

NETHERLANDS
JOURNAL OF
PSYCHOLOGY

VOLUME 66, NUMBER 4, DECEMBER 2011

Feeding problems in young children

The Dutch translation of the PRMQ

Volume 66/number 4/December 2011 Netherlands Journal of Psychology

Editorial Policy

The *Netherlands Journal of Psychology* publishes original articles of high quality, including empirical articles, review essays on selected books, theoretical and methodological papers in any area of psychology, as well as ongoing commentaries and discussion, and short reports on the validation of psychodiagnostic instruments and related methodological tools.

The *journal's* focus is on empirical and conceptual studies that contribute to the theoretical explanation of human behaviour and experience. Manuscripts can deal with human development, social processes and the social perspective of human behaviour, psychopathology, forensic psychology and psychiatry neuroscience, psychophysiology, philosophy of mind, the computational approach, emotion, cognition (including attention, perception, and memory), decision-making, human performance, educational psychology, health, selection and assessment and human behaviour in organisations, selection and assessment. Any other manuscripts that may be of importance to those involved with psychological research are welcomed. Manuscripts should be written to the professional and academic readership.

It is the *Netherlands Journal of Psychology's* policy to publish about recent developments in psychology and related fields. It is also the editors' policy to regularly focus on recent developments in psychology in the Netherlands. In particular, authors may be invited to contribute to special issues.

The *Netherlands Journal of Psychology* will help to focus the interest of psychologists, and others professionally interested in the field, on information about developments in a wide area of specialists research activities and results of empirical and theoretical work in the field of psychology.

The *Netherlands Journal of Psychology* offers specialists the opportunity to publish their findings to a broad audience that is scientifically interested in psychology.

The *Netherlands Journal of Psychology* aims at offering a continuous forum for intellectual discussion and transfer of knowledge and information about developments in psychology.

Categories of articles to be published and manuscripts to be welcomed are:

Review articles

Manuscripts should be limited to a maximum of 8000 words. Authors planning contributions that exceed this maximum must contact the editor prior to submitting their manuscript.

Original reports of empirical research

Manuscripts should be limited to a maximum of 5000 words. Authors planning contributions that exceed this maximum must contact the editor prior to submitting their manuscript.

Thematic issues

Authors with plans for planning a thematic issue are encouraged to contact the editor in an early stage. Consultation will be necessary about number of manuscripts, number of words per manuscript, review procedure, covering of the field, etc.

Developments in the field (short)

Manuscripts should be limited to a maximum of 1000 words. Authors planning contributions that exceed this maximum must contact the editor prior to submitting their manuscript.

Book review essays (short)

Manuscripts with a maximum of 1000 words need no preliminary contact with the editor. Authors planning larger contributions must contact the editor.

Letters to the editor

Manuscripts should be limited to a maximum of 500 words. Authors planning contributions that exceed this maximum must contact the editor prior to submitting their manuscript.

Technical notes

Manuscripts should be limited to a maximum of 2000 words. Authors planning contributions that exceed this maximum must contact the editor prior to submitting their manuscript. Authors reporting (in English) on, e.g. validation, of tests and other instruments in the Dutch language or in the Netherlands are encouraged to report in *The Netherlands Journal of Psychology*. The editors want to inform non-Dutch researchers of developments and of the use of instruments in the Dutch language.

Editor

René van Hezewijk
Open University of the Netherlands

Associate editors

Frederik Anseel *Ghent University*
Arjan Bos *Maastricht University*
Maaike Cima *Tilburg University*
Paul van Geert *University of Groningen*
Annemarie Zand Scholten *University of Amsterdam*

Editorial board

O. van den Berg *University of Leuven*
N. Elleemers *Leiden University*
E. de Haan *University of Amsterdam*
J. van Heerden *Maastricht University*
M. van den Hout *Utrecht University*
J. Jolles *Maastricht University*
W. Koops *Utrecht University*
W. Schaufeli *Utrecht University*
R. Schreuder *Radboud University Nijmegen*
H.J. Stam *University of Calgary*

Editor's address

Professor René van Hezewijk
Faculty of Psychology, Open University of the Netherlands, PO Box 2960,
6401 DL Heerlen, the Netherlands
tel + 31 45 576 23 99
All correspondence by e-mail: rene.vanhezewijk@ou.nl

Publisher: Wil Zeegers, Nederlands Instituut van Psychologen,
PO Box 2085, 3500 GB Utrecht, the Netherlands,
E-mail: wil.zeegers@psynip.nl

Subscription rates

Personal rate: € 125.–
Institutional rate: € 226.–
Student rate: € 62.50
All prices are per calendar year and include value added tax (VAT)
Price per issue: € 31.95 (incl. VAT)

Subscription administration

Performis Media, PO Box 2396, 5202 CJ 's Hertogenbosch, the Netherlands, tel:
+ 31 73 689 58 89. For information and orders, please consult www.performis.nl

Change of address

Please notify any changes in addressee and/or address via
www.performis.nl.

Payment

Please use the payment/accept giro form if possible as this simplifies the administrative process.

Advertisements

Performis Media, PO Box 2396, 5202 CJ 's Hertogenbosch,
the Netherlands, tel: + 31 73 689 58 89.

The *Netherlands Journal of Psychology* is published four times a year.

© Nederlands Instituut van Psychologen 2011
ISSN 1872-552x

Contents

VOLUME 66, NUMBER 4, DECEMBER 2011

Towards the development of a Dutch screening instrument for the detection of feeding problems in young children Marijn van Dijk, Marieke E. Timmerman, Chantal Martel and Maria Ramsay	112
---	-----

The Prospective Retrospective Memory Questionnaire: Psychometric properties and normative data of a Dutch translation Sieberen P. van der Werf and Sandra Vos	120
--	-----

Towards the development of a Dutch screening instrument for the detection of feeding problems in young children

Feeding problems are common in young children and have clear negative consequences. Recently, Ramsay, Martel, Porporino and Zygmuntowicz (2011) developed the Montreal Children's Hospital Feeding Scale for a rapid identification of feeding problems. This study aims at analysing the psychometric properties of the Dutch translation of this instrument (Screeningslijst Eetgedrag Peuters, or SEP). A normative sample of 1448 Dutch caretakers of children (aged 6 months to 4 years, $M = 103.3$ weeks, $SD = 58.6$ weeks) participated in the study by completing the SEP and relevant background questions. The results of the psychometric analyses provide support for the SEP. Furthermore, clear differences were found between the scores of parents who had sought help for feeding difficulties and those who had not. There was an increase in difficulties with the child's age. Further research aims at providing standardised norms for the Dutch population and to make these available for professionals working with this group.

Where: Netherlands Journal of Psychology, Volume 66, 112-119

Received 21 September 2011; Accepted 23 November 2011

Keywords: Feeding difficulties; Feeding problems; Feeding behaviour; Child; Infant; Screening instrument; Assessment; Symptoms

Authors: Marijn van Dijk*, Marieke E. Timmerman**, Chantal Martel*** and Maria Ramsay***

* Department of Developmental Psychology, University of Groningen, the Netherlands,

** Psychometrics and Statistics, University of Groningen, the Netherlands
*** The Montreal Children's Hospital/McGill University Health Centre, Montreal, Canada

Correspondence to: Marijn van Dijk, Department of Developmental Psychology, University of Groningen, the Netherlands
E-mail: m.w.g.van.dijk@rug.nl

Most popular parenting books dedicate at least one chapter to feeding difficulties in early childhood and how to deal with them as a caretaker. This is no surprise considering the fact that feeding problems are very common among young children. Drinking and eating are primary needs in life, and not being able to provide a healthy intake pattern to a child can be a frustrating experience for parents (Van den Engel-Hoek, 2006). Estimations in the literature suggest that 10% to 33% of all parents report problems when feeding their infant or child (Lindberg, Bohlin, & Hagekull, 1991; McDermott, Mamun, Najman, Williams, O'Callaghan, & Bor, 2008; Reau, Senturia, Lebailly, & Christoffel, 1996). Severe problems are reported to exist in 3-10% of all children (Corbett & Drewett, 2004; Ramsay, Martel, Porporino, & Zygmuntowicz, 2011). As there is no universally accepted definition for feeding

problems, different terms have been used by authors to describe the overt behaviours (or symptoms) of feeding problems. Overt behaviours that are most frequently described are food refusal (Lindberg et al., 1991), irregular eating (McDermot et al., 2008), non-compliance during mealtime (Sanders, Patel, Le Grice, & Shepherd, 1993) and 'mealtime negativity' (Johnson & Harris, 2004). Although some feeding problems are mild and transient, there is a striking continuity in early feeding difficulties and difficulties later on in childhood and even adolescence (McDermott et al., 2008; Marchi & Cohen, 1990; Dahl & Sundelin, 1992). Feeding problems have a clear negative impact on the development of the child, ranging from increased parenting difficulties and mealtime stress to poor growth and delayed cognitive development (Lindberg, Bohlin, Hagekull, & Thunstrom, 1994).

