

ORIGINAL ARTICLE

Self- and observer ratings of capacity limitations in patients with neurological conditions

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Abstract

Objective: The purpose of this study was to compare the self- and observer ratings of capacity limitations in patients with neurological conditions. Research on this topic is relevant for assessing the patients' ability to participate in work and social life and improving collaborative patient-clinician relationships.

Method: The self- and observer ratings of capacity limitations in a sample of $N = 245$ patients with neurological conditions from a rehabilitation facility were compared and assessed using the short rating of activity limitations and participation restrictions in mental disorders according to the International Classification of Functioning, Disability and Health (Mini-ICF-APP) and the equivalent self-rating questionnaire (Mini-ICF-APP-S).

Results: Paired-samples t -tests revealed significant differences between the self- and observer ratings for six out of 13 capacity dimensions. On average, the patients rated the capacity dimensions *adherence to regulations*, *planning and structuring of tasks*, *professional competency* and *endurance* as significantly less limited, in comparison to the observers (small to medium effect sizes). The self-ratings for limitation of *contact with others* and *self-care* were only marginally higher than the observer ratings.

Conclusions: The findings show that psychological capacity limitations occur in patients with neurological conditions. In clinical practice, limitations in each capacity dimension and discrepancies in patient- and clinician-ratings should be thoroughly assessed. This is especially relevant in patients with neurological conditions who have a potential tendency to underestimate or deny their disability.

Keywords: Capacity limitation; Mini-ICF-APP; self- and observer rating; neurological conditions; rehabilitation; socio-medical assessments; self-awareness

Introduction

According to the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF), and in line with a bio-psycho-social understanding of health and disease, health conditions are not only characterized by clinical symptoms but also by participation restrictions affecting different areas of life, such as work and social life (Deutsches Institut für Medizinische Dokumentation und Information [DIMDI], 2005; Linden, 2016; WHO, 2001). This is particularly relevant in neurological conditions, which are commonly linked to poor quality of life (e.g., Gullo, Fleming, Bennett, & Shum, 2019; Mitchell, Kemp, Benito-León, & Reuber, 2010; Mujica-Mota et al., 2015; Paul et al., 2005), unemployment (Pearson et al., 2017) and difficulties in returning to

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work (e.g., percentage of people re-entering the workforce within the first two years after acquired brain injury: approximately 40%; van Velzen, van Bennekom, Edelaar, Sluiter, & Frings-Dresen, 2009).

However, restrictions on participation do not result directly from clinical symptoms. Instead, the limitation of capacities in the context of specific role requirements, seems to play a key role in the context of disease and participation restriction (Baron & Linden, 2009; Linden, 2016). For example, a patient with aphasia might only be restricted when participating in work, if the capacity to establish new social relations is limited but required at the patient's workplace (e.g., when working as a recruiter at the human resources department). Following the ICF terminology, psychological capacities can be described as specific psychological activities which an individual is able to carry out, given specific context requirements (DIMDI, 2005; Linden, Keller, Noack, & Muschalla, 2018; WHO, 2001). They can also be referred to as *soft skills* (Linden, Keller, et al., 2018) which are essential in today's working life with increased psychological requirements and which enable individuals to interact with others and to adjust to different situations or requirements (Linden, 2016; Linden, Keller, et al., 2018; Muschalla, Linden, Baron, & Ostholt-Corsten, 2019). They include the (1) adherence to regulations, (2) planning and structuring of tasks, (3) flexibility, (4) professional competency, (5) judgments, (6) endurance, (7) assertiveness, (8) contact with others, (9) group integration (10) intimate relationships, (11) spontaneous activities, (12) self-care and (13) mobility (Linden, Baron, & Muschalla, 2009; Linden, Baron, & Muschalla, 2015).

Capacity limitations occur when the individual has problems in performing certain activities which are required in a specific context (WHO, 2001). Problems include negative consequences for the individual or others, or (full or partial) assistance being required from others to meet specific requirements (Linden, Baron, Muschalla, & Ostholt-Corsten, 2015). In the context of work, the nature and extent of disease-related capacity limitations can, in certain roles, lead to long-term sick leave (Muschalla, 2018) and are essential when evaluating disability (Anner, Schwegler, Kunz, Trezzini, & de Boer, 2012; Linden, 2016; Muschalla, Angerer, & Knaevelsrud, 2017).

