	Driving a car	30	1.9 (1.5)
7	Dressing	104	2.8 (0.4)	Creative activities	58	1.9 (1.2)
8	Mobility outdoors	106	2.8 (0.5)	Writing	94	1.9 (1.1)
9	Recognition and communication	107	2.8 (0.5)	Holidays and trips	68	1.7 (1.4)
10	Personal health care	89	2.8 (0.5)	Making music	23	1.7 (1.4)

Table 2. (Continued)

rank	Total study population (n=241)	n	GI score Mean	Total study population (n=241)	n	GD score Mean (SD)
	<b>Women (n=134)</b>			<b>Women (n=134)</b>		
1	Interaction with partner	89	2.9 (0.3)	Mending clothes	91	2.5 (1.2)
2	Eating and drinking	103	2.9 (0.3)	Applying for a job	17	2.2 (1.3)
3	Mobility at home	106	2.9 (0.3)	Driving a car	17	2.1 (1.7)
4	Felling fit	107	2.9 (0.3)	Creative activities	73	2.0 (1.3)
5	Reading	106	2.8 (0.5)	Education	34	2.0 (1.2)
6	Accessibility at work	39	2.8 (0.5)	Reading	132	2.0 (1.1)
7	Dressing	104	2.8 (0.4)	Personal administration	91	2.0 (1.3)
8	Mobility outdoors	106	2.8 (0.5)	Watching TV	128	1.9 (1.0)
9	Recognition and communication	107	2.8 (0.5)	Holidays and trips	82	1.9 (1.5)
10	Personal health care	89	2.8 (0.5)	Writing	127	1.9 (1.2)

SD: Standard deviation; GI: Goal Importance; GD: Goal Difficulty. Ranking is based on mean scores (rounded to two decimal places) and response option 'not applicable' was treated as missing.

Table 3: Longitudinal analyses at the rehabilitation goal level, including change in Importance, Difficulty and Priority scores for each goal

ICF	Goals	n		Mean (SE)	Mean (SE)	Mean (SE)	95% CI	95% CI	95% CI	
				BL	4 months	12 months	for difference BL- 4 months	for difference 4 - 12 months	for difference BL- 12 months	
1	Reading	241	I	2.85 (0.03)	2.85 (0.03)	2.82 (0.03)	-0.07 - 0.06	-0.04 - 0.11	-0.03 - 0.10	
		240	D	2.06 (0.07)	1.81 (0.08)	1.68 (0.08)	0.09 - 0.41 **	-0.04 - 0.29	0.22 - 0.54 ***	
	Writing	239	I	2.54 (0.05)	2.52 (0.06)	2.53 (0.06)	-0.09 - 0.12	-0.11 - 0.09	-0.11 - 0.12	
		232	D	1.93 (0.08)	1.74 (0.08)	1.83 (0.09)	0.05 - 0.32 **	-0.23 - 0.05	-0.04 - 0.23	