Factors contributing to feeding problems in young children

Today, feeding problems in early childhood are explained by a ‘biopsychosocial’ model, meaning that they are considered to be the result of a complex interplay between physiological and psychosocial factors (Johnson & Harris, 2004; Rommel, De Meyer, Feenstra, & Veereman-Wauters, 2003). Food refusal – which is one of the main symptoms – is conceived to be a complex feeding problem in which many interacting factors are involved (Williams, Field, & Seiverling, 2010). Physiological factors contributing to feeding difficulties may be skill based (oral sensory-motor) and/or motivation based (inherent or acquired). These influence the feeding interactions between parent and child negatively, which results in stress. As a result, parents feel the need to pressure their child to eat more, which may subsequently lead to an exacerbation of the feeding problems (e.g. Rommel et al., 2003; Lindberg, Bohlin, & Hagekull, 1991; Field, Garland, & Williams, 2003; Ramsay et al., 2011). The interactions described above illustrate how negative patterns can develop over time and create a vicious cycle that is difficult for parents and children to break. In a previous publication (Van Dijk, Hunnius, & Van Geert, 2009), we argued that feeding can be described as a process of co-regulation of consensual frames (Fogel, 1993). Various vulnerabilities may influence the quality of this co-regulation process. These vulnerabilities may consist of biological preconditions such as illness, low appetite, oral sensory motor difficulties (Ramsay, Gisel, & Boutry, 1993; Wright & Birks, 2000; Field et al., 2003), and temperament (Pliner & Loewen, 1997) but may also consist of psychological variables such as on-going poor mother-child relationships (Feldman, Keren, Gross-Rozval, & Tyano, 2004) and familial eating problems (Stapleton, Fielder & Kirkham, 2008). In addition, medical factors such as prematurity (Burklow, McGrath, Valerius, & Rudolph, 2002; Samara, Johnson, Lamberts, Marlow, & Wolke, 2010) have been shown to play an important role in the development of feeding problems.

Early detection of feeding problems

Because of the prevalence and negative consequences of feeding problems in young children, clinicians working with the parents of these children need access to a valid and reliable screening instrument that can quickly verify parental complaints about their child’s feeding difficulties (Ramsay et al., pp. 148). This will ensure early referrals to specialists. Although the literature provides several reliable and valid instruments, none of them are suited for a quick identification of these problems in a clinical setting. Most recent

scales, such as the *Children’s Eating Behaviour Inventory* (Archer, Rosenbaum, & Streiner, 1991), the *Behavioral Pediatrics Feeding Assessment Scale* (Crist, McDonnell, Beck, Gillespie, Barrett, & Mathews, 1994) and the *Children’s Eating Behavior Questionnaire* (Wardle, Guthrie, Sanderson, & Rapoport, 2001), consist of a few dozen items (between 35 and 40 each) and work with different subscales. As a result, they are more suitable for scientific than for clinical purposes. There are also several clinical scales available in the field of the speech-language pathology, such as the *Pre Speech Assessment Scale* (Morris, 1982), the *Oral-Motor and Feeding Assessment Inventory* (Herman, 1991), the *Neonatal Oral-Motor Assessment Scale* (Palmer, Crawley, & Blanco, 1993), and the *Observation Scale Oral-Sensory Feeding Disorders* (Palmer & Heymans, 1993). However, these instruments are often qualitative and extensive in nature, and clinicians may need additional training before they can be used properly. For this reason, Ramsay et al. (2011) developed the *Montreal Children’s Hospital Feeding Scale* (MCH-FS) as an easily administrable scale with its primary aim to quickly identify feeding problems during a short consultation session. The scale is based on the conceptualisation that causes of feeding difficulties are skill based and these physiological factors alter mealtime behaviours.

The MCH-FS consists of 14 items on overt symptoms of feeding problems in the following domains: oral sensory/motor symptoms, appetite, parental concerns, mealtime behaviours, compensatory strategies and family reactions. The primary feeder is asked to rate each of the 14 items on a seven-point Likert scale. The scale has explicit anchor points on either side, but no labels for values between 2 and 6 (for instance, item 2 ‘How worried are you about your child’s eating?’ goes from ‘not worried’ at value 1 to ‘very worried’ at value 7). In roughly 10 minutes the clinician can get an impression of the severity of the symptoms by mirroring the responses to half of the items, summing up the total score and comparing it with a norm table.

The validity and reliability were tested by the original developers in a sample of 372 children aged 0;6 to 6;11 years (as reported in Ramsay et al., 2011), consisting of a clinical sample of 174 (children visiting the feeding clinic of the Montreal Children’s Hospital) and a control sample of 198 (recruited from community paediatricians’ offices). Clear differences were shown to exist between the two groups ($M = 60.43 / SD = 13.06$ versus $M = 32.65 / SD = 12.73$). Test-retest reliability (the interval between the two administrations was 7-10 days) was also good ($r = .92$ for the clinical sample and $.85$ for non-clinical sample). A factor analysis

(principal component analysis (PCA)) revealed one single factor that accounted for 48% of the variance, suggesting that the total score can be used as a measure of feeding problems. The results indicated that children in the clinical group display the same feeding behaviours as reported by the MCH-FS as children in the control group but at a higher frequency or severity.

In order to see whether a Dutch screening list can be developed based on the MCH-FS, a cross-sectional pilot study was carried out among 355 children from the normal population (174 boys and 181 girls, aged 6 months to 6 years¹). We conducted this small study in collaboration with the original developers. The scale was translated into Dutch and renamed the *Screeninglijst Eetgedrag Peuters* (short: SEP, translated as Screening List Eating Behavior Toddlers). The results showed a reasonable reliability for the Dutch version of the scale ($\alpha = .82$) (Van Dijk, Laansma, & Stevens, 2010). The mean total score was 28.49 ($SD = 9.89$), which is lower than in the Canadian sample. In contrast to the study of the original developers, the Dutch pilot showed that – on average – caretakers of older children reported somewhat more feeding problems ($t(348) = -5.30; p < .01$) than those of younger children. Furthermore, unlike in the Canadian sample where one single factor accounted for 48% of the variance, our sample exploratory factor analysis (PCA) suggested two underlying factors that correspond well in 12 of 14 items of the MCH-FS (explaining 43% of the variance in total). These results call for further research before constructing norms for the Dutch population.

Aim

The present study aims at analysing the psychometric properties of the SEP on a large normative sample from the Dutch population. The original developers of the scale have included items that cover seven domains of symptoms (with some overlap between domains). These are: oral motor, oral sensory, appetite, parental concerns about feeding, mealtime behaviours, compensatory strategies used and family reactions to their child's feeding. Whereas the Canadian data showed evidence for the existence of a single general underlying factor, the Dutch pilot study suggested a two-factor solution. In the present study, we first evaluate the psychometric properties of the SEP. That is, we examine how many meaningful factors can be differentiated in a large normative sample, and to what degree these correspond with the theoretical domains that were described. We also consider the quality of the individual items, and the reliability of the total (sub)scale(s). Further, we consider the important question whether the SEP is able to differentiate between scores of

parents who have sought help for feeding difficulties and those who have not. If the scale has any potential as a screening instrument in clinical settings, it should be able to detect differences between these two groups.

Finally, we address the empirical question whether the total scores reflect age differences. Whereas the normative study of Ramsay and co-authors (2011) did not show significant differences between age groups, small but significant differences were found in the Dutch pilot study (toddlers and preschoolers had higher scores compared with infants). This is in line with the suggestion that parents of toddlers report a higher incidence of feeding problems because this age group often shows a fear of new foods and oppositional behaviour (Wright, Parkinson, Shipton, & Drewett, 2007, pp. e1017). It is the aim of the present study to analyse these possible age differences in greater detail.

Research questions

1. What are the psychometric properties of the SEP?
2. Does the SEP differentiate between parents who seek help and those who do not?
3. Are there age-related differences in the SEP scores?

Method

Participants

A normative sample of 1448 caretakers of children living in the province of Groningen, the Netherlands, ((sub)urban and rural area) participated in the study when visiting the local Child Health Centre (*Consultatiebureau*) for a routine check-up. Children were all aged between 6 months and 4 years (mean age = 103.3 weeks, $SD = 58.6$ weeks). The sample consisted of 724 boys and 718 girls (in 6 cases, 'gender' was left blank).

Material

The questionnaire consisted of the *Screeninglijst Eetgedrag Peuters* (SEP), the Dutch translation of the *MCH-FS* (2011). In addition, the mothers were given a background questionnaire (including the age of the child, gender, city of residence, current weight and length, birth history and weight, and whether the family had sought professional advice in relation to the feeding of the child).

Procedure

In collaboration with the *Gemeentelijke Gezondheidsdienst Groningen* (the regional healthcare institution also responsible for the execution of the national vaccination program), 10,000 questionnaires were distributed among all parents who visited their local Child Health Centre in the first three months of 2011. Caretakers were also given a flyer explaining the aim of the study and

¹ A relatively large proportion (49.6%) of this sample consisted of 9-month-old infants, because it was collected within another study on observed oral hypersensitivity in infants.

stating that participation was on a voluntary basis. The entire questionnaire was filled in anonymously and sent back to the Department of Developmental Psychology of the University of Groningen by means of a postage-free envelope. Parents could either fill in the questionnaire while they were waiting for their appointment, put it in the envelope and give it back to the assistant of the Child Health Centre, or take it home and send it back later. A total of 1621 were completed and returned, resulting in a response rate of roughly 16%. After removal of incomplete SEPs, the sample size was 1448. All questionnaires were entered manually in SPSS version 18 (IBM SPSS,

2009) with the help of bachelor/master students. Items 1, 3, 4, 8, 10, 12 and 13 were mirrored prior to obtaining the total scores. Data analyses consisted of descriptive analysis, factor analyses and analyses of variance.

Results

Scale description

Though there were clear differences between items, the average scores were relatively low (ranging between 1.47 and 3.12, where the scale goes from 1 to 7 for all items, see Table 1), and were consistent with the Canadian normative item scores. Descriptive analyses also show that the distribution of scores was clearly right skewed, not only for the total score, but also for all individual item scores.

