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The AMQ: A Four-Factor Inventory of Absentmindedness and Memory

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The Absentmindedness and Memory Questionnaire (AMQ) is a new self-rating scale designed to evaluate everyday memory problems related to absentmindedness. It includes 24 items and is based on studies of different samples ($N = 623$). Its test-retest reliability is high and it has consistently shown similar factor structure. The AMQ thus measures four weakly correlated factors: Absentmindedness, Persons, Locations and Codes/Addresses. Factor analysis further indicates that Absentmindedness may include two subfactors: momentary attention deficit and prospective forgetfulness or impaired agenda memory. Gender differences were found in Persons (Female+) and Locations (Male+) but not in Absentmindedness or Codes/Addresses. The current version of AMQ has seven interindividually comparable response alternatives for each item in the questionnaire. This makes it useful as a measure of subjective absentmindedness or forgetfulness as well as a complementary measure of subjective memory for persons, locations, and codes/addresses/stories, especially at follow-up examinations.

Key words: Absentmindedness, questionnaire, inventory, personality, subjective memory, factor analysis, prospective memory.

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INTRODUCTION

To know where you are and what time it is must be one of the more basic kinds of knowledge that a person living in the modern world should have. Of course it is also an advantage to be appropriately dressed and to keep a check on all the little things in your immediate personal sphere like your mobile phone, credit cards, calendar, etc. People who regularly fail in these matters are often called absentminded or forgetful. These terms are often used in the same way as we use personality or trait terms. However, the stability of the trait absentmindedness will not be discussed in this paper, which is instead devoted to the question of how to measure or rate this trait.

Forgetfulness may stem from different sources, some of which are probably unrelated to absentmindedness as a trait. For example, individuals with incipient dementia are typically forgetful but are not necessarily considered absentminded. Although benign, the forgetfulness of absentminded individuals may interfere with educational and occupational performance and hence call for assessment and counseling. The question arises whether different profiles of forgetfulness and absentmindedness can be distinguished and assessed reliably as a basis for individual counseling. The present study was initially motivated by experiences from courses in mnemonic training with young or middle-aged participants given as part of a university curriculum. Participants did not generally complain about problems with memory acquisition *per se* but rather about an erratic and troublesome forgetfulness in activities of daily life, and this highlighted a need to quickly document the specific memory problems of each participant.

Because absentmindedness or forgetfulness is hard to measure using objective cognitive tests (Baddeley, 1981; Mäntylä &

Nilsson, 1997), a well-designed rating scale may be the best substitute. Baddeley tried to test memory for planned actions (Baddeley, 1981; Wilkins & Baddeley, 1978), while others have employed tests to assess prospective memory in aging using somewhat different techniques (Mäntylä & Nilsson, 1997; Rönnlund, Mäntylä & Nilsson, 2008). Further, interesting computer-based methods have been developed for the assessment of impaired prospective memory in ADHD (Kerns & Price, 2001). Recently it has been shown that self-reports of impaired episodic memory predicted performance in tests of prospective memory better than did tests of episodic memory (Mäntylä, 2003). All the experiments referred to above tap the aspect of forgetfulness labeled prospective memory; they clearly show that it is possible to mimic the aspect of cognitive failure or trait we usually call absentmindedness.

The neuropsychology of prospective memory has been reviewed elsewhere (d'Ydewalle, Bouckaert & Brunfaut, 2001). Although there is a hypothesis linking impaired prospective memory to the frontal lobe, the available literature is not conclusive. Both the frontal and parietal lobes are often activated in working memory tasks (Cabeza & Nyberg, 2000). Because prospective memory by its very nature occupies working memory at times during a prospective memory task, the idea of a frontal involvement in prospective memory seems very reasonable.

In addition to the practical or technical difficulties in studying cognitive failures in everyday life, for instance forgetfulness, there are methodological arguments for using inventories in memory research as substitutes for or compliments to objective testing. One important aspect is the testing situation *per se*. Subjects may act differently in a laboratory setting with expectations of maximum performance than in an everyday situation, where the demands on maximum performance are very small

(Zelinski, Gilewski, & Thompson, 1980). Although this is a factor affecting all cognitive testing, it is potentially a serious problem when it comes to forgetfulness. If the psychologist or psychiatrist needs to know how a person perceives, remembers and acts outside the laboratory, it is also quite logical to interview the person. The approach to study memory performance outside the laboratory has also been argued for by prominent memory researchers (Baddeley, 1990). An alternative competing method, when it comes to register forgetful behaviors, would be direct observation by the use of video camera, but because unprovoked forgetfulness does not appear on demand, such data acquisition would be extremely time-consuming and thus too expensive.