	Watching TV	241	I	2.25 (0.06)	2.28 (0.06)	2.34 (0.06)	-0.13 - 0.07	-0.15 - 0.06	-0.18 - 0.03	
		236	D	1.79 (0.07)	1.64 (0.07)	1.56 (0.08)	0.00 - 0.30	-0.09 - 0.23	0.07 - 0.38 **	
2	Personal administration	203	I	2.47 (0.06)	2.49 (0.06)	2.55 (0.06)	-0.15 - 0.12	-0.17 - 0.05	-0.21 - 0.06	
		203	D	1.89 (0.10)	1.78 (0.10)	1.80 (0.10)	-0.07 - 0.29	-0.20 - 0.17	-0.10 - 0.28	
	Following a schedule	234	I	2.71 (0.04)	2.72 (0.05)	2.77 (0.04)	-0.13 - 0.11	-0.15 - 0.05	-0.17 - 0.05	
		233	D	0.81 (0.07)	0.75 (0.08)	0.70 (0.08)	-0.11 - 0.21	-0.11 - 0.22	-0.05 - 0.27	
	3	Using a computer	187	I	2.05 (0.09)	1.91 (0.10)	2.01 (0.10)	-0.01 - 0.30	-0.26 - 0.05	-0.11 - 0.20
			140	D	1.69 (0.10)	1.49 (0.10)	1.23 (0.11)	0.00 - 0.40 *	0.06 - 0.46 *	0.26 - 0.66 ***
Personal correspondence		229	I	2.64 (0.05)	2.58 (0.05)	2.60 (0.05)	-0.05 - 0.18	-0.14 - 0.10	-0.07 - 0.16	
		222	D	1.68 (0.09)	1.53 (0.09)	1.62 (0.10)	-0.01 - 0.31	-0.26 - 0.08	-0.11 - 0.22	
Using a telephone		240	I	2.84 (0.03)	2.83 (0.03)	2.85 (0.03)	-0.06 - 0.08	-0.10 - 0.05	-0.09 - 0.06	
		240	D	0.76 (0.07)	0.68 (0.07)	0.63 (0.07)	-0.07 - 0.23	-0.11 - 0.20	-0.03 - 0.27	
4	Mobility at home	239	I	2.91 (0.02)	2.92 (0.02)	2.92 (0.02)	-0.07 - 0.03	-0.06 - 0.07	-0.06 - 0.04	
		239	D	0.76 (0.06)	0.61 (0.07)	0.68 (0.07)	0.02 - 0.28 *	-0.21 - 0.06	-0.06 - 0.21	
	Mobility indoors	236	I	2.60 (0.05)	2.60 (0.05)	2.58 (0.05)	-0.11 - 0.12	-0.10 - 0.14	-0.10 - 0.14	
		236	D	1.41 (0.08)	1.33 (0.08)	1.43 (0.09)	-0.07 - 0.24	-0.26 - 0.06	-0.17 - 0.14	
	Walking outdoors (walking)	233	I	2.83 (0.03)	2.83 (0.03)	2.80 (0.04)	-0.07 - 0.07	-0.05 - 0.11	-0.06 - 0.11	
		232	D	1.31 (0.09)	1.32 (0.08)	1.35 (0.08)	-0.18 - 0.17	-0.18 - 0.12	-0.19 - 0.12	
	Riding a (motorized) bike (data 'riding bicycle')	153	I	2.25 (0.10)	2.12 (0.10)	2.16 (0.10)	-0.03 - 0.28	-0.20 - 0.11	-0.07 - 0.24	
		124	D	1.62 (0.14)	1.72 (0.12)	1.58 (0.13)	-0.28 - 0.09	-0.09 - 0.37	-0.22 - 0.30	