Because of the skewed distributions of the responses on the items, we used a common factor analysis based on polychoric correlations, herewith taking into account the polytomous character of the items (e.g., Muthén & Kaplan, 1985). Specifically, we performed a minimum rank factor analysis (MRFA; Ten Berge & Kiers, 1991). To assess the number of factors, we performed a polychoric parallel analysis with a 95% boundary (PA). We considered both a PA based on MRFA and on PCA. The latter is the classical variant of parallel analysis (Horn, 1965). Those two methods performed best to indicate the number of common factors underlying polytomous items (Timmerman & Lorenzo-Seva, 2011). The factor loadings were obliquely rotated using the Promin criterion. The analyses were performed with the FACTOR program (Lorenzo-Seva & Ferrando, 2006).

The two PAs yielded inconclusive results: the PA based on MRFA indicated one factor, and PA based on PCA two factors. The common factor model with one and two factors accounted for 79% and 90% of the common variance, respectively. The Promin rotated loadings yielded an interpretable solution, which can be found in Table 2 (note that the items are reordered in such a way that 'comparable items' are clustered). The correlation between both factors is high, namely .69.

As can be deduced from Table 2, the first factor clusters behaviours that concern *Negative mealtime behaviours* (such as 'difficult meals' and 'starting to refuse food in the beginning of the meal'). The second factor covers a broader range of symptoms that are *Negative causes and consequences* of feeding difficulties (e.g. oral motor and sensory symptoms, concerns and family reactions). Two of the three items on compensatory strategies load substantially (around .35) on both factors.

Table 1 Means and skewness of individual items

Items	Mean	Skewness
1 ('difficult mealtimes')	2.43	0.97
2 ('worries about feeding')	1.95	1.61
3 ('poor appetite')	3.12	0.32
4 ('start refusing food')	3.03	0.69
5 ('long mealtimes')	2.64	1.72
6 ('bad behaviour at table')	2.44	0.87
7 ('gags/spits/vomits')	1.78	1.89
8 ('holding food in mouth')	1.90	1.97
9 ('follow around/distract')	2.05	1.54
10 ('force to eat')	1.98	1.52
11 ('poor chewing abilities')	1.65	2.01
12 ('poor growth')	1.51	2.61
13 ('influence relation')	1.47	2.28
14 ('influence family relations')	1.68	2.30
Average	2.10	1.80

Table 2 Promin rotated factor loadings in the individual items of the SEP; loadings higher than 0.30 in absolute value are in bold face

Item	Construct	Factor 1	Factor 2
7 ('gags/spits/vomits')	Oral sensory	.08	.71
8 ('holding food in mouth')	Oral motor, oral sensory, mealtime behaviour	.07	.59
11 ('poor chewing abilities')	Oral motor	.21	.82
3 ('poor appetite')	Appetite	-.41	-.01
4 ('start refusing food')	Appetite	-.78	-.22
1 ('difficult mealtimes')	Parental concern	-.75	-.02
2 ('worries about feeding')	Parental concern	-.28	.46
12 ('poor growth')	Parental concern	-.07	.70
6 ('bad behaviour at table')	Mealtime behaviour	-.68	.02
5 ('long mealtimes')	Compensatory strategies	-.15	.19
9 ('follow around/distract')	Compensatory strategies	-.34	.36
10 ('force to eat')	Compensatory strategies	-.45	.33
13 ('influence relation')	Family reactions	-.15	.68
14 ('influence family relations')	Family reactions	-.25	.55

This implies that parents who are reporting those compensatory strategies are also reporting high on *Negative mealtime behaviours* and on *Negative causes and consequences*. One item on compensatory strategies (item 5) does not fit with the factors in this solution.

This factor solution suggests that the primary distinction in feeding problems reported among parents is made on the basis of a single factor. Thus, in our community sample, the severity of feeding problems reported by parents can be indicated on a single scale. The reliability of the total score – which we denote as the SEP score – is .84 (Cronbach’s alpha). However, if a more specific evaluation of the reported feeding problems is desired, a two-scale approach would be more appropriate in order to distinguish between *Negative mealtime behaviours* on the one hand, and *Negative causes and consequences* on the other hand. In our sample, their reliabilities appear adequate (Cronbach’s alphas .82 and .75, respectively). In what follows, we focus on the SEP as a measure of severity of feeding problems.

Group differences in SEP scores

In total, 107 (7.4%) caretakers indicated that they had sought help for the experienced feeding difficulties. This ranged from seeking advice from the nurse of the Child Health Centre (roughly 36%²), primary care physician (roughly 7%) or paediatrician (roughly 17%), to referrals to a dietician (roughly 19%), speech language pathologist (roughly 2%), or help from multiple sources and/or multidisciplinary help (roughly 17% in total).

Table 3 indicates that the mean total score of the ‘sought help’ group was higher than that of the group where the parents indicated that they have never sought help for feeding difficulties, with the ‘sought help’ group having a much larger standard deviation.

Table 3 further indicates that with regard to the

Table 3 The mean total score for the ‘sought help’ and for the ‘never sought help’ groups

Groups	M	SD	N
Help			
Sought help	38.67	14.47	107
Never sought help	28.83	9.48	1337*
Age groups			
0;6 - 1;0 yrs	25.69	8.2	408
1;0 - 2;0 yrs	27.79	9.2	425
2;0 - 3;0 yrs	32.53	10.8	240
3;0 - 4;0 yrs	33.82	10.9	375
Total	29.54	10.3	1448

* There were 4 missing values

2 Not all parents specified the type of help, the percentages are based on those who did (n = 90).

3 Non-parametric analyses (Wilcoxon Mann-Whitney and Kruskal-Wallis tests) also showed the significant differences between groups.

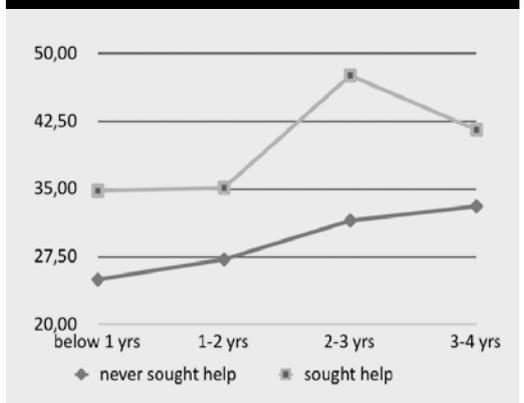
second variable of interest, the means and standard deviations increase with age, suggesting that feeding difficulties are more frequent in older children and the older the children are the greater the inter-individual differences among them.

A two-way ANOVA³ – with ‘age groups’ and ‘sought help’ as independent variables – revealed a main effect for both variables ($F(1,7) = 52.407$; $p < .01$). The effect of age on the total SEP score was relatively small (partial eta-squared = .04) and the effect of ‘sought help’ was medium sized (partial eta-squared = 0.08). There was a very small but significant interaction effect (partial eta-squared = .01).

Figure 1 shows the mean SEP scores for the ‘sought help’ and ‘never sought help’ groups by age. Both groups display an increase in mean SEP scores with the age of the child. The means of the ‘sought help’ group are higher than that of the ‘never sought help’ group, with the ‘sought help’ group ‘spiking’ between 2 and 3 years of age.

Finally, no differences were found between boys and girls ($t = -0.357$; $p = .941$).

Figure 1 Mean feeding problems of the four age groups by parents who have sought help for feeding difficulties and parents who have not



Discussion

Summary of results

The results of the psychometric evaluation of the SEP with a large-scale normative sample provide support for using the screening tool for detecting feeding problems. Cronbach’s alphas for the SEP scale and the two subscales were satisfactory, suggesting a robust internal consistency. Evidence was found for a meaningful latent variable structure with two factors: 1) *Negative mealtime behaviours* and 2) *Negative causes and consequences*. However, the high correlation between these two factors might suggest that a one-factor solution can be used when the primary goal is the rapid identification of feeding difficulties. For a more detailed analysis, a two-scale analysis might provide more information.

The results also suggest that item 5 ('how long do mealtimes take for your child?') is statistically weak; it does not belong to any of the two factors and has a very low item-total correlation. Further research is needed before deciding on the final set of items for screening and clinical purposes.

The results from this large Dutch sample show clear differences between those parents who had sought help for feeding difficulties and those who had not. Although the degree of 'help' was very heterogeneous (from seeking advice from a nurse on a single occasion to participating in a multidisciplinary therapeutic intervention), the differences were robust for all age groups, suggesting at least some degree of sensitivity. An interesting observation was that the 'sought help' group showed the highest mean scores between 2 and 3 years of age, and a somewhat lower score between age 3 and 4. It might be speculated that this decrease is due to the fact that parents indeed received help, which diminished the problems they experienced. Further research targeting clinical groups is the next necessary step to shed light on these properties.

The mean total score found in this study is somewhat lower than the one reported by the Canadian team (29.54 vs. 32.65⁴). However, given that the age range in the present sample was smaller (from 6 months to 4;0 years) than in the Canadian sample (from 6 months to 6;11 years, with 22% of the normative sample over 4 years of age), the total mean was indeed comparable with the Canadian mean. Although one might interpret these results that fewer Dutch children than Canadian children have feeding problems, such interpretations would need further research.

There was a small but significant and consistent increase in reported feeding difficulties with the increasing age of the child. These results reflect the Canadian trend of higher mean total scores for older children; however their mean total scores for age differences were not significant. Given that our sample size was much larger, similar small differences resulted in statistical significance. The range of scores also increased with each age group, indicating that inter-individual differences also increase over time. It has been argued before that feeding problems have the tendency to exacerbate due to the complex interactions between physical, psychological and social factors (e.g. Rommel et al., 2003; Lindberg, Bohlin & Hagekull, 1991; Field et al., 2003). The age effect we have reported may be explained in this light.