The inventory method proposed and used in this study should not be confused with introspection as defined by 19th-century psychologists. The inventories used do not ask subjects to report how their remembering or forgetting proceeds, but rather how hard it is or how often forgetfulness episodes occur. In this aspect, modern inventories of cognitive performance do not differ logically from the scales used in perceptual research within psychophysics. It is also a common procedure in cognitive testing to include subjective effort among the objective measures in order to get a measure of reserve capacity (Dornic, 1977).

A more general methodological advantage with inventories in cognitive research should be mentioned, namely the increased number of subjects that can be included in a single study compared to objective testing. Because testing is a time-consuming business and often hard to carry out in large groups of subjects, inventories will allow a greater amount of data to be collected. However, a prerequisite is that the reliability and construct validity has to be as carefully controlled, and the scale must be constructed in such a way that scores on individual items or factors can be compared between individuals or between different test occasions within the same individual.

The methodological arguments for using inventories with self-ratings of forgetfulness and memory function in everyday life could thus be summarized as follows:

- (1) Technical problems with laboratory tests of forgetfulness;
- (2) The frequent and successful use of subjective ratings in other cognitive fields.
- (3) The larger number of subjects obtained with this method of data collection.

IME-F, SMQ and other contemporary inventories

In the following the inventories that had an impact on the development of the AMQ will be reported. The work by Reason on absentmindedness and self-ratings of cognitive failures was the starting point for some researchers in the field of memory in everyday life (Reason, 1982, 1984). His self-rating scales are not used to any greater extent in experimental or clinical psychology, despite the fact that data emanating from them forms the basis for his theory on human error within the field of engineering psychology (Reason, 1990). Broadbent's group, inspired by Reason, has also used the inventory method in their

study of cognitive failures, and developed the Cognitive Failures Questionnaire (CFQ; Broadbent, Cooper, FitzGerald & Parkes, 1982), which has been frequently used ever since. The CFQ investigates a person's tendencies towards clumsiness and absentmindedness. Behaviors like "bumping into people" and "dropping things" are typical of the item content in the CFQ. Broadbent *et al.* argued for the construct "cognitive failures" to be seen as a personality trait. It may be noted that such a construct does not easily fit into any of the Big Five personality factors, although it relates to impulsivity and conscientiousness (McCrae & Costa, 1990). Broadbent *et al.* (1982) also presented a theory on absentmindedness.

A few studies published in the last decades on memory performance in everyday life have used self-rating scales. The Inventory of Memory in Everyday Life (IME-F) by Herrmann and Neisser (1978) included 48 items with seven-point rating scales on remembering and forgetting. The IME-F was apparently developed to meet the ecological demand of reaching out of the laboratory to obtain fruitful data from everyday life. The eight orthogonal factors resulting from principal component analysis were relatively small compared to the principal component or main factor. One of the factors was labeled Absentmindedness, a concept almost synonymous with forgetfulness, which is the prime matter of the current study.

The Subjective Memory Questionnaire (SMQ) was developed within a clinical program where memory assessment is important (Bennett-Levy & Powell, 1980). The questionnaire has 43 items with five-point rating scales. Factor analysis of the scores from this inventory also resulted in an Absentmindedness factor in addition to other factors.

Likewise, Sunderland, Harris and Baddeley (1983) developed their own memory questionnaire, again finding relatively low correlations or shared variance with test performance, although ratings by relatives tended to be more accurate predictors of patients' memory test scores.

Similar findings were made by Kapur and Pearson (1983) and by Squire and Zouzonis (1988), the latter finding a "temporal gradient" in remote memory, such that memory-disordered patients evaluated their earlier memories as being relatively spared, compared to more recent memories. Moreover, comparing Korsakoff and non-Korsakoff amnesic patients, Squire and Zouzonis (1988) found that the former patients reported significantly less impairment in evaluating their current memory performance, despite a lower mean memory quotient. By contrast, Parkin, Bell and Leng (1988) failed to find significant differences on a 14-item questionnaire when comparing patients with presumed diencephalic lesions and those with presumed temporal lobe lesions. Although all patient groups showed significantly lower subjective memory evaluations than healthy subjects, the temporal lobe group rated themselves significantly lower than the frontal lobe or diencephalic groups despite comparable severity of amnesia, implying more severely impaired "insight" in the latter two groups. There was a temporal gradient such that patients rated their memory for "old" (premorbid) items better than their memory for "new" (recent) or prospective items.