The precise and comprehensive assessment of capacity limitations is crucial when planning treatment and conducting socio-medical assessments (e.g., concerning work ability): To obtain a comprehensive picture of the patient's limitations, it is beneficial to include both self- and observer ratings (Linden, Deck, & Muschalla, 2018; Muschalla, 2020). However, as self-ratings can differ from those of observers, this needs to be taken into account when conducting socio-medical assessments (Linden, Deck, et al., 2018), which require expertise (Linden, Keller, et al., 2018).

To date, the research conducted into the comparison of self- and observer ratings has primarily been in the context of participation restrictions (e.g., Linden, Deck, et al., 2018) and psychopathological aspects (e.g., Biancosino et al., 2007; Carter, Frampton, Mulder, Luty, & Joyce, 2010; Hartmann, Fritzsche, & Lincoln, 2013). In addition, psychological capacity limitations have been examined primarily in the context of psychological disorders (e.g., Linden et al., 2009; Linden, Baron, & Muschalla, 2015; Linden, Keller, et al., 2018; Muschalla, 2020; Muschalla, Poguntke, & Linden, 2019; Muschalla, Rau, Küster, Willmund, & Knaevelsrud, 2017), whereas there are only some studies of psychological capacity limitations in the context of neurological conditions. Hence, there is a need to examine the self- and observer ratings of psychological capacity limitations in a sample of patients with neurological conditions. Research on that topic would allow a better understanding of capacity limitations in patients with neurological conditions, which is needed to assess the patients' ability to participate in work or social life. It might also improve collaborative alliances between clinicians and patients. For example, following the dimensions of therapeutic alliances proposed by Bordin (1979), identifying and addressing the patient's perception of limitations in therapy might contribute to finding a better agreement on objectives and interventions.

Differences in self- and observer ratings of capacity limitations

Discrepancies between self- and observer ratings have been examined in different contexts for decades and are not unique to the socio-medical context. They can arise for various reasons.

For example, research has indicated that people with a higher depressive or anxiety symptom load, tend to interpret information more negatively than those without (Everaert, Bronstein, Cannon, & Joormann, 2018; Krahé, Whyte, Bridge, Loizou, & Hirsch, 2019), and that a depressive symptom load is related to an internal attribution style of negative experiences (Cropley & MacLeod, 2003). Higher levels of perceived hopelessness in people with a depressive or anxiety symptom load are associated with a decreased expectancy to attain objectives (Hadley & MacLeod, 2010) and an increased inner conviction of negative predictions (Miranda, Fontes, & Marroquín, 2008). In the context of socio-medical assessments, it is possible for self-ratings to be influenced by a motivation to receive a disability pension or other benefits: In this case, there may be a tendency for the self-rated capacity limitations to be exaggerated or even fabricated (Baron, 2019; Linden, 2016). Self-ratings of the impairment might also be more pronounced than the observer's evaluations due to a tendency to clarify or emphasize it (Muschalla, 2020). Conversely, some patients might underestimate their limitations due to a social desirability bias (Baron, 2019).

Patients may also be referring to different contexts than the observers, when rating their limitations, which reduces the validity of the self-ratings (Baron, 2019; Linden, 2016). For example, patients might rate their social skills, by reference to their number of friends (Baron, 2019; Linden, 2016), the social capacities of other people, with their capacities before and after disease onset or according to their personal goals (Baron, 2019; Linden, Keller, et al., 2018; Muschalla, 2020). Other potential causes of discrepancies between self- and observer ratings might be different interpretations of observations concerning capacity limitations or attribution biases on the part of the observers (Baron, 2019).

Research has shown that people with psychological symptom loads or psychological disorders, tend to rate their symptoms and participation restrictions as more severe, in comparison to the ratings of clinicians or observers (e.g., Carter et al., 2010; Linden, Deck, et al., 2018; Linden, Muschalla, Haverkamp, & Keßler, 2013). However, there is less research on discrepancies between self- and observer ratings of (psychological) capacity limitations. Muschalla, Rau, et al. (2017) revealed that the self-rated capacity limitations of serving members of the German military with psychological disorders, were significantly positively correlated with the expert rated capacity limitations for almost all the capacity dimensions examined. The results indicate a similarity but not full conformity, between the self- and observer ratings.