Table 3 (continued)

ICF	Goals	n	Mean (SE) BL	Mean (SE) 4 months	Mean (SE) 12 months	95% CI for difference BL- 4 months	95% CI for difference 4 - 12 months	95% CI for difference BL- 12 months
	Driving car (for disabled persons) ('driving car'#)	103	I 1.83 (0.15)	1.80 (0.15)	1.85 (0.14)	-0.17 - 0.22	-0.33 - 0.23	-0.24 - 0.19
		61	D 2.17 (0.21)	1.92 (0.23)	2.03 (0.22)	-0.17 - 0.66	-0.53 - 0.32	-0.26 - 0.54
	Using public transportation	211	I 2.17 (0.08)	2.24 (0.08)	2.36 (0.08)	-0.21 - 0.06	-0.25 - 0.02	-0.37 - -0.02 *
		179	D 1.71 (0.11)	1.63 (0.11)	1.67 (0.12)	-0.11 - 0.26	-0.23 - 0.16	-0.16 - 0.23
5	Dressing	238	I 2.87 (0.03)	2.83 (0.03)	2.88 (0.03)	-0.03 - 0.11	-0.12 - 0.03	-0.08 - 0.06
		236	D 0.64 (0.07)	0.62 (0.07)	0.61 (0.07)	-0.10 - 0.14	-0.10 - 0.11	-0.09 - 0.14
	Personal hygiene	236	I 2.83 (0.04)	2.90 (0.02)	2.89 (0.03)	-0.15 - 0.01	-0.06 - 0.07	-0.15 - 0.02
		233	D 0.70 (0.07)	0.60 (0.07)	0.58 (0.07)	-0.04 - 0.24	-0.12 - 0.16	-0.02 - 0.26
	Personal health care/ medication	233	I 2.81 (0.04)	2.84 (0.03)	2.86 (0.03)	-0.12 - 0.06	-0.11 - 0.08	-0.11 - 0.02
		229	D 0.65 (0.07)	0.63 (0.08)	0.77 (0.08)	-0.13 - 0.16	-0.29 - 0.01	-0.27 - 0.03
	Eating and drinking	239	I 2.93 (0.02)	2.94 (0.02)	2.93 (0.02)	-0.06 - 0.04	-0.05 - 0.05	-0.06 - 0.05
		238	D 0.34 (0.05)	0.38 (0.05)	0.32 (0.05)	-0.13 - 0.07	-0.03 - 0.15	-0.08 - 0.13
6	Cleaning and tidying up	223	I 2.57 (0.06)	2.57 (0.05)	2.45 (0.07)	-0.12 - 0.13	-0.02 - 0.25	0.00 - 0.23 *
		206	D 1.22 (0.09)	0.99 (0.09)	0.96 (0.08)	0.04 - 0.42 *	-0.12 - 0.17	0.06 - 0.45 *
	Doing laundry	185	I 2.53 (0.07)	2.50 (0.07)	2.53 (0.07)	-0.10 - 0.17	-0.16 - 0.11	-0.13 - 0.14
		171	D 0.69 (0.08)	0.73 (0.09)	0.66 (0.09)	-0.20 - 0.11	-0.09 - 0.23	-0.14 - 0.18
	Doing chores at home	186	I 1.78 (0.10)	1.86 (0.10)	1.77 (0.10)	-0.28 - 0.12	-0.12 - 0.29	-0.19 - 0.21
		142	D 1.96 (0.11)	1.70 (0.11)	1.87 (0.11)	0.04 - 0.48 *	-0.39 - 0.06	-0.13 - 0.31
	Mending clothes	184	I 1.89 (0.10)	1.76 (0.11)	1.65 (0.11)	-0.08 - 0.35	-0.13 - 0.34	0.03 - 0.46 *
		140	D 2.47 (0.12)	2.32 (0.13)	2.29 (0.14)	-0.10 - 0.40	-0.24 - 0.31	-0.08 - 0.44
	Paying and withdrawing money	221	I 2.73 (0.04)	2.74 (0.05)	2.76 (0.05)	-0.12 - 0.10	-0.14 - 0.10	-0.14 - 0.08
		221	D 1.50 (0.10)	1.13 (0.10)	1.32 (0.10)	0.20 - 0.54 ***	-0.37 - -0.01 *	0.01 - 0.36 *
	Daily shopping	209	I 2.55 (0.06)	2.62 (0.06)	2.58 (0.06)	-0.19 - 0.06	-0.09 - 0.17	-0.15 - 0.10
		196	D 1.40 (0.10)	1.33 (0.11)	1.40 (0.11)	-0.11 - 0.25	-0.25 - 0.12	-0.18 - 0.19
	Shopping (other than groceries)	223	I 2.01 (0.08)	1.95 (0.08)	2.11 (0.08)	-0.11 - 0.23	-0.34 - 0.01	-0.28 - 0.07
		196	D 1.61 (0.11)	1.62 (0.11)	1.58 (0.11)	-0.20 - 0.18	-0.15 - 0.24	-0.17 - 0.22