A limitation of the study was the low response rate (16%), which can be explained by the set-up of the

study. Parents received the questionnaire and flyer from an assistant while they were in the waiting room of the Child Health Centre with their small child. It might not have been convenient for parents to fill in the list on the spot (in many cases, the child also needed to be undressed during the same time interval). It was made clear to caretakers that participation was voluntary and they were given the opportunity to take the questionnaire home and fill it in and return it later (which is what happened in many cases). This might have led to a lower response than what might have been achieved with a more direct approach. Therefore, we cannot be sure that the parents who filled in the questionnaire were representative of the general population. However, the average score found in this sample was in the same order of magnitude as the one reported in the Canadian sample, where a very different set-up was followed. In the Canadian study, participants were approached directly and asked verbally to participate. The results of the present study also indicate that most children whose parents participated are 'doing fine' (given the low average score and right skewed distribution of scores). Thus, although there are no real indications that the sample is unrepresentative, we cannot be certain that incidence of symptoms is exactly the same as in the general population.

Future directions

As in many other countries, there is no standardised instrument available for the purpose of a quick identification of feeding problems in the Netherlands. However, healthcare clinicians who are in contact with this population express a clear need for such an instrument. The availability of the MCH-FS and its Dutch counterpart the SEP, with its strong psychometric qualities, provides a unique opportunity to fulfil this need. Further research aims at providing standardised norm tables for the Dutch population aged 6 months to 4 years and to make these available for professional healthcare facilities working with parents of young children (e.g. the local Child Health Centres and family physicians). Strategic additional samples from other regions in the Netherlands have to be collected in order to be able to generalise norms for the country as a whole. However, before the SEP can be made available as a reliable and valid screening instrument for the detection of early feeding problems for the Dutch population, more validation studies are needed. These studies are now being set up with the following aims. The first is to compare the results of the normative sample to two clinical groups. One clinical group will include children whose parents sought help for problematic feeding in their child and the other clinical group will comprise children who were born prematurely and are thus 'at risk'

⁴ This difference was significant using a one sample t-test ($t(1477)=-9.12$; $p < .01$).

for developing feeding problems. By comparing the results of the normative sample with those two clinical groups, the sensitivity and specificity of the instrument can be established. The second aim is to investigate the stability and variability of the reported feeding problems by means of repeated administration of the scale with the same participants.

Feeding problems are stressful for parents and children and have been shown to have a clear negative impact on later development. Although some problems may be transient, others have the tendency to form a vicious cycle that is difficult to break. The availability of a short screening instrument might help healthcare workers in

detecting feeding difficulties early in life and contribute to a more efficient referral for specialised help.

Acknowledgements

We thank the GGD-Groningen for the distribution of the *Screeninglijst Eetgedrag Peuters* (SEP) and students Neeltje Verbrugge, Marit Veldhuis, Carlijn Wieten, Wilma Koeslag, Cynthia Pruim and Marijke Metz for the data entry and preliminary statistical analyses.

References

- Archer, L. A., Rosenbaum, P. L., & Streiner, D. L. (1991). The Children's Eating Behavior Inventory. Reliability and validity results. *Journal of Pediatric Psychology*, *16*, 629-642.
- Burklow, K. A., McGrath, A. M., Valerius, K. S., & Rudolph, C. (2002). Relationship between feeding difficulties, medical complexity, and gestational age. *Nutrition in Clinical Practice*, *17*, 373-378.
- Corbett, S. S., & Drewett, R. F. (2004). To what extent is failure to thrive in infancy associated with poorer cognitive development? A review and meta-analysis. *Journal of Child Psychology and Psychiatry*, *45*, 641-654.
- Crist, W., McDonnell, P., Beck, M., Gillespie, C. T., Barrett, P., & Mathews, J. (1994). Behavior at mealtime and nutritional intake in the young child with cystic fibrosis. *Journal of Development and Behavioral Pediatrics*, *15*, 157-161.
- Dahl, M., & Sundelin, C. (1992). Feeding problems in an affluent society. Follow-up at four years of age in children with early refusal to eat. *Acta Paediatrica*, *81*, 575-579.
- Feldman, R., Keren, M., Gross-Rozval, O., & Tyano, S. (2004). Mother-child touch patterns in infant feeding disorders: Relation to maternal, child, and environmental factors. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*, 1089-1097.
- Field, D., Garland, M., & Williams, K. (2003). Correlates of specific childhood feeding problems. *Journal of Pediatrics and Child Health*, *39*, 299-304.
- Fogel, A. (1993). *Developing through relationships. Origin of communication, self and culture*. Chicago: The University of Chicago Press.
- Herman, M. J. (1991). Comprehensive assessment of oral-motor dysfunction in failure-to-thrive infants. *The Transdisciplinary Journal*, *1*, 109-123.
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*, 179-185.
- Johnson, R., & Harris, G. (2004). A preliminary study of the predictors of feeding problems in late infancy. *Journal of reproductive and Infant Psychology*, *22*, 183-188.
- Lindberg, L., Bohlin, G., & Hagekull, B. (1991). Early feeding problems in a normal population. *International Journal of Eating disorders*, *10*, 395-405.
- Lindberg, L., Bohlin, G., Hagekull, B., & Thunstrom, M. (1994). Early food refusal: Infant and family characteristics. *Infant Mental Health Journal*, *15*, 262-277.
- Lorenzo-Seva, U., & Ferrando, P. J. (2006). FACTOR: A computer program to fit the exploratory factor analysis model. *Behavioral Research Methods, Instruments and Computers*, *38*, 88-91.
- Marchi, M., & Cohen, P. (1990). Early childhood eating behaviors and adolescent eating disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, *29*, 112-117.
- McDermott, B. M., Mamun, A. A., Najman, J. M., Williams, G. M., O'Callaghan, M. J., & Bor, W. (2008). Preschool children perceived by mothers as irregular eaters: Physical and psychosocial predictors from a birth cohort study. *Journal of Development in Behavioural Pediatrics*, *29*, 197-205.
- Morris, S. E. (1982). *The normal acquisition of oral feeding skills. Implications for assessment and treatment*. New York: Therapeutic Media.
- Muthén, B., & Kaplan, D. (1985). A comparison of some methodologies for the factor analyses of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology*, *38*, 171-189.
- Palmer, M. M., Crawley, K., & Blanco, I. A. (1993). The Neonatal Oral-Motor Assessment Scale: A reliability study. *Journal of Perinatology*, *13*, 28-35.
- Palmer, M. M., & Heymans, M. B. (1993). Assessment and treatment of sensory- versus motor-based feeding problems in very young children. *Infants and Young Children*, *6*, 168-173.
- Pliner, P., & Loewen, E. R. (1997). Temperament and food neophobia in children and their mothers. *Appetite*, *28*, 239-254.
- Ramsay, M., Martel, C., Porporino, M., & Zygmuntowicz, C. (2011). The Montreal Children's Hospital Feeding Scale: A brief bilingual screening tool for identifying feeding problems. *Paediatrics and Child Health*, *16*, 147-151.
- Ramsay, M., Gisel, E. G., & Boutry, M. (1993). Non-organic failure to thrive: Growth failure secondary to feeding skills disorder. *Developmental Medicine and Child Neurology*, *35*, 285-297.
- Reau, N. R., Senturia, Y. D., Lebailly, S. A., & Christoffel, K. (1996). Infant and toddler feeding patterns and problems: Normative data and a new direction. *Journal of Development and Behavioral Pediatrics*, *17*, 149-153.
- Rommel, N., De Meyer, A. M., Feenstra, L., & Veereman-Wauters, G. (2003). The complexity of feeding problems in 700 infants and young children presenting to a tertiary care institution. *Journal of Pediatric Gastroenterology and Nutrition*, *37*, 75-84.
- Samara, M., Johnson, S., Lamberts, K., Marlow, N., & Wolke, D. (2010). Eating problems at age 6 years in a whole population sample of extremely preterm children. *Developmental Medicine & Child Neurology*, *52*, e16-e22.

- Sanders, M. R., Patel, R. K., Le Grice, B., & Shepherd, R. W. (1993). Children with persistent feeding difficulties: An observational analysis of the feeding interactions of problem and non-problem eaters. *Health Psychology, 12*, 64-73.
- Stapleton, H., Fielder, A., & Kirkham, M. (2008). Breast or bottle? Eating disordered, childbearing women and infant feeding decisions. *Maternal and Child Nutrition, 4*, 106-120.
- Timmerman, M. E., & Lorenzo-Seva, U. (2011). Dimensionality assessment of ordered polytomous items with parallel analysis. *Psychological Methods, 16*, 209-220.
- Ten Berge, J. M. F., & Kiers, H. A. L. (1991). A numerical approach to the exact and the approximate minimum rank of a covariance matrix. *Psychometrika, 56*, 309-315.
- Van den Engel-Hoek, L. (2006). *Eet- en drinkproblemen bij jonge kinderen: een leidraad voor logopedisten en andere hulpverleners in de gezondheidszorg*. Assen: Van Gorcum.
- Van Dijk, M., Hunnius, S., & Van Geert, P. (2009). Variability in eating behavior throughout the weaning period. *Appetite, 52*, 766-770.
- Van Dijk, M., Laansma, F., & Stevens, N. (2010). *The development of eating problems and their relation with oral hypersensitivity*. Unpublished document. University of Groningen, The Netherlands.
- Wardle, J., Guthrie, C., Sanderson, S., & Rapoport, L. (2001). Development of the Children's Eating Behaviour Questionnaire. *Journal of Child Psychology and Psychiatry, 42*, 963-970.
- Williams, K. E., Field, D. G., & Seiverling, L. (2010). Food refusal in children: A review of the literature. *Research in Developmental Disabilities, 31*, 625-633.
- Wright, C., & Birks, E. (2000). Risk factors for failure to thrive: A population-based survey. *Child: Care Health and Development, 26*, 5-16.
- Wright, C. M., Parkinson, K. N., Shipton, D., & Drewett, R. F. (2007). How do toddler eating problems relate to their eating behavior, food preferences, and growth? *Pediatrics, 120*, e1069.