Self- and observer ratings of capacity limitations in patients with neurological conditions

In Germany, cerebrovascular diseases (e.g., stroke) and multiple sclerosis are the most common neurological conditions in patients receiving rehabilitation services or disability pensions (DRV, 2010). These and other neurological conditions are quite complex in the sense that they can involve different levels of severity and neurological damage in different areas and therefore, display varied functional impairments, capacity limitations and participation restrictions (DRV, 2010). Another peculiarity of neurological conditions, is that they can be accompanied by symptoms similar to those found in psychological disorders, such as impaired memory, attention and concentration disorders, anxiety, fatigue, hallucinations and illusions, impulsivity, changes in the affectivity, apathy, hopelessness and sleeping problems (e.g., Amato, Zipoli, & Portaccio, 2006; Beyenburg, Mitchell, Schmidt, Elger, & Reuber, 2005; DRV, 2010; Djamshidian et al., 2012; Lou, Kearns, Oken, Sexton, & Nutt, 2001; Mattle & Mumenthaler, 2015; Patten & Metz, 2002; Penner & Paul, 2017; Rooney, Wood, Moffat, & Paul, 2019; den Brok et al., 2015). They both represent disorders of the brain (Gustavsson et al., 2011; Wittchen et al., 2011).

So far, only a few studies have investigated psychological capacity limitations in patients with neurological conditions. For example, there has been a study showing that Parkinson's disease is linked to impulsive and irrational decision-making (Djamshidian et al., 2012). Gullo et al. (2019) revealed that both high physical and cognitive fatigue in patients with multiple sclerosis go along with several disabilities. For example, patients who reported high compared to low physical fatigue

perceived significantly more disease-related difficulties in their everyday life, for example concerning their ability to move. Other studies have emphasized that neurological conditions are associated with impaired social cognitive functioning (e.g., Alonso-Recio, Carvajal, Merino, & Serrano, 2021; Henry, Von Hippel, Molenberghs, Lee, & Sachdev, 2016; Phillips et al., 2011) and restricted executive functioning, involving deficits in planning performance (Weintraub et al., 2005).

Due to similarities in some of their symptoms and capacity limitations, one might assume there could be a similar pattern concerning differences in self- and observer-rated capacity limitations in patients with neurological conditions and psychological disorders. However, some research has shown that patients with neurological conditions without concomitant psychopathology tend to *underestimate* the severity of their functional impairment or capacity limitation whereas, patients with neurological conditions and concomitant psychopathology seem to *overestimate* the severity of the same (e.g., Bruce & Arnett, 2004; Carone, Benedict, Munschauer III, Fishman, & Weinstock-Guttman, 2005). For example, Carone et al. (2005) showed that patients with multiple sclerosis who underestimated their cognitive impairment, showed a lower depressive symptom load than patients who overestimated it. Those results are in line with a previous study which revealed that patients with multiple sclerosis without depressive symptoms, tended to underestimate their memory deficits, while those with mild depressive symptoms seemed to overestimate them (Bruce & Arnett, 2004). Another study showed that patients with traumatic brain injury underestimated their deficits in social interaction and emotional control compared to their relatives' evaluations, while the control group of patients with neuropsychiatric conditions did not show an underestimation of their limitations (Prigatano, 1996).

As suggested previously, individuals with a depressive or anxiety symptom load or hopelessness, might evaluate their capacity limitations as being more severe, in comparison to the observers' assessment, due to their tendency to have a rather pessimistic view of their abilities or future (e.g., Cropley & MacLeod, 2003; Hadley & MacLeod, 2010; Miranda et al., 2008). Following Beck's theory of depression (Beck, Rush, Shaw, & Emery, 1979), Bruce and Arnett (2004) suggested that patients with neurological conditions but without concomitant psychopathology might underestimate their symptom severity or limitation, based on a tendency to attribute successful performances to their own capacities and non-successful performances to external factors. Thus, they might draw their attention to their positive capacities, rather than paying attention to their limitations (Bruce & Arnett, 2004).