<b>Daily meal preparation</b>	200	I	2.60 (0.06)	2.53 (0.07)	2.57 (0.06)	-0.04 – 0.17	-0.18 – 0.10	-0.11 – 0.17
	191	D	0.80 (0.08)	0.84 (0.09)	0.85 (0.09)	-0.18 – 0.11	-0.16 – 0.14	-0.20 – 0.11
<b>Health care for an adults</b>	110	I	2.36 (0.13)	2.20 (0.12)	2.14 (0.12)	-0.08 – 0.40	-0.19 – 0.30	-0.03 – 0.46
	85	D	1.49 (0.16)	1.48 (0.17)	1.45 (0.17)	-0.31 – 0.33	-0.30 – 0.37	-0.28 – 0.36
<b>(Grand) child care</b>	149	I	2.51 (0.08)	2.51 (0.09)	2.58 (0.09)	-0.18 – 0.19	-0.27 – 0.13	-0.26 – 0.13
	133	D	0.90 (0.10)	0.78 (0.11)	0.80 (0.12)	-0.12 – 0.34	-0.26 – 0.23	-0.14 – 0.33
<b>Pet care</b>	109	I	1.78 (0.13)	1.79 (0.14)	1.75 (0.15)	-0.21 – 0.20	-0.18 – 0.26	-0.18 – 0.24
	72	D	0.54 (0.12)	0.47 (0.12)	0.46 (0.10)	-0.19 – 0.33	-0.20 – 0.21	-0.15 – 0.29
<b>7 Personal communication</b>	241	I	2.81 (0.04)	2.81 (0.03)	2.88 (0.02)	-0.06 – 0.07	-0.14 - -0.01 *	-0.14 - -0.00 *
	239	D	0.58 (0.06)	0.54 (0.06)	0.65 (0.06)	-0.10 – 0.17	-0.24 – 0.03	-0.20 – 0.07
<b>Relationship loved ones ( 'relationship partner'#)</b>	168	I	2.88 (0.04)	2.90 (0.04)	2.92 (0.03)	-0.07 – 0.03	-0.10 – 0.05	-0.13 – 0.04
	162	D	0.28 (0.05)	0.28 (0.05)	0.37 (0.07)	-0.10 – 0.10	-0.22 – 0.03	-0.22 – 0.02
<b>Interaction with colleagues</b>	123	I	2.40 (0.10)	2.54 (0.09)	2.76 (0.06)	-0.70 – 0.42	-0.42 - -0.01 *	-0.59 – -0.12 **
	108	D	0.47 (0.09)	0.39 (0.08)	0.31 (0.08)	-0.09 – 0.24	-0.10 – 0.25	-0.05 – 0.36
<b>Interaction with strangers</b>	235	I	1.99 (0.07)	2.02 (0.07)	2.11 (0.07)	-0.16 – 0.11	-0.23 – 0.06	-0.26 – 0.03
	222	D	0.71 (0.07)	0.67 (0.07)	0.69 (0.07)	-0.09 – 0.18	-0.16 – 0.11	-0.12 – 0.16
<b>8 Managing finance</b>	215	I	2.60 (0.06)	2.61 (0.06)	2.68 (0.05)	-0.14 – 0.11	-0.18 – 0.05	-0.18 – 0.02
	204	D	1.23 (0.10)	1.18 (0.10)	1.29 (0.11)	-0.11 – 0.19	-0.26 – 0.06	-0.26 – 0.14
<b>Regulatory and information</b>	241	I	2.67 (0.05)	2.62 (0.05)	2.62 (0.05)	-0.06 – 0.17	-0.12 – 0.11	-0.07 – 0.16
	237	D	1.33 (0.09)	1.02 (0.08)	1.01 (0.09)	0.10 – 0.51 **	-0.18 – 0.21	0.13 – 0.51 **
<b>Education</b>	187	I	1.14 (0.11)	1.10 (0.11)	1.32 (0.12)	-0.20 – 0.28	-0.47 – 0.03	-0.43 – 0.07
	89	D	2.10 (0.15)	1.64 (0.16)	1.48 (0.16)	0.11 – 0.80 **	-0.20 – 0.52	0.27 – 0.97 **
<b>Apply for a job</b>	168	I	0.79 (0.12)	0.67 (0.12)	0.71 (0.13)	-0.16 – 0.41	-0.33 – 0.26	-0.21 – 0.38
	52	D	1.91 (0.21)	1.76 (0.21)	1.66 (0.20)	-0.25 – 0.57	-0.13 – 0.32	-0.18 – 0.69
<b>Working activities</b>	124	I	2.41 (0.11)	2.60 (0.07)	2.54 (0.09)	-0.40 – 0.02	-0.06 – 0.17	-0.37 – 0.10
	105	D	1.15 (0.12)	1.02 (0.12)	0.92 (0.11)	-0.10 – 0.36	-0.08 – 0.27	-0.01 – 0.46
<b>Accessibility at work</b>	110	I	2.58 (0.10)	2.61 (0.08)	2.45 (0.11)	-0.15 – 0.09	-0.01 – 0.33	-0.04 – 0.30
	97	D	0.62 (0.11)	0.72 (0.10)	0.55 (0.11)	-0.32 – 0.12	-0.06 – 0.39	-0.16 – 0.30

Table 3 (continued)