Table 1. Participants included in analyses of the AMQ

Subsample	Items	N	Median age	Range
Adult sample	20	108	44	23–60
Police students	24	175	22.5	19–36
Psychology students I	24	121	32	20–54
Social workers	24	83	38	27–58
Psychology students II	25	62	21	16–50
Psychology classes	7	74	20	16–42
Total		623	28.1	16–58

The primary purpose of the current study was to develop a self-rating scale of absentmindedness, which can be used as a quick method for assessing forgetfulness and absentmindedness in the context of everyday memory performance not only at one occasion, but also as a follow-up instrument. A secondary purpose was to study the relationships between absentmindedness and other aspects of self-rated memory.

METHOD

The AMQ underwent a development procedure between the initial pilot version in 1980 until its current version. Different samples of healthy participants were engaged at each revision with the major portion of participants being students. The samples were 108 adult students at senior high school level and their relatives, 175 police students, 129 psychology students at a university and 83 social workers, 62 psychology students at a small college, and 74 senior high school students, in total 623 participants (see Table 1).

Factor analysis was the main method used in order to define the factor structure of the questionnaire. The Maximum Likelihood and the

Generalized Least Squares (GLS) methods were used with promax rotations to define correlations between factors. The significance level was set to 0.05 to assess the minimum number of factors involved, which means that the residual correlation matrices should not include significant unexplained correlations between items. The breakpoint in the plot of eigenvalues above 1 was used as the first criterion for the number of factors. The maximum number of factors was determined by the use of Chi² differences at each subsequent step after reaching non-significance. The confirmatory factor analysis used was the LISREL II developed by Jöreskog.

RESULTS

Pilot sample

A pilot version of the AMQ was administered to groups of adult students at a senior high school north of Stockholm. This version had rating scales with four response alternatives, and was factor analyzed using GLS with promax rotation. Three factors emerged based on 16 of the 20 items in the inventory from self-ratings of the 108 participants in the pilot study (see Table 2). This solution was based on the numbers of factors at the scree of the plot of eigenvalues and the probability level. The adjustment of the model, based on the oblique rotation, was 0.35 with a Tucker's reliability of 1.07. The factors may be interpreted as (I) Forgetfulness, (II) Person memory, and (III) General knowledge. Factors were interpreted based on content rather than process. This interpretation was because correlational data from objective semantic or episodic memory tests were not available and because there were no significant correlations with age.

Most participants found it difficult to rate their forgetfulness and memory using only four response alternatives. Modeling some

Table 2. Factor structure of the pilot version of AMQ after promax rotation

Item no.	Item content	I. Forgetfulness	II. Person memory	III. General knowledge
3	Appointments	0.43	-0.09	-0.23
5	Miss TV-show	0.35	0.17	-0.17
6	Important things	0.75	0.05	-0.06
9	Forgetful	0.58	0.02	0.07
11	Misplace things	0.57	0.12	0.07
16	Petty things	0.92	-0.07	0.11
19	Routine acts	0.68	-0.22	0.07
20	Things undone	0.47	-0.03	-0.18
1	Birthdays	0.25	0.48	0.18
2	Phone numbers	-0.25	0.69	0.001
7	Addresses	0.09	0.53	-0.07
10	Remote family events	0.26	0.40	-0.04
12	Names, numbers	-0.10	0.77	-0.49
14	English glossary	-0.12	0.05	-0.44
15	Contemporary history	0.08	0.01	-0.46
4	Facts from reading	-0.11	0.16	-0.66
Factor correlations				
	I. Forgetfulness	1.00		
	II. Person memory	0.23	1.00	
	III. General knowledge	-0.17	0.07	1.00
	Chi ² with 75 df = 78.99	<i>p</i> -level = 0.35		
	Tucker's reliability = 1.07	<i>N</i> = 108		