Other possible explanations for underestimating the severity of their functional impairment or capacity limitation, include a reduced awareness of their deficits due to brain damage, or denial of disability as a coping mechanism after brain injury (e.g., Bivona et al., 2019; Hartman-Maeir, Soroker, Oman, & Katz, 2003; Katz, Fleming, Keren, Lightbody, & Hartman-Maeir, 2002; Prigatano & Sherer, 2020; Prigatano, 1996). In the context of neurological conditions, self-awareness describes the ability to perceive deficits due to brain injury and to understand their consequences with reference to current and future contexts (Crosson et al., 1989). An impaired self-awareness has commonly been found in patients with cerebrovascular conditions and after acquired and traumatic brain injuries (e.g., Fischer, Trexler, & Gauggel, 2004; Geytenbeek, Fleming, Doig, & Ownsworth, 2017; Hartman-Maeir et al., 2003), seems to decrease but persist half a year after hospitalization (Geytenbeek et al., 2017), and is related to poorer community participation (Geytenbeek et al., 2017; Robertson & Schmitter-Edgecombe, 2015).

Aim of this study

The aim of this paper is to provide an addition to previous research on differences between self- and observer-rated capacity limitations on the one hand, and psychological capacity limitations in neurological conditions on the other. This would allow a better understanding of which psychological capacities might be limited in patients with neurological conditions and how they perceive

their limitations compared to observers. Thus, self- and observer ratings of capacity limitations will be compared in a sample of patients with neurological conditions.

Materials and methods

Design

The study is part of a larger project which examines psychological symptoms and capacity limitations in patients with neurological, orthopedic and cardiological conditions. It was conducted between April and October 2019, after approval from the Technische Universität Braunschweig's ethics commission.

Participants

Patients from the neurology department (phase 'D' – an in-patient follow-up treatment of patients who only need little nursing support in activities of their daily life) of the Brandenburgklinik Berlin-Brandenburg rehabilitation clinic were randomly assigned to the study by an external therapy coordinator, shortly after their arrival at the clinic. To take part in the study, the patients had to be of working age and have sufficient language skills to respond to the interview and questionnaire.

Measures

Capacity limitations in observer rating

The short rating of activities and participation in psychological disorders according to the ICF (Mini-ICF-APP) is a semi-structured observer rating instrument which measures the degree of limitation of the following psychological capacity dimensions: (1) adherence to regulations, (2) planning and structuring of tasks, (3) flexibility, (4) professional competency, (5) judgments, (6) endurance, (7) assertiveness, (8) contact with others, (9) group integration (10) intimate relationships, (11) spontaneous activities, (12) self-care and (13) mobility (Linden *et al.*, 2009; Linden, Baron, & Muschalla, 2015). It is based on the ICF (WHO, 2001). The limitation ratings were based on the information gathered during the interview, through self-reports and observations. For example, it was asked if others often noticed mistakes made by the patient (professional competency) or if the patient had problems with performing at work without additional breaks (endurance; Linden, Baron, Muschalla, *et al.*, 2015). With reference to a specific context (e.g., work), a trained member of the research team (observer) rated the capacity limitations using a Likert scale ranging from 0 = *no limitation* to 4 = *full limitation*.

The Mini-ICF-APP has a high inter-rater reliability ($r = .92$) for trained observers, correlates significantly with psychopathology and work ability measurements and is sensitive to change (Linden *et al.*, 2009; Linden, Baron, & Muschalla, 2015). The results of an international validity study showed a good inter-rater reliability (ICC = .89) and a high internal consistency (Cronbach's $\alpha = .87$; Molodynski *et al.*, 2013).

Capacity limitations in self-rating

The Mini-ICF-APP-S (Linden, Keller, *et al.*, 2018) is a self-rating instrument which is equivalent to the Mini-ICF-APP. The patient self-rates their perceived level of capacity limitation using a Likert scale ranging from 0 = *this is a strength of mine* to 7 = *I am completely unable to do this*. Cronbach's alphas ranging from .86 to .92 indicate a good internal consistency (Brenner, Köllner, & Bachem, 2019; Linden, Keller, *et al.*, 2018; Muschalla, 2020). Low ($r = .121$) to high ($r = .692^{***}$) correlations between the different capacity dimensions indicate that the Mini-ICF-APP-S includes separate capacities (data set; Linden, Keller, *et al.*, 2018). The Mini-ICF-APP-S has been found to

Table 1. Transformation of the Mini-ICF-APP-S Scale (Linden, Keller, et al., 2018) According to the Mini-ICF-APP Scale (Linden et al., 2009; Linden, Baron, & Muschalla, 2015; Linden, Baron, Muschalla, et al., 2015)