ICF	Goals	n		Mean (SE) BL	Mean (SE) 4 months	Mean (SE) 12 months	95% CI for difference BL– 4 months	95% CI for difference 4 – 12 months	95% CI for difference BL– 12 months
<b>9</b>	<b>Following the news</b>	241	I	2.70 (0.04)	2.69 (0.04)	2.70 (0.04)	-0.07 – 0.09	-0.09 – 0.08	-0.08 – 0.09
		239	D	0.87 (0.07)	0.69 (0.07)	0.63 (0.07)	0.04 – 0.33 *	-0.08 – 0.21	0.08 – 0.41 **
	<b>Having visitors</b>	231	I	2.57 (0.05)	2.57 (0.05)	2.59 (0.05)	-0.11 – 0.11	-0.13 – 0.10	-0.13 – 0.10
		225	D	1.19 (0.09)	1.09 (0.08)	1.04 (0.08)	-0.05 – 0.26	-0.10 – 0.20	0.01 – 0.29 *
	<b>Social events</b>	235	I	2.41 (0.06)	2.44 (0.05)	2.42 (0.06)	-0.17 – 0.10	-0.10 – 0.14	-0.16 – 0.13
		228	D	1.18 (0.08)	1.12 (0.09)	1.03 (0.09)	-0.11 – 0.25	-0.10 – 0.27	-0.03 – 0.34
	<b>Dining out</b>	231	I	1.89 (0.07)	1.93 (0.08)	1.91 (0.08)	-0.19 – 0.11	-0.14 – 0.18	-0.18 – 0.13
		208	D	1.05 (0.09)	1.05 (0.09)	1.03 (0.09)	-0.17 – 0.17	-0.15 – 0.19	-0.15 – 0.19
	<b>Holidays and trips</b>	220	I	2.22 (0.08)	2.10 (0.08)	2.03 (0.08)	-0.04 – 0.28	-0.10 – 0.23	0.03 – 0.35 *
		189	D	1.86 (0.11)	1.84 (0.12)	1.78 (0.12)	-0.21 – 0.25	-0.18 – 0.31	-0.15 – 0.33
	<b>Physical activities and/or sports</b>	235	I	2.42 (0.06)	2.50 (0.05)	2.61 (0.04)	-0.20 – 0.04	-0.22 – 0.04	-0.31 – -0.07 **
		226	D	1.08 (0.08)	0.90 (0.08)	1.06 (0.08)	0.04 – 0.33 *	-0.31 – -0.01 *	-0.13 – 0.18
	<b>Recreational leisure time management</b>	-	-	-	-	-	-	-	
	<b>Gardening/taking care of plants</b>	212	I	2.08 (0.08)	2.03 (0.08)	2.17 (0.08)	-0.12 – 0.21	-0.31 – 0.03	-0.27 – 0.07
		190	D	1.06 (0.09)	1.08 (0.10)	0.98 (0.10)	-0.22 – 0.18	-0.11 – 0.30	-0.13 – 0.27
	<b>Playing instrument or singing</b>	176	I	0.84 (0.11)	0.90 (0.10)	0.89 (0.10)	-0.23 – 0.10	-0.10 – 0.14	-0.19 – 0.10
		60	D	1.56 (0.20)	1.67 (0.20)	1.29 (0.20)	-0.47 – 0.25	0.01 – 0.74	-0.10 – 0.63
	<b>Intellectual activities (e.g., book club/lecture)</b>	209	I	1.20 (0.10)	1.28 (0.10)	1.35 (0.11)	-0.28 – 0.12	-0.29 – 0.15	-0.35 – 0.07
		130	D	1.55 (0.12)	1.28 (0.12)	1.18 (0.13)	0.05 – 0.50 *	-0.13 – 0.34	0.15 – 0.61 **
	<b>Cultural/other events (e.g., theater, film)</b>	219	I	1.56 (0.09)	1.54 (0.08)	1.70 (0.09)	-0.17 – 0.21	-0.32 – 0.00	-0.33 – 0.05
		169	D	1.56 (0.11)	1.39 (0.11)	1.27 (0.11)	-0.05 – 0.40	-0.10 – 0.34	0.08 – 0.52 **
	<b>Playing games</b>	230	I	1.46 (0.08)	1.59 (0.09)	1.55 (0.09)	-0.28 – 0.03	-0.12 – 0.20	-0.24 – 0.08
		174	D	1.53 (0.10)	1.37 (0.11)	1.58 (0.11)	-0.05 – 0.37	-0.43 – 0.01	-0.26 – 0.17
	<b>Creative activities (e.g., drawing, crafting)</b>	224	I	1.85 (0.09)	1.73 (0.09)	1.53 (0.10)	-0.05 – 0.28	0.03 – 0.38 *	0.11 – 0.52 **
		163	D	1.98 (0.11)	1.65 (0.11)	1.57 (0.12)	0.09 – 0.57 **	-0.18 – 0.35	0.15 – 0.68 **