Table 3. Promax-rotated factor loadings, police students

Item no.	Item content	I. Forgetfulness	II. Location memory	III. Person memory	IV. Codes and addresses
6	Misplace things	0.73	-0.01	0.02	-0.03
11	Forgetfulness	0.70	-0.05	0.14	0.17
12	Petty things	0.66	-0.09	0.02	-0.02
16	Stop and wonder	0.61	0.07	0.02	0.02
17	Important things	0.45	0.03	-0.11	-0.19
22	Routine acts	0.20	0.01	0.11	0.07
14	What to do	0.50	-0.01	0.00	0.08
3	Appointments	0.41	-0.01	-0.10	0.05
8	What to say	0.40	0.07	-0.07	-0.07
10	Face recall	0.00	0.06	-0.37	0.14
15	Gait recall	-0.13	-0.06	-0.75	0.11
19	Interior	0.07	0.03	-0.69	-0.17
4	Road directions	0.01	0.55	-0.15	0.05
9	Find way home	-0.08	0.94	0.00	-0.02
24	Local sense	0.11	0.76	0.10	0.05
1	Make phone call	0.16	0.08	0.25	0.52
5	Phone numbers	-0.11	0.08	0.01	0.33
21	Numbers	-0.09	-0.01	-0.04	0.52
2	Addresses	-0.03	-0.07	-0.23	0.49
20	Anecdotes	0.08	0.05	0.03	0.17
23	Celebrity names	0.18	-0.10	-0.16	0.36
	Maximum likelihood				
	Chi ² with 132 df =	159.41			
	Probability level:	0.05			

Table 4. Factor correlation matrix, police students

	I. Forgetfulness	II. Location memory	III. Person memory	IV. Codes and addresses
I. Forgetfulness	1.00			
II. Location memory	-0.37	1.00		
III. Person memory	-0.30	-0.09	1.00	
IV. Codes and addresses	0.19	0.26	0.20	1.00

features of the IME-F, the AMQ pilot was therefore modified into an inventory with 24 items with seven-point scales. The reason for keeping the inventory that short was that the number of random factors otherwise could intrude into the analysis in small samples. If the number of factors is expected to be around 5, and the number of items around 24, then the number of participants must exceed 120, according to Jöreskog's rule of thumb (Jöreskog, personal communication).

Police students

The new version of the questionnaire was administered to 175 police students and responded to as part of their psychology classes. Their mean age was 26 ± 3.4 years among whom 127 were men and 48 women. They came from all over Sweden representing primarily lower middle class or middle class. The questionnaire took 10–15 minutes to complete. This was done anonymously. Two study groups ($N = 35$) took the AMQ twice with a four-week interval in order to get data for retest

reliability, which was estimated to $r_{tt} = 0.86$ using Pearson correlation.

As can be seen in Table 3, there were more factors involved in this version of the questionnaire. The factor structure is barely above significance, but clearly interpretable according to item content. Factors were thus labeled Forgetfulness, Locations, Person Memory and Numbers/Addresses. Intercorrelations between factors are shown in Table 4. None of the factor correlations exceeds 0.40. There were no significant correlations with age. Split-half reliability was computed for the subscale or factor Forgetfulness ($r = 0.75$).

Psychology students

The inventory was then administered among 129 students attending senior high school, adult education or undergraduate courses at Stockholm University. Once again the scores were subjected to factor analysis according to Jöreskog's exploratory methods using the Maximum Likelihood method with oblique

Table 5. Promax-rotated factor loadings, psychology students

Item no.	Item content	I. Forgetfulness	II. Location memory	III. Person memory	IV. Codes and addresses
6	Misplace things	0.67	0.05	0.02	0.03
11	Absentminded	0.69	0.03	-0.01	-0.01
12	Petty things	0.73	-0.08	-0.03	0.23
16	Stop and wonder	0.61	0.09	0.15	0.00
17	Important things	0.74	-0.03	-0.16	0.13
22	Routine acts	0.59	0.06	-0.03	0.01
14	What to do	0.69	-0.07	0.10	-0.17
3	Appointments	0.47	0.00	0.08	-0.08
8	What to say	0.37	0.00	0.00	-0.15
10	Face recall	-0.03	0.18	0.41	0.03
15	Gait recall	0.05	-0.10	0.74	0.02
19	Interior	0.00	0.08	0.71	0.06
4	Road directions	0.09	0.57	-0.06	-0.20
9	Find way home	-0.01	0.94	0.04	0.03
24	Local sense	-0.05	0.89	-0.03	0.06
1	Make phone call	-0.07	0.04	-0.04	-0.71
5	Phone numbers	-0.12	-0.10	0.17	-0.63
21	Numbers	0.05	0.01	-0.30	-0.65
2	Addresses	-0.05	0.03	0.04	0.31
20	Anecdotes	-0.01	-0.03	0.18	0.01
23	Celebrity names	0.22	-0.16	0.14	-0.30
	Maximum likelihood				
	Chi ² with 132 df =	151.09			
	Probability level:	0.12			