DR. MARIJN VAN DIJK

Assistant Professor, Developmental Psychology, Heymans Institute of Psychological Research, Groningen, the Netherlands. Her research centres on child-parent dynamics in early development. Specific topics are: feeding interactions and difficulties, caretaker-child adaptation, and child language and child directed speech in everyday (parent/teacher-child) interactions. Much of her work concerns the methodological aspects of analysing patterns of change.
E-mail: m.w.g.van.dijk@rug.nl

DR. MARIEKE TIMMERMAN

Associate Professor, Methods for Data Analysis, Heymans Institute of Psychological Research, Groningen, the Netherlands. Her research focuses on the development of models for multivariate data with complex structures, to obtain an understanding of the processes underlying those, mainly psychological, data. Her research interests include latent variable models, data reduction methods, classification, and multilevel, multiway and multiset models.
E-mail: m.e.timmerman@rug.nl

DR. CHANTAL MARTEL

Paediatric psychologist, Pediatric Feeding Program, The Montreal Children's Hospital, McGill University Health Centre, Montreal, Quebec, Canada. Her clinical is in the area of feeding disorders as well as other developmental disorders. Her research focuses on children's feeding problems.
E-mail: chantal.martel@mail.mcgill.ca

DR. MARIA RAMSAY

Paediatric psychologist / Director, Pediatric Feeding Program, The Montreal Children's Hospital, McGill University Health Centre, Montreal, Quebec, Canada. Her research focuses on children's feeding problems. Her work has been published in several peer-reviewed journals and she has given numerous presentations at the international level.
E-mail: maria.ramsay@mcgill.ca

The Prospective Retrospective Memory Questionnaire: Psychometric properties and normative data of a Dutch translation

Ten years ago the Prospective Retrospective Memory Questionnaire (PRMQ) was specifically developed to assess perceived problems concerning both episodic memory and memory for future intentions. Since then, various PRMQ translations have been carried out. These previous studies of this self-report measure showed not only good psychometric properties, but also a cross-culturally robust underlying factor structure. The PRMQ has also been used in many clinical studies. The aforementioned findings were the reason to present and test the Dutch translation of the PRMQ and compare its psychometric properties with that of previous studies. The analyses involved both non-clinical ($N = 425$) and clinical ($N = 217$) participants. The results confirmed the previously reported underlying structure of the PRMQ, the good internal consistency, and the validity of this measure. Therefore, we decided to also present normative data of this new translation. Possible future uses and sensitivity issues are discussed.

Where: Netherlands Journal of Psychology, Volume 66, 120-128

Received 31 August 2011; Accepted 16 December 2011

Keywords: Prospective Retrospective Memory Questionnaire; Normative data; Dutch translation

Authors: Sieberen P. van der Werf*, ** and Sandra Vos***

* Department of Psychology, University of Amsterdam, the Netherlands

** Department of Psychology and Medical Psychology, Onze Lieve Vrouwe Gasthuis, Amsterdam, the Netherlands

*** Donders Institute for Brain, Cognition and Behaviour, Centre for Neuroscience, Department of Medical Psychology, Radboud University Nijmegen Medical Centre, the Netherlands

Correspondence to: Dr. S.P. van der Werf, Department of Psychology (Brain & Cognition) University of Amsterdam, Roetersstraat 15, 1018 WB Amsterdam, the Netherlands
E-mail: s.p.vanderwerf@uva.nl

In this study we present the Dutch translation of the Prospective Retrospective Memory Questionnaire (PRMQ) and compare its underlying structure and psychometric properties with previous international studies. The authors of the PRMQ had noticed that memory studies of Alzheimer's disease focused mainly on the assessment of episodic memory. They also perceived a similar bias for retrospective memory in the existing self-report measures of cognitive failures (Smith, Della Sala, Logie, & Maylor, 2000). This, despite the fact that it had been argued before that forgetting appointments, forgetting to take medication, or forgetting to turn the iron off, could have serious negative consequences for independent daily living (Einstein & McDaniel, 1996). At that time in the existing self-report measures,

few items addressed prospective memory failures: Cognitive Failure Questionnaire (2 out of 25 items) and in the Everyday Memory Questionnaire (3 out of 28 items) (Broadbent, Cooper, Fitzgerald, & Parkes, 1982; Sunderland, Harris, & Baddely, 1984). Smith et al. (2000) developed the PRMQ not only to fill this gap but also to study whether ageing affected memory for past events differentially from memory for future intentions. The PRMQ was a concise 16-item self-report measure that not only balanced the number of retrospective and prospective memory items, but also made distinctions between short- versus long-term memory, and self-cued and environmentally cued memory. Item validity was then assessed by asking eight colleague memory researchers to classify each of the 16 memory items into the eight (2 x 2 x

2) pre-defined categories, e.g. items representing a prospective short-term self-cued memory failure. This procedure resulted in a high consistency of classifications among the raters. Although the intended underlying structure of the PRMQ was not formally tested until two years later, subsequent research among a variety of both clinical and normative studies strongly suggested that the a-priori selected items were not only reliable, but also represented a surprisingly robust but more simple underlying structure.

The first normative study that also tested the underlying structure of the PRMQ found that the data were best suited to a three-factor model with a general (episodic) memory factor corresponding to all of the PRMQ items and two orthogonal specific factors of prospective and retrospective memory (Figure 1). Both of these factors corresponded to the intended prospective and retrospective subscale items (Crawford, Smith, Maylor, Della Sala, & Logie, 2003). This tripartite model seemed to be in line with the theoretical contention that prospective memory could not entirely be dissociated from retrospective memory. It had already been argued by the authors of the PRMQ and other researchers, that the ability to remember intentions at the appropriate time in the future involves various cognitive processes. For example, to remember that one has to return a book to the library not only requires active monitoring of the time that has passed, but also retrospective memory such as the actual books and return dates that are concerned. Furthermore it might involve goal planning, e.g. when one can make time to return the books in question. Both time monitoring and goal planning can be facilitated by external cues. Nevertheless one has to remember what exactly has to be done (McDaniel & Einstein, 2000).

Since its first psychometric evaluation, the PRMQ had been translated into various languages, e.g. Japanese, Swedish, Portuguese (Gondo, Renge,

Ishioka, Kurokawa, & Euenon, 2010; Rönnlund, Mantyla, & Nilsson, 2008; Piauilino, Bueno, Tufik, Bittencourt, Santos-Silva, & Hachul, 2010). The cross-cultural findings consistently indicated satisfactory psychometric properties. A recent Brazilian population-based random sampling study of the PRMQ tested the latent structure of the PRMQ and compared the results with those of the original British, and subsequent Swedish normative studies (Piauilino et al., 2010). The authors not only found a high degree of similarity between the outcomes of the structural equation modelling results, but also for the reliability and validity properties.

Our first aim was compare the underlying structure of the Dutch translation of the PRMQ with the aforementioned findings. Our second aim was to present reliability data in both a clinical and control sample. The third aim was to provide tentative normative data and study the gender and age effects on the PRMQ measures, while our last aim was to provide validity data.

Method

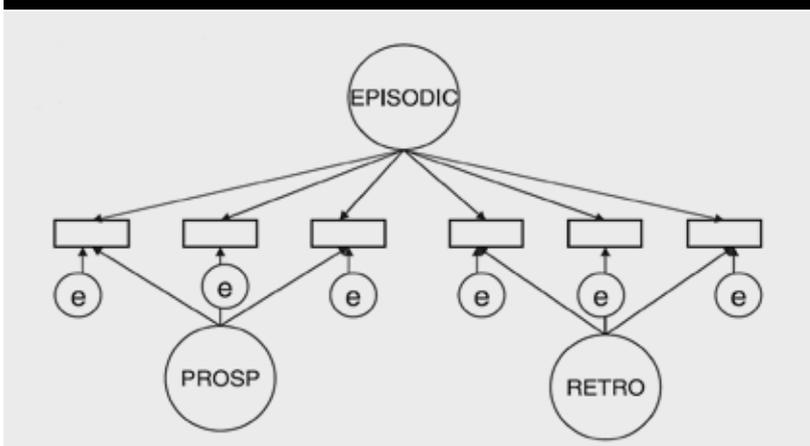
PRMQ

The PRMQ was translated into Dutch by a fellow clinical neuropsychologist (HB) who is proficient in the English language. This translation was subsequently judged and compared with the original English version by the author of this article (SvdW), a fellow Dutch neuropsychologist (SV), and a person with a native English speaking background, but who had lived in the Netherlands for over twenty years, and was proficient in the Dutch language (IM). The Dutch translation of the PRMQ is available upon request by the corresponding author of this article.

Validity assessment

For the validity assessments we compared the data of the PRMQ with those of the Multimodal Memory Questionnaire (MMQ) and the Symptom Checklist 90 (SCL-90). The MMQ (57 items) has three subscales representing self-appraisal of memory (MMQ contentment); perceived daily memory failures (MMQ ability); and the use of memory strategies (MMQ strategies). All of the MMQ scales are positively defined, meaning that a higher score indicates higher memory contentment, less daily memory failures and more daily memory strategy use (Troyer & Rich, 2002; Van der Werf & Vos, 2011). The SCL-90 is a clinical measure of psychological distress and divided into nine subscales. The SCL-90 total score is a reflection of general psychological distress (Derogatis, Lipman, & Covi, 1973).