<b>Hobbies and crafts</b>		184	I	0.87 (0.10)	1.06 (0.11)	0.97 (0.11)	-0.41 – 0.04	-0.15 – 0.32	-0.33 – 0.13
		77	D	1.93 (0.16)	1.76 (0.16)	1.68 (0.18)	-0.17 – 0.51	-0.29 – 0.43	-0.13 – 0.62
<b>10</b>	<b>Emotional life and acceptance ('handle feelings'#)</b>	241	I	2.60 (0.05)	2.58 (0.05)	2.64 (0.05)	-0.10 – 0.14	-0.17 – 0.06	-0.14 – 0.07
		240	D	1.38 (0.08)	1.33 (0.08)	1.29 (0.08)	-0.11 – 0.20	-0.13 – 0.20	-0.08 – 0.24
	<b>Emotional life and acceptance ('acceptance'#)</b>	240	I	2.73 (0.04)	2.75 (0.04)	2.77 (0.04)	-0.11 – 0.07	-0.11 – 0.07	-0.13 – 0.05
		240	D	1.61 (0.07)	1.33 (0.07)	1.34 (0.08)	0.13 – 0.44 ***	-0.17 – 0.15	0.11 – 0.45 **
<b>Fatigue, concentration energy ('feeling fit'#)</b>		241	I	2.89 (0.02)	2.88 (0.02)	2.87 (0.03)	-0.05 – 0.06	-0.05 – 0.08	-0.04 – 0.08
		241	D	1.36 (0.08)	1.20 (0.07)	1.23 (0.07)	0.01 – 0.31 *	-0.11 – 0.17	-0.02 – 0.27

\* p <0.05; \*\* p <0.01; \*\*\* p < 0.001; BL = baseline; I = Importance score; D = Difficulty score; - = no data available. Formulation of goals are based on the new D-AI with 41 goals (plus 7 subgoals). Data presented are based on the research version of the D-AI with 65 goals (plus 26 subgoals); # data used from a similar 'goal' in the research version of the D-AI (which is not available in the new D-AI).

unclear whether the changes that were measured are clinically relevant, also at an individual level. For a better interpretation of the scores, more research on these issues is required.

The data of this observational study provide insight into how rehabilitation needs change during the course of rehabilitation based on a non-systematic 'usual' intake at the MRC. Therefore, now there are reference data which allow to better evaluate whether rehabilitation is improved when the rehabilitation trajectory is based on a structured intake using the D-AI, and whether new intervention programs are more effective. Moreover, the MRCs now have better insight into the longitudinal outcomes of rehabilitation. All this may be helpful in determining the direction of future research.

## **Experiences with the D-AI by an optometric service**

Besides implementation of the pilot at the two MRCs, another application of the D-AI was used by an optometrist at the department of Ophthalmology of the VU University Medical Center. The optometrist and the two MRCs started a collaboration to stimulate and facilitate referral of visually impaired patients of an optometric service with more complex rehabilitation needs to multidisciplinary care. For this purpose, patient consultations were planned with the optometrist and an MRC employee together. To get a brief overview of possible activity limitations and participation restrictions, a shorter 'D-AI-screener' was developed in which not the (degree of) importance and difficulty of goals was assessed, but in which patients were asked to indicate for which goals the patient felt 'a need for help because of the visual impairment' by simply ticking a box (Figure 1). In this application, the D-AI-screener functions as a screening instrument to refer patients with more complex rehabilitation needs to MRCs by making optometrists aware of goals which often tend to be overlooked and/or goals that require a multidisciplinary approach. In this way, visually impaired persons in ophthalmology or optometry departments will probably be referred to multidisciplinary care more often, as recommended by van Nispen.<sup>3</sup> With the use of the D-AI-screener, about 30% of the patients were referred to an MRC; however, it is unknown whether this number has changed as no previous data were available. Of the 233 patients who filled in the D-AI-screener (between May 2011 and September 2012), the most frequently reported help requests concerned the following goals: 'Reading' (53%), 'Watching TV' (20%), 'Computer use' (11%), 'Writing' (9%), 'Mobility outdoors' (9%), 'Recreational activities' (5%), 'Emotional life' (5%), 'Mobility indoors' (4%), 'Daily shopping' (4%), and 'Shopping (not daily shopping)' (4%). Additional research is required to further

elucidate the role of the D-AI in rehabilitation services to improve the outcome of our visually impaired patients.