Table 6. Factor correlation matrix, psychology students

I. Forgetfulness	1.00			
II. Location memory	-0.05	1.00		
III. Person memory	-0.26	-0.05	1.00	
IV. Codes	-0.17	-0.10	-0.16	1.00

rotation of factor axes. As shown in Table 5, the same factor structure as for the police sample was obtained, and factor loadings were about the same magnitude for this sample. Inter-correlations among factors were generally smaller for the sample of psychology students with none of the correlations exceeding 0.30 (see Table 6).

Analysis of the subscale Forgetfulness

An inspection of the matrix of correlations among items loading on Forgetfulness indicated that a number of correlations were relatively low; see Table 7, in which items have been sorted in order to minimize correlations in the left lower quadrant. A GLS analysis of these correlations revealed two subfactors, tentatively labeled Attentional Deficit and Prospective Memory (see Table 8).

Gender differences

Differences were found in two factors, Locations and Person Memory. Table 9 shows that men rated their location memory

significantly higher than women, while the reverse relationship was found regarding person memory. There was no significant gender difference in the Absentmindedness or Forgetfulness factor. Instead the two genders rated their absentmindedness in the eight items similarly.

Social workers

A confirmatory factor analysis using LISREL was made using a third sample ($N = 83$) including social workers with a median age of 37 and with a majority of women (63/83). The 24-item version was significant, but items 7 and 13 were excluded on the same basis as in the earlier analyses. Item 20, Anecdotes, was also excluded because it loaded only insignificantly in the earlier exploratory analysis only among males. The four-factor model was then confirmed as it deviated from significance ($p = 0.09$). LISREL estimates are given for the four factors (see Table 10). An explorative factor analysis of the same sample showed an excellent fit for a similar factor structure ($p = 0.98$).

No significant differences were found between the main categories (police students, psychology students and social workers) and no significant age correlations were obtained in the separate scales.

Second version, college students

Four items were added to the questionnaire in order to include aspects of verbal episodic memory with a narrative basis. This new version of the questionnaire was administered to 64 college

Table 7. Correlation matrix for the subscale Forgetfulness

Item	Content	17	12	6	11	16	14	8	3
17	Important things	1.00							
12	Petty things	0.33	1.00						
6	Misplace things	0.33	0.44	1.00					
11	Absentminded	0.25	0.43	0.51	1.00				
16	Stop and wonder	0.32	0.30	0.46	0.43	1.00			
14	What to do	0.19	0.24	0.29	0.31	0.35	1.00		
8	What to say	0.20		0.29	0.22	0.19	0.31	0.25	1.00
3	Appointments	0.06	0.26	0.27	0.30	0.26	0.35	0.27	1.00

Correlations < 0.2 are in bold.

Table 8. GLS analysis of Table 7

Item no.	Content	One-factor	Two factors	
			Attention	Prospective
17	Important things	-0.45	0.46	0.00
12	Petty things	-0.61	0.57	0.08
6	Misplace things	-0.70	0.74	-0.01
11	Absentminded	0.67	0.66	0.05
16	Stop and wonder	-0.64	0.44	0.27
14	What to do	-0.51	0.01	0.63
8	What to say	-0.44	-0.04	0.60
3	Appointments	-0.45	0.05	0.50

students with a median age of 21 during their psychology classes. The new items were Lecture recall, Film plot recall, Anecdote recall and Agenda recall (to remember speaker order at meetings). The factor solution in this sample was similar to earlier versions except for the small loadings for the items Forget what to say and Forget appointments on the Absentmindedness factor. Furthermore, the Person factor now received substantial loadings from Names, Face recall, Face recognition and Speaker order, while the item Furniture loaded on the Local factor. There were no significant effects of gender on any of the scales, but a significant correlation between Age and Numbers & addresses ($r = -0.26, p < 0.05$).