Mini-ICF-APP Scale	Mini-ICF-APP-S Scale
0: No limitations: The patient has no difficulties in performing the required activities and meets the standard expectations for the reference group.	0: This is a strength of mine. 1: I am better than many others. 2: I can do this well.
1: Mild limitation: The patient has slight difficulties in performing the required activities. No negative consequences can be observed.	3: This is somehow possible.
2: Moderate limitation: The patient has noticeable difficulties in performing the required activities. There are observable negative consequences for the patient or others.	4: This does not always work. 5: I have problems with this.
3: Severe limitation: The patient is not able to meet the role expectations for the most part. Partial assistance from others is required.	6: I need help in this regard.
4: Full limitation: The patient is not able to perform the required activities. Full takeover of tasks by others is required.	7: I am completely unable to do this.

be low ($r = .170$) to moderately ($r = .398^{***}$) correlated with a global symptom load (SCL-90-R GSI score; data set; Linden, Keller, et al., 2018). This shows that capacities are different from psychopathology.

Procedure

At the beginning of the assigned, one-hour appointments, the patients were given information material about the study and the procedure was explained to them. They were asked to sign a declaration of consent and a declaration of release from confidentiality to take part in the study. The interviews were conducted by members of the research team including a state-licensed psychotherapist and a psychotherapist in training. To reduce the risk of bias they had to undergo an extensive training prior to the start of this study. To assess the inter-rater reliability, 34 interviews were co-rated by the members of the research team. After the interview, the participants were asked to complete an anonymous questionnaire in a paper and pencil format, which included questions on their perceived capacity limitations. As the current research is part of a larger project, the interview and questionnaire also included questions on topics other than capacity limitations, such as the ability to work, psychological symptom load, participation restrictions and work requirements.

Statistical approach and analysis

Data preparation

In order to compare the self- and observer-rated capacity limitations, the Mini-ICF-APP-S scale was transformed according to the Mini-ICF-APP scale based on the alignment of values between both scales (see Table 1), as indicated by Muschalla, Rau, et al. (2017).

Internal consistency and inter-rater reliability

Cronbach's alphas were computed to test the internal consistency of the Mini-ICF-APP and the Mini-ICF-APP-S. The inter-rater reliability was assessed by computing Pearson correlations between the interviewer- and co-ratings for the overall Mini-ICF-APP score.

Statistical analysis

The paired-samples *t*-tests were conducted using SPSS (Version 25), in order to examine whether the self-ratings of neurological patients were significantly different to the observer ratings. Differences with $p < .05$ (two-tailed) were treated as being statistically significant. Cohen's *d* was calculated to determine the effect sizes. An effect size from 0.2 up to 0.5, indicates a small effect, an effect size between 0.5 and 0.8 indicates a medium effect and an effect size of 0.8 and higher, can be interpreted as a large effect (Cohen, 1992).

Results

Sample

$N = 328$ patients were interviewed in this study. 252 Mini-ICF-APP-S questionnaires were completed by the patients. Possible reasons for 76 patients not completing the questionnaire might include a lack of motivation, having forgotten about completing it, or an early departure from the rehabilitation clinic. Out of the $n = 252$ patients who completed the self-ratings, the data of $n = 6$ patients were excluded due to missing values in all sub scales of the Mini-ICF-APP-S and $n = 1$ was excluded due to missing values in all categories of the Mini-ICF-APP. The data of $N = 245$ patients were used for the analyses. The sample characteristics are presented in Table 2. The mean scores of observer-rated capacity limitations for the main subgroups of neurological conditions ($n_{\text{subgroup}} > 20$) are presented in Supplemental Table S1.

Internal consistency and inter-rater reliability

Cronbach's alphas for the observer- (Cronbach's $\alpha = .81$) and self-rating (Cronbach's $\alpha = .88$) scales indicate a good internal consistency. A good inter-rater reliability of the Mini-ICF-APP was shown by a large correlation between observer- and co-ratings, $r = .958$, $p < .001$.