Figure 1 Three-factor model



Participants

Non-clinical population

The non-clinical population consisted of 425 control participants (females = 295, males = 130). The majority of the data came from a control group of an internet survey where we compared memory complaints among the relatives of patients ($N = 97$) with a neurodegenerative disorder with those of participants who did not have a parent with a neurodegenerative disorder ($N = 398$). In addition, written PRMQ data were available from 27 control participants who had participated in two smaller projects assessing the relation between memory ratings and test performance. The mean age of the total sample was 40.02 ($SD = 14.78$) with a range of 18 to 89 years.

Clinical population

The PRMQ was sent together with the written appointment for a (neuro)psychological assessment to outpatients of a neurology clinic. These patients

were referred by their clinicians, mostly neurologists but in some cases also other physicians, e.g. psychiatrists or rehabilitation physicians, from a university medical centre. All patients who had full PRMQ data were included in this study. The referral questions pertaining to this population were quite heterogeneous and reflected the mixed medical background of this neurology outpatient population. In total 217 (females = 82, males = 135) PRMQ questionnaires were collected. The mean age of this sample was 54.94 ($SD = 13.87$) with an age range of 19 to 85 years.

Results

Factor structure of the PRMQ

The combined data ($N = 643$) of both the patient and control groups were used for the structural equation modelling analyses. The analyses were carried out with AMOS (version 5). In line with Piaulino et al. (2010), we decided to limit the analyses to six

Table 1 Comparison of the fit indices of the different models that were tested in four language versions of the PRMQ

Models	Sample	Chi-square	df	RMSEA	SRMR	CFI
1. Unitary model	Dutch (N=643)	499.19	104	0.077	0.045	0.918
	Brazilian (N=664)	485.97	104	0.081	0.054	0.880
	Swedish (N=540)	360.70	104	0.062	0.048	0.910
	British (N=551)	407.20	104	0.073	0.057	0.890
2. Two factors, retrospective / prospective (uncorrelated)	Dutch	1091.88	104	0.122	0.289	0.796
	Brazilian	824.30	104	0.094	0.209	0.757
	Swedish	-	-	-	-	-
	British	732.40	104	0.105	0.268	0.780
3. Two factors, retrospective / prospective (correlated)	Dutch	434.47	103	0.071	0.042	0.931
	Brazilian	400.16	103	0.069	0.047	0.907
	Swedish	316.90	103	0.062	0.045	0.920
	British	336.10	103	0.064	0.053	0.920
4a. Tripartite model (complete)	Dutch	257.95	88	0.055	0.028	0.965
	Brazilian	218.46	88	0.047	0.032	0.959
	Swedish	220.20	88	0.053	0.035	0.950
	British	245.40	88	0.057	0.044	0.950
4b. Tripartite model (retrospective removed)	Dutch	372.09	96	0.067	0.039	0.942
	Brazilian	353.10	96	0.068	0.044	0.920
	Swedish	-	-	-	-	-
	British	306.30	96	0.060	0.047	0.930
4c. Tripartite model (prospective removed)	Dutch	380.25	96	0.068	0.036	0.941
	Brazilian	323.80	96	0.062	0.039	0.930
	Swedish	-	-	-	-	-
	British	288.80	96	0.063	0.050	0.930

Summary of the fit indices of the different structural models of the PRMQ in the Dutch, Brazilian (Piaulino et al., 2010), Swedish (Rönnlund et al., 2008) and British (Crawford et al., 2003) studies. The best fitting model is depicted in bold. Chi-square (smaller values indicate better fit); RMSEA (root mean square of approximation: good fit < 0.06; very good fit < 0.05); SRMR (standardised root mean square residual: good fit < 0.08); CFI (comparative fit index: for a good fit > 0.95)

models and report the same fit indices and added our data into a table similar to the way they presented their data (Table 1). As in the previous studies, the best fitting model turned out to be the one with the tripartite structure.

Reliability of the PRMQ

Cronbach's alphas indicated high internal consistency for all scales within both samples. PRMQ total clinical $\alpha = .93$ and non-clinical $\alpha = .92$; PRMQ prospective clinical $\alpha = .83$, non-clinical $\alpha = .82$; PRMQ retrospective clinical $\alpha = .90$ and non-clinical $\alpha = .90$.

Influence of age and gender on PRMQ scores

With respect to the development of normative data we examined the relationships between the PRMQ scales and the demographic variables in the control group. Pearson product-moment correlation between scores on each of the scales and age and gender (females coded as 1, males coded as 0) were computed; the latter set of coefficients are termed point-biserial correlation coefficients.

There were small but significant correlations between age and the PRMQ total score ($r = .07$, $p = 0.15$), and the PRMQ retrospective score ($r = .11$, $p = 0.03$) but not with the PRMQ prospective subscale ($r = .03$, $p = 0.51$). The biserial correlation coefficients between gender and the PRMQ scales were also relatively small and only reached significance for the PRMQ prospective scale ($r = .12$, $p = 0.01$), and not for the PRMQ total ($r = .09$, $p = .06$) or PRMQ retrospective scores ($r = .04$, $p = 0.44$).

Validity assessment

To provide evidence for convergent validity we correlated the PRMQ subscales to the three subscales of the Multimodal Memory Questionnaire (MMQ) in our combined clinical and non-clinical sample ($N = 643$).

The PRMQ total scores turned out to have high and negative correlations with the MMQ ability ($r = -.88$, $p < .01$) and the MMQ contentment scales ($r = -.71$,

$p < .01$). The PRMQ total scores were also positively correlated with the MMQ strategy scores ($r = .61$, $p < .01$).

The PRMQ prospective score showed high and negative correlations with the MMQ ability scale ($r = -.86$, $p < .01$) and the MMQ contentment scale ($r = -.68$, $p < .01$). The PRMQ total score correlated positively with the MMQ strategy scale ($r = .62$, $p < .01$).

The PRMQ retrospective score had high and negative correlations with the MMQ ability ($r = -.81$, $p < .01$) and the MMQ contentment ($r = -.67$, $p < .01$) scales. The PRMQ retrospective score correlated positively with the MMQ strategy scale ($r = .41$, $p < .01$).

A small part of our clinical sample ($N = 36$) had also filled out the SCL-90 psychopathology questionnaire and in this study the SCL-90 turned out to have significant correlations with the PRMQ total scores ($r = .58$, $p < .01$), the PRMQ prospective scores ($r = .53$, $p < .01$), and the PRMQ retrospective scores ($r = .56$, $p < .01$). The SCL-90 concentration subscale (items concerning perceived attention and memory weakness, indecisiveness etc.) correlated highest with the PRMQ scales: total ($r = .72$, $p < .01$), prospective ($r = .66$, $p < .01$), and retrospective ($r = .71$, $p < .01$). The SCL-90 subscale Hostility (items referring to losing temper, irritability etc.) correlated lowest with the PRMQ scales: PRMQ total ($r = .16$, $p = .37$), PRMQ prospective ($r = .14$, $p = .42$) and PRMQ retrospective ($r = .16$, $p = .36$).

In order to test whether the PRMQ could differentiate between a clinical and a non-clinical sample, the three PRMQ scale scores of the clinical and non-clinical sample were compared by 2 x 2 ANCOVAs, with group and gender as independent variables and age as covariate. Table 2 depicts the mean PRMQ values and standard deviations for both groups.

Age was not significantly related to the PRMQ total score ($F(1,642) = 1.00$, $p = .31$, partial $\eta^2 = .002$). There was no significant interaction effect between

Table 2 Mean PRMQ scores and standard deviations of the non-clinical and clinical samples and intercorrelations within the non-clinical group

	Intercorrelations (Rho) in the non-clinical group (N=425)		Non-clinical group (N=425)	Clinical group (N=218)
	Prospective	Retrospective	Mean (SD)	Mean (SD)
PRMQ scores				
Total scale	0.95	0.93	30.51 (9.56)	34.00 (11.35)
Prospective scale		0.78	16.20 (5.50)	17.75 (6.48)
Retrospective scale			14.31 (4.63)	16.26 (5.55)

group and gender ($F(1,642) = 0.68, p = .41$, partial $\eta^2 = .001$). The clinical group had higher PRMQ total scores than the control group ($F(1,642) = 15.07, p < .01$, partial $\eta^2 = .023$) and women reported higher PRMQ total scores ($F(1,642) = 8.75, p < .01$, partial $\eta^2 = .014$).

Age was not significantly related to the PRMQ prospective score ($F(1,642) = 0.31, p = .86$, partial $\eta^2 = .000$). There was no significant interaction effect between group and gender ($F(1,642) = 0.49, p = .48$, partial $\eta^2 = .001$). The clinical group had higher PRMQ prospective scores than the control group ($F(1,642) = 14.41, p < .001$, partial $\eta^2 = .022$) and women reported higher PRMQ prospective scores ($F(1,642) = 13.16, p < .001$, partial $\eta^2 = .020$).

Age was significantly related to the PRMQ retrospective score ($F(1,642) = 5.16, p = .23$, partial $\eta^2 = .008$). There was no significant interaction effect between group and gender ($F(1,642) = 0.77, p = .38$, partial $\eta^2 = .001$). The clinical group had higher PRMQ retrospective scores than the control group ($F(1,642) = 12.40, p < .001$, partial $\eta^2 = .019$) and there was no significant gender effect ($F(1,642) = 3.31, p = .07$, partial $\eta^2 = .005$). The T-test analyses confirmed the differences between the two groups (PRMQ retrospective: $t = 4.60, df(640), p < .001$; PRMQ prospective: $t = 3.10, df(640), p = .002$).