AMQ-short

A short version of AMQ that included only the seven absentmindedness items from the original versions was administered to a young sample (mean age: 20.4, SD 5.4). There were 32

men and 42 women, 74 in all. There was no significant gender difference in age ($t < 1$). The KMO measure of sampling adequacy was 0.79 and Cronbach's alpha was 0.82. A two-factor solution in which factors correlated 0.22 was acceptable; the χ^2 difference, compared to the one-factor solution, with 6 degrees of freedom was significant ($p < 0.001$). Based on a Maximum Likelihood analysis, five of the seven items loaded on the first factor (see Table 11). However, the interpretation of these factors is not straightforward. Possibly, the first factor may reflect absentmindedness related to deficient prospective memory whereas the second factor may be interpreted as working memory overload or dysfunction.

An ANOVA for repeated measures showed no significant effect of gender ($F < 1$) on scores from the two factors, nor was there any significant gender \times factor interaction.

Items 1 and 3 had relatively low standard deviations in this younger sample and were also very skewed. In order to enhance internal consistency, these items were excluded in a second analysis, resulting in an improved Cronbach's alpha of 0.85. The KMO measure of sampling adequacy was also improved to 0.82. A Maximum Likelihood factor analysis was conducted on these five items (see Table 12). One factor accounted for 53.7% of the total variance. This version of AMQ, tentatively labeled AMQ-5, showed a less skewed distribution, with a small group of absentminded individuals scoring about two standard deviation units above the mean (see Fig. 1). The gender difference was not significant [$t(71) = 1.18, n.s.$].

DISCUSSION

Different versions of the AMQ were factor-analyzed in order to define the factor structure of the questionnaire. The first seven-

Table 9. Mean factor scores by gender

Factors	Women	Men	<i>t</i> -value	<i>p</i>	Sex in favor
I. Forgetfulness	46.44	46.34	0.09	0.93	
II. Location memory	13.98	15.84	-3.32	0.001	Men
III. Person memory	13.46	11.44	4.37	0.001	Women
IV. Codes and addresses	11.41	11.71	0.71	0.67	

Table 10. Confirmatory factor analysis (social workers)

Item no.	Item content	I. Forgetfulness	II. Location memory	III. Person memory	IV. Codes and addresses
6	Misplace things	0.53	0.00	0.02	0.00
11	Absentminded	0.69	0.00	-0.01	-0.01
12	Petty things	0.61	0.00	-0.03	0.00
16	Stop and wonder	0.60	0.00	0.15	0.00
17	Important things	0.57	0.00	-0.16	0.00
22	Routine acts	0.57	0.00	-0.03	0.00
14	What to do	0.80	0.00	0.10	0.00
3	Appointments	0.53	0.00	0.08	0.00
8	What to say	0.28	0.00	0.00	0.00
10	Face recall	0.00	0.00	0.28	0.00
15	Gait recall	0.00	0.00	0.77	0.00
19	Interior	0.00	0.32	0.81	0.00
4	Road directions	0.00	0.61	0.00	0.00
9	Find way home	0.00	0.98	0.00	0.00
24	Local sense	0.00	0.88	0.00	0.00
1	Make phone call	0.00	0.00	-0.04	0.50
21	Numbers	0.00	0.00	-0.30	0.42
2	Addresses	0.00	0.00	0.04	0.58
23	Celebrity names	0.30	-0.16	0.14	0.25
	Maximum likelihood				
	Chi ² with 181 df =	206.53			
	Probability level:	0.09			
Factor correlations in the confirmatory analysis					
	I. Forgetfulness	1.00			
	II. Location memory	-0.07	1.00		
	III. Person memory	0.26	-0.18	1.00	
	IV. Codes	-0.17	-0.13	0.34	1.00