Self- and observer ratings of capacity limitations in patients with neurological conditions

Table 3 shows the results of the statistical analysis. Overall, the average global capacity limitation in the self- ($M = 0.50$, $SD = 0.53$) and the observer rating ($M = 0.65$, $SD = 0.59$) indicates a mild limitation. A mild limitation means that the patient has problems with fulfilling specific requirements, which does not result in negative consequences or requires assistance from others (Linden, Baron, Muschalla, et al., 2015). However, the levels of limitation varied for the different capacity dimensions. According to the self-rating, the highest proportion of patients with moderate to full limitation was in the dimension of mobility (30.0%), whereas the lowest proportion was found in the category of adherence to regulations (7.4%). In the observer rating, the highest proportion of ratings indicating a moderate to full limitation, was found in the endurance dimension (62.6%), while the lowest proportion was discovered in the domain of self-care (11.5%).

Significant positive small to medium correlations were revealed between the self- and observer ratings across all domains of capacity limitation, while the correlation of the global scores can be interpreted as large. However, the paired-samples *t*-tests showed that in some capacity dimensions, the average level of limitation differed between the self- and observer ratings. On average, the patients rated their limitations significantly lower than the observers, in the capacity dimensions of adherence to regulations, planning and structuring of tasks, professional competency and endurance, $t(242) = -6.15$, $p < .001$, $d = 0.40$; $t(239) = -3.49$, $p < .001$, $d = 0.23$; $t(234) = -4.72$, $p < .001$, $d = 0.31$; $t(236) = -11.20$, $p < .001$, $d = 0.73$, respectively. The effect sizes of these significant differences indicate small to medium effects (Cohen, 1992). In contrast, the limitation of the capacity dimensions of contact with others and self-care were, on average, rated significantly more highly by the patients than the observers, $t(238) = 2.40$, $p = .017$, $d = 0.16$; $t(236) = 2.29$, $p = .023$, $d = 0.15$, respectively. However, the effects can be interpreted as marginal (Cohen,

Table 2. Sample Characteristics ($N = 245$)

Sample Characteristics	<i>n</i> (%)
Gender	
Male	132 (53.9)
Age, in years <i>M</i> (<i>SD</i>)	53.2 (10.4)
Education	
Vocational education	165 (67.3)
University degree	52 (21.2)
Master craftsman diploma	8 (3.3)
In training/education	4 (1.6)
No professional qualification	16 (6.5)
Work status	
Full-time position	116 (47.7)
Part-time position	34 (14.0)
Unemployed	42 (17.3)
Disability pension	21 (8.6)
Retirement pension	15 (6.2)
In education/training	7 (2.9)
Partial disability pension	5 (2.1)
Other work status	3 (1.2)
Disability pension	
Applied	10 (4.2)
Planned to apply	35 (14.8)
Disability status	
Approved	87 (35.7)
Applied or planned to apply	40 (16.4)
Applied for disability status to be changed to a higher level	8 (3.3)
Sick leave	215 (90.0)
Duration, in weeks <i>M</i> (<i>SD</i>)	11.5 (15.7)
Neurological condition	
Stroke	117 (47.8)
Multi organ failure or complex disorders involving different body systems	31 (12.7)
Critical illness polyneuropathy, migraine, headaches or nerve damage	25 (10.2)
Multiple sclerosis	23 (9.4)
Tumor	22 (9.0)
Skull fracture or traumatic brain injury	8 (3.3)
Aneurysm or transient ischemic attack	8 (3.3)
Epilepsy or Parkinson's disease	6 (2.4)
Long-term brain damage after trauma or alcohol abuse	5 (2.0)

Table 3. Comparison of Mean Scores of Self- and Observer-Rated Capacity Limitations in Patients with Neurological Conditions ($N = 245$)^a