Normative data

In our non-clinical sample, the three PRMQ subtest scores had non-normal distributions: PRMQ total scores, $D(425) = 0.15, p < .001$, PRMQ prospective scores, $D(425) = 0.16, p < .001$, and PRMQ retrospective scores, $D(425) = 0.15, p < .001$. The distributions of all PRMQ scale scores were positively skewed (z-scores skewness: PRMQ total: 13.1, PRMQ retrospective: 11.6 and PRMQ prospective: 13.3). The PRMQ raw scores departed from a normal distribution; therefore, we decided to convert the raw scores into percentiles. Since both age and gender effects were small and we did not want to reduce our sample sizes on which norms would be based too much, it was decided not to stratify for different gender or age groups.

Tables 3A to 3C depict the percentile ranks for each raw score of the three PRMQ scales. As recommended by Crawford et al. (2009), percentile scores were defined as the percentage of scores that fall below the score of interest, where half of those obtaining the score of interest are included in the percentage. Furthermore, in the present study the point estimates of the percentile ranks were accompanied with 95% confidence intervals. These confidence intervals were calculated according to a Bayesian estimating method with software accompanying the paper of Crawford et al. (2009).

We compared the cut-off scores (5%) of our PRMQ data to that of the cut-off scores (T-score ≤ 33) of both the Crawford et al. (2002) and Rönnlund et al. (2008) studies. Since the Rönnlund et al. study provided data for different age brackets, we estimated a general cut-off based on the four age groups. The following cut-off scores were found for the three PRMQ measures: PRMQ total cut-off score Van der Werf = 49, Rönnlund = 49/50, and Crawford = 55; PRMQ prospective cut-off scores Van der Werf = 27/28, Rönnlund = 28/29, and Crawford = 27; PRMQ retrospective cut-off scores Van der Werf = 23/24, Rönnlund = 24, and Crawford = 28/29. Our cut-off points resembled most closely those of the Rönnlund study.

Table 3A Percentile estimates for the PRMQ-total scores (n=425)

PRMQ total Raw scores	Percentile estimates	95% Confidence interval	
		Min	Max
16	0.2	0.0	1.2
17	0.7	0.2	2.0
18	1.4	0.5	3.1
19	2.5	1.1	4.5
20	4.7	2.3	7.9
21	8.0	5.2	12.0
22	14.0	8.9	18.8
23	20.0	15.0	24.5
24	26.0	20.2	32.0
25	32.0	26.8	37.0
26	38.0	31.8	45.4
27	46.0	40.1	51.5
28	51.0	45.2	55.9
29	55.0	49.5	60.1
30	60.0	54.0	65.3
31	64.0	59.2	69.2
32	68.0	62.9	72.6
33	71.0	66.4	75.7
34	74.0	69.2	78.0
35	76.0	71.3	79.7
36	78.0	73.2	81.5
37	80.0	75.5	83.6
38	82.0	78.1	86.0
39	84.0	80.6	87.9
40	86.0	82.2	88.9
41	87.0	83.0	89.6
42	88.0	84.5	91.2
43	90.0	86.3	92.2
44	90.0	87.2	93.0
45	92.0	88.7	94.6
46	93.0	90.7	95.5

Table 3A Percentile estimates for the PRMQ-total scores (n=425)

PRMQ total Raw scores	Percentile estimates	95% Confidence interval	
		Min	Max
47	94.0	91.0	95.7
48	94.0	91.5	96.1
49	95.0	92.3	96.5
50	95.0	92.5	96.7
51	95.3	92.9	97.0
52	95.8	93.5	97.4
53	96.1	93.9	97.7
54	96.6	94.5	98.1
55	97.1	95.1	98.4
56	97.5	95.6	98.8
57	98.0	96.3	99.0
58	98.2	96.6	99.2
59	98.2	96.8	99.3
60	98.4	96.8	99.3
61	98.5	96.9	99.4
62	98.8	97.4	99.6
63	99.1	97.8	99.7
64	99.1	97.8	99.7
65	99.1	97.8	99.7
66	99.1	97.8	99.7
67	99.1	97.8	99.7
68	99.2	97.9	99.8
69	99.5	98.4	99.9
70	99.8	98.9	100.0
71	99.8	98.9	100.0
72	99.8	98.9	100.0
73	99.8	98.9	100.0
74	99.8	98.9	100.0
75	99.8	98.9	100.0
76	99.8	98.9	100.0
77	99.8	99.1	100.0
78	100.0	99.4	100.0
79	100.0	99.4	100.0
80	100.0	99.4	100.0

Table 3B Percentile estimates for the PRMQ retrospective memory scores (n=425)

PRMQ retrospective Raw scores	Percentile estimates	95% Confidence interval	
		Min	Max
8	1.5	0.0	4.1
9	5.0	2.5	9.2
10	12.0	6.9	18.1
11	23.0	15.4	30.6
12	36.0	27.5	44.6
13	48.0	40.7	55.1
14	58.0	50.7	64.7
15	67.0	60.2	72.9
16	74.0	68.3	79.3
17	79.0	74.6	83.8
18	83.0	78.8	86.6
19	86.0	81.8	89.4
20	89.0	85.2	91.1
21	91.0	88.0	93.8
22	93.0	89.9	95.3
23	94.0	91.8	96.5
24	95.4	93.0	97.2
25	95.9	93.7	97.5
26	96.6	94.4	98.2
27	97.6	95.7	98.9
28	98.4	96.7	99.3
29	98.9	97.5	99.7
30	99.3	98.1	98.8
31	99.3	98.1	99.8
32	99.4	98.3	99.9
33	99.5	98.5	99.9
34	99.5	98.5	99.9
35	99.6	98.6	100.0
36	99.8	98.9	100.0
37	99.8	98.9	100.0
38	99.8	98.9	100.0
39	99.9	99.1	100.0
40	100.0	99.4	100.0

Table 3C Percentile estimates for the PRMQ prospective memory scores (n=425)

PRMQ prospective Raw scores	Percentile estimates	95% Confidence interval	
		Min	Max
8	0.6	0.0	2.1
9	2.5	0.8	5.0
10	6.0	3.1	10.0
11	12.0	7.5	17.9
12	21.0	14.8	26.9
13	31.0	23.4	38.4
14	42.0	34.4	49.0
15	51.0	44.5	58.3
16	60.0	53.6	67.1
17	68.0	62.3	73.7
18	74.0	68.5	78.5
19	77.0	72.6	80.9
20	80.0	75.1	83.8
21	83.0	78.7	86.7
22	86.0	81.8	89.0
23	88.0	84.2	90.8
24	90.0	86.4	92.8
25	92.0	88.8	94.4
26	93.0	90.4	95.4
27	94.0	91.6	96.3
28	95.5	93.0	97.4
29	96.6	94.5	98.1
30	97.4	95.4	98.7
31	98.0	96.3	99.0
32	98.2	96.6	99.2
33	98.5	96.9	99.4
34	98.7	97.2	99.5
35	98.9	97.6	99.6
36	99.3	98.0	99.8
37	99.5	98.5	99.9
38	99.6	98.6	100.0
39	99.8	98.9	100.0
40	99.9	99.1	100.0

Discussion

The PRMQ data of the Dutch translation were best fitted to the tripartite model confirming the results of previous studies. Moreover, the fit indices of the competing models closely resembled those of the British, Swedish and Brazilian data. These findings illustrated again the cross-cultural robustness of the underlying structure of the PRMQ and the proposition that prospective and retrospective memory share an underlying common memory factor.

In both the clinical and non-clinical samples, the internal consistency measures for the PRMQ total and the two subscales were adequate (all > 0.80) and resembled those of previous studies and translations.

The normative data suggested that the influences of gender and age were rather small. The correlations between the PRMQ scores and age resembled those reported in the Crawford et al. (2003) study. Moreover, gender accounted for maximally 1.4% of the variance in the PRMQ scores, while the Crawford et al. study reported a 1.3%. These small demographic effects did not seem to be specific for the PRMQ. We found similar results in our MMQ normative study (Van der Werf & Vos, 2011).

The mean PRMQ scores were somewhat lower than those of the original Crawford study. This perhaps indicates that cultural differences do not affect the underlying structure of the PRMQ, but might influence the interpretation of the severity scale. Alternatively, one could argue that our Internet survey might have biased our sample to a relatively more active functioning and cognitively more able group. However, our website survey targeted the general population and did not explicitly exclude people with psychiatric or neurological co-morbidity. One could therefore also argue that these types of complaint surveys might attract people who experience problems. However, when we compared our data with another Swedish study that reviewed PRMQ scores of 105 self-reporters of memory problems with a group of 92 non-self reporters with a similar mean age (mean 42.4 years) to our non-clinical group, we noticed that the PRMQ scores of the comparison group matched quite closely to those of our non-clinical group, the mean PRMQ total score being 29.8 in the Swedish study compared with 30.5 in our study (Mantyla, 2003). In addition, both our data and those of the Mantyla study closely resembled the previously mentioned Rönnlund et al. (2008) study.

Our validity data showed good convergent validity with a different validated memory questionnaire and with the 'most' cognitive subscale of the SCL-90 distress measure. The divergent validity was demonstrated by the low correlation with the hostility subscale of the SCL-90. The clinical group had, as one would expect, higher PRMQ scores compared with the non-clinical group. The effect sizes, however, were small (partial eta's ranged between .019 and -.022). This could be explained by the heterogeneous character of our clinical sample. We did not specifically target patients with memory complaints and, in contrast to the original PRMQ study, the PRMQs of our memory-impaired patients were not rated by caregivers but by the patients themselves, some of whom might have had signs of

anosognosia. When we compared the PRMQ data with those of the MMQ, we found that the difference between the clinical and the non-clinical sample of the report of memory failures (MMQ ability) amounted to approximately one standard deviation, compared with only one third of a standard deviation difference for the PRMQ total score. One might therefore conclude that the MMQ is a more sensitive measure for memory failures, or that the MMQ is more sensitive for bias, e.g. distress. We were not convinced by this last proposition since both the MMQ ability and PRMQ total scores showed comparable correlations with psychological distress as measured by the SCL-90 (Van der Werf & Vos, 2011).