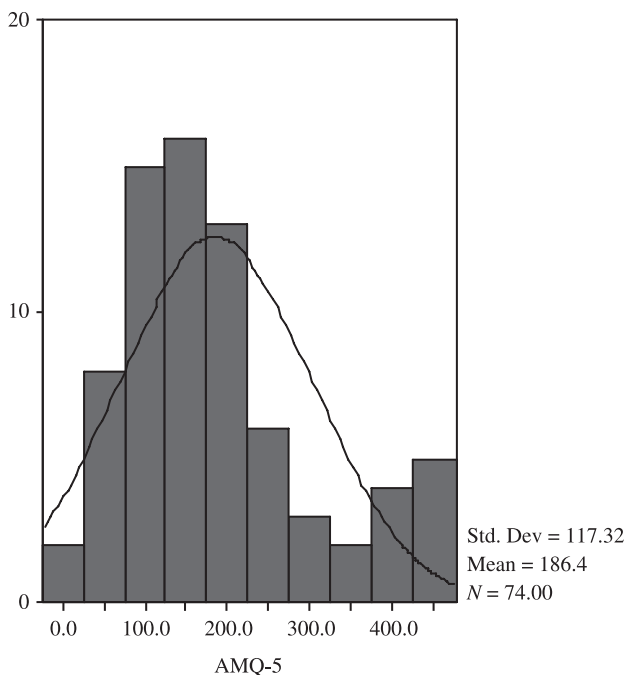


Fig. 1. Distribution of AMQ-Short scores.

point version was also subjected to a test-retest reliability test, and *t*-tests were conducted to investigate gender effects in the subscales defined by factor analysis. The AMQ had a high test-retest reliability of 0.86. Later versions of the AMQ showed

good reliability, internal consistency, based on Cronbach's alpha. Earlier versions of the questionnaire included an item which explicitly asked the respondent if he/she had been criticized for being absentminded, and this item loaded strongly on the absentmindedness factor; this may be considered a test of the validity of the questionnaire. Results from different samples showed that self-rated absentmindedness is based on an isolated factor, which correlates weakly with other memory factors extracted from correlations from self-ratings in the domains Persons, Locations and Codes/Addresses.

There were significant gender differences in favor of women in the factor Persons, which included items on face recall, face recognition, and memory for dress and furniture in the first three samples studied. This finding is in line with differences found between women and men in face recognition (Herlitz, Nilsson & Bäckman, 1997). In contrast, there were gender differences favoring men in the factor Locations, which was based on items related to sense of direction, not going astray, memory for road directions and the ability to find one's way back home in a new environment. This finding is in agreement with studies of sex differences in spatial tasks (Kimura, 1999). There were no significant differences in the factor related to codes and addresses.

The last two analyses of the AMQ, based on relatively young samples, showed factor structures similar to previous ones. So far, these analyses validated earlier findings. The attempt to identify subjective forgetfulness in verbal recollection or narrative memory

Table 11. *College students*, N = 62
Pattern matrix

	Factor			
	1	3	4	
Make phone call	0.109	0.14	-0.07	-0.25
Names	-0.01	-0.10	0.40	0.26
Appointments	0.32	-0.39	-0.14	-0.14
Road directions	0.00	0.56	0.12	0.03
Phone numbers	0.20	0.12	-0.27	0.99
Misplace	0.81	-0.06	-0.04	0.02
Face recall	0.01	-0.03	0.60	-0.07
Find way home	0.05	0.76	-0.09	0.10
Face recognition	-0.05	0.22	0.64	0.01
Addresses	0.39	0.20	-0.07	0.47
Petty things	0.79	-0.04	0.14	-0.16
Lecture	-0.10	0.19	0.11	0.21
Forget to do	0.62	0.02	-0.18	0.06
Gait recall	0.01	0.06	0.36	0.21
Stop wonder	0.79	0.00	0.17	0.12
Important things	0.60	-0.05	-0.24	-0.07
Film plot	0.03	-0.06	0.30	-0.00
Get lost	-0.13	0.66	0.05	-0.06
Interior	0.04	0.41	0.28	-0.08
Anecdotes	-0.30	0.168	0.18	0.08
Numbers	0.09	0.13	-0.01	-0.26
Routine acts	0.41	-0.21	-0.10	0.05
Local sense	-0.08	0.67	-0.07	-0.12
Speaker order	0.00	-0.10	0.62	-0.13

Notes: Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 9 iterations.

by the addition of four items, however, was not successful. Only one of the new items (Speaker order) loaded above 0.40, but on the Person factor. It may also be noted that the Person factor, which in earlier analyses only included items on visual memory (Face recall, Face recognition, Memory for clothes and Memory for furniture), now also included memory for names. Further analyses of a larger sample might replicate this finding. Regarding the scoring of the absentmindedness factor, the findings from the two latest samples may indicate that only five of the original seven items should actually be included if older and younger samples should be compared.