Capacity	Self-rating M (SD) [rank; % ≥ 2]	Observer rating M (SD) [rank; % ≥ 2]	t	Cohen's d	Pearson r
Adherence to regulations ($n = 242$)	0.24 (0.63) [1; 7.4]	0.68 (1.14) [10; 20.9]	-6.148***	0.395	.304***
Planning and structuring of tasks ($n = 239$)	0.36 (0.72) [5; 13.1]	0.58 (1.03) [8; 17.8]	-3.493***	0.226	.421***
Flexibility ($n = 234$)	0.63 (0.88) [11; 19.1]	0.73 (1.11) [12; 25.3]	-1.319	0.086	.358***
Professional competency ($n = 234$)	0.26 (0.66) [2; 7.9]	0.56 (1.07) [7; 18.4]	-4.718***	0.308	.433***
Judgments ($n = 237$)	0.34 (0.73) [4; 10.5]	0.45 (0.98) [5; 13.6]	-1.691	0.110	.289***
Endurance ($n = 236$)	0.78 (1.05) [13; 25.6]	2.00 (1.52) [13; 62.6]	-11.199***	0.729	.197**
Assertiveness ($n = 237$)	0.59 (0.89) [8; 20.5]	0.55 (1.11) [6; 17.7]	0.604	0.039	.310***
Contact with others ($n = 238$)	0.59 (0.95) [8; 21.4]	0.43 (0.91) [4; 13.1]	2.397*	0.155	.425***
Group integration ($n = 238$)	0.38 (0.72) [6; 10.4]	0.42 (0.87) [3; 14.0]	-0.536	0.035	.270***
Intimate relationships ($n = 237$)	0.28 (0.65) [3; 9.9]	0.36 (0.85) [2; 12.5]	-1.454	0.094	.309***
Spontaneous activities ($n = 240$)	0.60 (0.86) [10; 19.9]	0.68 (1.11) [10; 19.4]	-1.111	0.072	.395***
Self-care ($n = 236$)	0.49 (0.80) [7; 16.8]	0.33 (0.83) [1; 11.5]	2.293*	0.149	.168*
Mobility ($n = 176$)	0.77 (1.06) [12; 30.0]	0.60 (1.07) [9; 21.9]	1.912	0.144	.378***
Global score ($n = 245$); range	0.50 (0.53); 0.00–2.54	0.65 (0.59); 0.00–3.00	-4.544***	0.290	.571***

^aData of $n = 0-69$ was excluded from analyses due to missing values.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

1992). No significant differences in limitation were found between the self- and observer ratings for the other capacity domains.

Discussion

The aim of this study was to compare self- and observer ratings of psychological capacity limitations in patients with neurological conditions. It provides an addition to previous research on differences between self- and observer-rated capacity limitations on the one hand, and capacity limitations in neurological conditions on the other.

Self- and observer ratings of capacity limitations in patients with neurological conditions

Overall, the sample of patients with neurological conditions showed only mild limitations in their capacities, on average. Only the capacity dimension *endurance* received an average rating of moderately limited from the observer. This was to be expected, given that the setting was the phase 'D' department of a rehabilitation clinic, which generally treats patients with less severe levels of disease and disability than acute clinics (DRV, 2010). The results of the observer ratings revealed that on average, patients with neurological conditions showed the highest levels of limitation in the areas of endurance and flexibility, while the lowest levels of limitation were in the areas of

self-care and intimate relationships. This is in accordance with previous findings in populations with psychological disorders (e.g., Linden, Deck, et al., 2018; Muschalla, Poguntke, et al., 2019). On average, the highest levels of limitation in the self-rating were in the categories of endurance, mobility and flexibility, while the lowest mean level was revealed for the adherence to regulations category, which is similar to previous findings (Linden, Keller, et al., 2018).

No substantial differences between the self- and observer ratings were revealed for some of the Mini-ICF-APP domains. Thus, the patients and the observers appear to be in general agreement concerning the level of limitation in those capacity dimensions. Higher scores for self-rated, compared to observer-rated, limitations were only revealed in two domains. However, due to the marginal effect sizes, the differences revealed are not considered meaningful. The opposite results were shown for the capacity dimensions of adherence to regulations, planning and structuring of tasks, professional competency and endurance. In those categories, the self-rated scores for limitations were significantly lower than the observer ratings. The results are therefore not in accordance with earlier empirical findings which had revealed higher scores for participation restrictions or psychopathology, from self-ratings, in comparison to observer ratings (e.g., Carter et al., 2010; Linden, Deck, et al., 2018). Instead, the results seem to accord, in part, with research showing that patients with neurological conditions tend to underestimate their functional impairment and capacity limitation, possibly due to impaired self-awareness, denial of disability as a coping mechanism or attribution errors (e.g., Bruce & Arnett, 2004; Carone et al., 2005; Fischer et al., 2004; Hartman-Maeir et al., 2003; Katz et al., 2002; Prigatano, 1996). Some of the previous findings indicated that these phenomena may occur primarily in patients with moderate or severe levels of disease (Prigatano & Sherer, 2020; Prigatano, 1996). However, another study showed that an impaired self-awareness can also be observed in mild disease cases (Geytenbeek et al., 2017). This study included patients in rehabilitation phase 'D', who generally show less severe levels of disease and milder impairments (DRV, 2010). Therefore, the current results suggest that despite not being present in all capacity dimensions, the underestimation of limitations might be a phenomenon which also occurs in patients with less severe neurological conditions.