**For which topics do you feel a need for help due to your visual impairment?**

<p><b>1 Learning and applying knowledge</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reading</li> <li><input type="checkbox"/> Writing</li> <li><input type="checkbox"/> Watching TV</li> </ul> <p><b>2 General tasks and demands</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Personal administration</li> <li><input type="checkbox"/> Following a schedule</li> </ul> <p><b>3 Communication</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Using a computer</li> <li><input type="checkbox"/> Personal correspondence</li> <li><input type="checkbox"/> Using a telephone</li> </ul> <p><b>4 Mobility</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Mobility at home</li> <li><input type="checkbox"/> Mobility indoors (not at home)</li> <li><input type="checkbox"/> Mobility outdoors (walking on the streets)</li> <li><input type="checkbox"/> Riding a (motorized) bicycle</li> <li><input type="checkbox"/> Driving a car/vehicle for disabled persons</li> <li><input type="checkbox"/> Using public transportation</li> </ul> <p><b>5 Self-care</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Dressing</li> <li><input type="checkbox"/> Personal hygiene</li> <li><input type="checkbox"/> Personal health care/medication</li> <li><input type="checkbox"/> Eating and drinking</li> </ul> <p><b>6 Domestic life</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cleaning and tidying up</li> <li><input type="checkbox"/> Doing laundry</li> <li><input type="checkbox"/> Doing chores at home</li> <li><input type="checkbox"/> Mending clothes</li> <li><input type="checkbox"/> Paying and withdrawing money</li> <li><input type="checkbox"/> Daily shopping</li> <li><input type="checkbox"/> Shopping (other than groceries)</li> <li><input type="checkbox"/> Daily meal preparation</li> <li><input type="checkbox"/> Health care for an adult</li> <li><input type="checkbox"/> (Grand) child care</li> <li><input type="checkbox"/> Pet care</li> </ul>	<p><b>7 Interpersonal interactions and relationships</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Personal communication</li> <li><input type="checkbox"/> Relation loved ones (due to visual impairment)</li> <li><input type="checkbox"/> Interaction with colleagues (due to visual impairment)</li> <li><input type="checkbox"/> Interaction with strangers (due to visual impairment)</li> </ul> <p><b>8 Major life areas</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Managing finance</li> <li><input type="checkbox"/> Regulatory and information</li> <li><input type="checkbox"/> Education</li> <li><input type="checkbox"/> Applying for a job</li> <li><input type="checkbox"/> Working activities</li> <li><input type="checkbox"/> Accessibility at work</li> </ul> <p><b>9 Community, social, and civil life</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Following the news</li> <li><input type="checkbox"/> Having visitors</li> <li><input type="checkbox"/> Social events</li> <li><input type="checkbox"/> Dining out</li> <li><input type="checkbox"/> Holiday and trips</li> <li><input type="checkbox"/> Physical activity and/or sports</li> <li><input type="checkbox"/> Recreational/leisure time management                             <ul style="list-style-type: none"> <li><input type="checkbox"/> gardening/taking care of plants</li> <li><input type="checkbox"/> playing an instrument or singing</li> <li><input type="checkbox"/> intellectual activities</li> <li><input type="checkbox"/> cultural or other events</li> <li><input type="checkbox"/> plying games</li> <li><input type="checkbox"/> creative activities</li> <li><input type="checkbox"/> hobbies and crafts</li> <li><input type="checkbox"/> other, i.e.: .....</li> </ul> </li> </ul> <p><b>10 Mental (emotional) health aspects</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Emotional life and acceptance</li> <li><input type="checkbox"/> Feeling fit</li> </ul>
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Figure 1. Dutch ICF Activity Inventory screener

## References

- 1 World Health Organisation. International classification of functioning, disability and health. WHO, Geneva, 2001.
- 2 Massof RW, Hsu CT, Baker FH, Barnett GD, Park WL, Deremeik JT, Rainey C, Epstein C. Visual disability variables. I: the importance and difficulty of activity goals for a sample of low-vision patients. *Arch Phys Med Rehabil* 2005;86:946-953.
- 3 Nispen RMA. Longitudinal measurement of the older patient's vision-related quality of life. Thesis, 2009.