When we reviewed some other comparative clinical studies that were carried out with the PRMQ, we noticed that the findings were quite heterogeneous and that the largest group differences ranged between half to a maximum of one standard deviation. Patients with chronic fatigue syndrome, for example, reported significantly more retrospective and prospective memory failures than age- and IQ-matched controls, with effects approximating one standard deviation (Attree, Dancy, & Pope, 2009). Bruce, Bruce, Hancock, and Lynch (2010) found a similar effect size when they compared 79 patients with multiple sclerosis to 20 age- and education-matched controls. Patients with Parkinson's disease reported significantly more self-cued prospective memory failures compared with age-matched healthy controls, with an effect size of approximately one standard deviation. When we aggregated the PRMQ subtest scores that were published in this study into estimates of the PRMQ total score, the difference between both groups was again between 0.5 and 1 standard deviation (Foster, McDaniel, Repovš, & Hershey, 2009)

An alternative measure for the sensitivity of the PRMQ might be its capacity to detect change. By comparing pre- and post-PRMQ scores and their

confidence intervals, one could judge whether there is significant change over time or after an intervention. However, in order to detect meaningful change over time or after an intervention, one ought to have test-retest data. Regrettably, up till this moment our study and the PRMQ studies that we have already mentioned cannot provide such data. For the time being, the reported Cronbach's alphas might be used as estimates of test-retest reliability in order to calculate confidence interval for the true scores.

The PRMQ seems particularly suitable to collect such data since it is concise with relatively short statements. In our experience, most patients were able to complete the PRMQ within 5 minutes; this is in contrast to the far lengthier (57 items) MMQ that normally takes 10-15 minutes. Although approximately half of the items of MMQ efficacy subscale seem to correspond to types of prospective memory failures, this distinction has not been tested and confirmed as has been done with the PRMQ. Although the PRMQ lacks items with respect to self-appraisal of memory or memory strategy use, its balanced division in prospective and retrospective memory failures, its few and to-the-point items, and the good cross-cultural psychometric properties, might make it the preferred choice for relatively quick but reliable screenings of the severity of memory complaints in a research context. Moreover, in a clinical context the PRMQ might also be a preferred measure to evaluate the perceived efficacy of memory strategy interventions which often specifically target prospective memory failures.

Acknowledgements

We would like to thank Dr. Hans Berger (UMCN) and Isa McClain for their help with the translation, and Eva Tool (UVA) for her help with the data collection.

References

- Attree, E. A., Dancy, C. P., & Pope, A. L. (2009). An assessment of prospective memory retrieval in women with Chronic Fatigue Syndrome using a virtual-reality environment: An initial study. *Cyberpsychology & Behavior, 12*, 379-385.
- Broadbent, D. E., Cooper, P. F., FitzGerald, P., & Parkes, K. R. (1982). The Cognitive Failures Questionnaire (CFQ) and its correlates. *British Journal of Clinical Psychology, 21*, 1-16.
- Bruce, J. M., Bruce, A. S., Hancock, L., Lynch, S. (2010). Self-reported memory problems in multiple sclerosis: Influence of psychiatric status and normative dissociative experiences. *Archives of Clinical Neuropsychology, 25*, 39-48.
- Crawford, J. R., Garthwaite, P. H., & Slick, D. J. (2009). On percentile norms in neuropsychology: Proposed reporting standards and methods for quantifying the uncertainty over the percentile ranks of test scores. *The Clinical Neuropsychologist, 23*, 1173-1195.
- Crawford, J. R., Smith, G., Maylor, E. A., Della Sala, S., & Logie, R. H. (2003). The Prospective and Retrospective Memory Questionnaire (PRMQ): Normative data and latent structure in a large non-clinical sample. *Memory, 11*, 261-275.
- Derogatis, L.R., Lipman, R.S., Covi. L. (1973). SCL-90: An outpatient psychiatric rating scale – preliminary report. *Psychopharmacological Bulletin, 9*, 13-28.

- Einstein, G. O., & McDaniel, M. A. (1996). Retrieval processes in prospective memory: Theoretical approaches and some new empirical findings. In M. Brandimonte, G. O. Einstein, & M. A. McDaniel (Eds.), *Prospective memory: Theory and applications* (pp. 115-141). Mahwah, NJ: Lawrence Erlbaum.
- Foster, E. R., McDaniel, M. A., Repovš, G., & Hershey, T. (2009). Prospective memory in Parkinson disease across laboratory and self-reported everyday performance. *Neuropsychology, 23*, 347-358.
- Gondo, Y., Renge, N., Ishioka, Y., Kurokawa, I., & Eueno, D. (2010). Reliability and validity of the Prospective and Retrospective Memory Questionnaire (PRMQ) in young and old people: A Japanese study. *Japanese Psychological Research, 52*, 175-185.
- Mantyla, T. (2003). Assessing absentmindedness: Prospective memory complaint and impairment in middle-aged adults. *Memory & Cognition, 31*, 15-25.
- McDaniel, M. A., & Einstein, G. O. (2000). Strategic and automatic processes in prospective memory retrieval: A multiprocess framework. *Applied Cognitive Psychology, 14*, S127-S144.
- Piauilino, D. C., Bueno, O. F. A., Tufik, S., Bittencourt, L. R., Santos-Silva, R., & Hachul, H. C. (2010). The Prospective and Retrospective Memory Questionnaire: A population-based random sampling study. *Memory, 18*, 413-426.
- Rönnlund, M., Mantyla, T., & Nilsson, L. G. (2008). The Prospective and Retrospective Memory Questionnaire (PRMQ): Factorial structure, relations to global subjective memory ratings, and Swedish norms. *Scandinavian Journal of Psychology, 49*, 11-18.
- Smith, G., Della Sala, S., Logie, R. H., & Maylor, E. A. (2000). Prospective and retrospective memory in normal ageing and dementia: A questionnaire study. *Memory, 8*, 311-321.
- Sunderland, A., Harris, J. E., & Baddeley, A. D. (1984). Assessing everyday memory after severe head injury. In J. E. Harris & P. E. Morris (Eds.), *Everyday memory, actions and absent mindedness* (pp. 191-206). London: Academic Press.
- Troyer, A. K., & Rich, J. B. (2002). Psychometric properties of a new metamemory questionnaire for older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 57*, 19-27.
- Van der Werf, S. P., & Vos, S. J. (2011). Memory worries and self-reported daily forgetfulness: A psychometric evaluation of the Dutch translation of the Multifactorial Memory Questionnaire. *The Clinical Neuropsychologist, 25*, 244-268.

DR. SIEBEREN VAN DER WERF

Clinical neuropsychologist at the Onze Lieve Vrouw Gasthuis in Amsterdam. Lecturer clinical neuropsychology at the University of Amsterdam. Main fields of interest: the behavioral determinants and consequences of experienced cognitive problems in conditions such as HIV, stroke, neuromuscular and neurodegenerative disorders.
E-mail: s.p.vanderwerf@uva.nl

DR. SANDRA VOS

Neuropsychologist and lecturer at the Department of Medical Psychology of the Radboud University Medical Centre in the Netherlands. Fields of interest are language processes and the relations between quality of life and cognitive functioning.
E-mail: SH.Vos@mps.umcn.nl

Notes for contributors

The Netherlands Journal of Psychology publishes exclusively in English, UK spelling. Manuscripts must be original and not currently under review or published elsewhere. Articles, Notes and other contributions should not exceed the word limit mentioned elsewhere on the cover without consulting the editor.

If an anonymous review is preferred, the manuscript should include two title pages, one with identifying information and one with the title only. All personal information should be excluded from the body of the text as well. Only manuscripts prepared in this fashion will be subject to blind reviews. Manuscripts are not returned to authors.

The associate editors will assist authors in preparing the manuscript conform the Journal's editorial policy. Because of the broad range of subject matter covered by the journal, authors are encouraged to supply the names of one or more potential referees. Doing so in no way guarantees that the editors will request reviews from these individuals, although such referees may be called upon in addition to those of the editors' choosing.

Netherlands Journal of Psychology follows the publication style of the American Psychological Association. All manuscripts require an abstract of 100-150 words typed on a separate page and 5-10 key words should be provided. Cited references should be presented in the text by author and date and be collated into a reference list at the end of the article with the following information: author(s), year of publication, title and publishing data. Authors are encouraged to consult the *Publication Manual of the American Psychological Association* (5th Edition, see downloadable Style Sheet for quick overview). Authors are requested to restrain from 'overcitation'. Often two or three references will suffice.

Manuscripts not properly prepared will not be considered.

Authors should supply a brief note of about 50 words with their main fields of interest, and including their mailing address, an electronic-mail address, and phone and fax numbers. Authors are responsible for obtaining permission from copyright holders for reproducing any illustrations, tables, figures or lengthy quotations previously published elsewhere. Authors are sent a pdf of the published version.

Copyrights conform the publisher's guideline (see cover).

Authors must submit manuscripts in electronic formats to:

Rene.vanhezewijk@ou.nl

Address of the editor

Editor of the Netherlands Journal of Psychology

Prof. R. van Hezewijk

Faculty of Psychology OUNL

PO Box 2960

6401 DL Heerlen

The Netherlands