Other explanations for lower self- than observer ratings, could include a different understanding of the capacity dimensions or different reference contexts, such as patients comparing their current capacity limitations to those during more severe stages of their neurological condition.

Practical and theoretical implications

In clinical practice, limitations in each capacity dimension as well as discrepancies in patient- and clinician-ratings should be thoroughly assessed. This is important for assessing participation restrictions (e.g., concerning work ability) as well as in the treatment process (Muschalla, 2020), for example to target the limited capacities in patients with neurological conditions and adjust therapy to the patient's level of self-awareness (following the neurological condition). The Mini-ICF-APP and the Mini-ICF-APP-S have been developed in the context of psychological disorders (Linden et al., 2009; Linden, Baron, & Muschalla, 2015). As the results of this study suggest that psychological capacity limitations also occur in samples with neurological conditions, the Mini-ICF-APP self- and observer ratings can also be used for assessing capacity limitations in patients with neurological conditions. They might reveal differences in self- and observer ratings which can help to address impaired self-awareness or denial and enhance collaborative relationships (in the sense of therapeutic alliances; Bordin, 1979) between the clinicians and patients. Schönberger, Humle, and Teasdale (2006) indicated a possible link between self-awareness in patients with brain injury and collaborative patient-clinician partnerships.

The results also highlight the need for developing interventions targeting the impaired awareness of capacity limitations. There have already been different approaches and proposals to enhance self-awareness in patients with brain injury, including metacognitive interventions and direct feedback (Tate et al., 2014). For example, Copley, Smith, Finch, Fleming, and

Cornwell (2020) assessed if a metacognitive treatment increased self-awareness in patients with acquired brain injury who were diagnosed with cognitive-communication disorders. They revealed that the intervention is associated with enhancements in self-awareness, for example concerning the ability to recognize consequences of the deficits for the patients' everyday life. Future intervention research should try to improve awareness of capacity limitations and their compensation (in the sense of the SOC model for selection, optimization and compensation; Baltes & Baltes, 1990) in patients with neurological conditions.

Limitations

The sample in this study only included patients who were in rehabilitation phase 'D'. This sample is particularly suitable to examine capacity limitations, as participating in or returning to work and social life becomes relevant from that stage on (DRV, 2010). However, the results cannot be generalized concerning patients with more severe levels of disease or limitations. Furthermore, all the participants in this study were recruited from a single rehabilitation clinic. Future studies should examine capacity limitations by recruiting patients from different rehabilitation clinics.

The Mini-ICF-APP-S scale was transformed according to the Mini-ICF-APP scale based on the content-related conformity of both scales. Further research is required for the self-rating version, for example representative studies in order to gain norm data for self-rated capacity levels of the general population.

Conclusion

Psychological capacity limitations occur not only in patients with psychological but also, similarly, in patients with neurological conditions. While the self- and observer ratings show similarities for some of the capacity limitation dimensions, indicating that the patients and observers are in general agreement, some variability was recorded between the patient- and observer ratings regarding the levels of limitation in other capacity dimensions. Hence, while capacity limitations in the context of socio-medical assessments need to be evaluated by experts (as also indicated by Linden, Keller, et al., 2018), it is beneficial to include self-ratings in the clinical context as a valuable source of information regarding the patients' awareness of limitations. This is especially relevant in those patients with neurological conditions who underestimate or deny their disability. Including both types of capacity limitation ratings in the clinical context might also contribute to establish and improve collaborative partnerships between the clinicians and patients and may also serve as a basis for intervention efforts, such as awareness trainings targeting capacity limitations. The Mini-ICF-APP and Mini-ICF-APP-S can be used to assess capacity limitations in patients with neurological conditions.

Supplementary materials. For supplementary material for this article, please visit <https://doi.org/10.1017/BrImp.2022.26>

Data availability. Data are available from the corresponding author upon request.

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