Another finding in the present study was that the absentmindedness factor may be divided into an attentional deficit factor and a factor related to memory for things to be done or prospective memory. This finding is in line with studies using the CFQ (Klumb, 1995). It may be noted, though, that this subdivision may not be as clear among younger individuals owing to less variation in forgetfulness pertaining to meetings or similar occupational activities.

Based on these results, absentmindedness may be construed as both an attentional deficit and a personality trait. This interpretation presupposes that the term personality trait stands for *habitual* ways of using cognitive and emotional capacities. Some absentminded persons may have attentional deficits,

Table 12a. *AMQ-short*
Pattern matrix

	Factor	
	1	2
Misplace	0.71	-0.26
Petty things	0.58	-0.11
Forget tasks	0.89	-0.01
Stop wonder	0.63	-0.50
Important things	0.50	-0.01
Appointments	0.58	0.35
Forget what to say	0.11	-0.56

Notes: Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 17 iterations.

Table 12b. *AMQ-short 5 items*
Factor matrix

	Factor
Misplace	1
Petty things	0.86
Forget tasks	0.66
Stop wonder	0.77
Important things	0.78

Notes: Extraction Method: Maximum Likelihood. 1 factor extracted. 4 iterations required.

while others may develop a specific action habit in which the focus of attention easily shifts from physical action to thinking. This would be the reverse of hyperactivity, in which attention often shifts from thinking to physical action (Copeland & Weissbrod, 1978). Actions are intended, implemented, maintained, disengaged, and finally evaluated (Heckhausen & Kuhl, 1985; Kuhl, 1994). The first and last of these phases, intention and evaluation, engage the intellect more than maintenance. The absentminded person may thus *habitually* attach greater importance to the first phases of an act, and accordingly less importance to maintenance, especially if the action includes overlearned physical procedures that leave channels open for further intellectual processing.

If this reasoning is correct, work psychologists and other professionals trying to minimize absentmindedness episodes should work with extremely absentminded people accordingly, and encourage and train absentminded people to refrain from intellectual processing during short-time routine activities. In order to reduce habitual absentmindedness, the absentminded person should then try specific self-control imperatives or indicative silent action-oriented statements like "Pick the screwdriver in the garage" or "I'm now walking into the garage in order to pick a screwdriver". From the results in the present

study it appears that absentminded people do not necessarily present with an impaired memory. Absentminded people should thus try "action training" rather than engage themselves in memory training.

It may actually be the case that habitually *non-absentminded* people in fact silently talk to themselves in that manner, but that absentminded people seldom do. To the knowledge of the authors, no research has compared such silent self-instructive behavior in extremely absentminded persons and non-absentminded, so an empirical study to address this issue would be welcome.

Another state of mind that would possibly give rise to absentmindedness is depression. Preliminary results from an ongoing study by the authors actually show that AMQ-short scores correlates significantly with scores from a modified version of Beck rating scale.

Finally, a methodological point may be addressed. Unlike recently developed questionnaires (e.g. Rönnlund *et al.*, 2008), the AMQ does not include Likert-type response scales. Likert items with extreme values at endpoints and no guidelines to intermediate response alternatives have the disadvantage of creating uncertainty regarding the underlying reference scales and so do not give sufficient information about the degree of forgetfulness or absentmindedness. As a consequence, they may be of less value when it comes to intra- or interindividual comparisons. If, as in the AMQ, the respondent has instead seven clearly defined frequency alternatives in each item there will be no ambiguity concerning any underlying reference scale (see the Appendix).

Concluding remarks

The AMQ was developed during a long period, about two decades, initially in the context of memory training courses as a quick subjective measure of absentmindedness and memory. It may, however, also be used as a questionnaire in memory clinics in order to get a reliable measure of subjective memory and forgetfulness in everyday life. Because the response alternatives make comparisons possible between test occasions in the main four factors as well as between subjects, the AMQ may also be used as a follow-up instrument.

The AMQ showed similar factor structures in five subsequent analyses of different samples. The factors Absentmindedness and Local memory seem rather robust, at least for the 4–5 items with the highest loadings. Exactly which items constitute the Person factor is unresolved though.

The authors encourage further research into absentmindedness as a personality trait, and propose an action intervention approach in order to minimize the frequency of forgetfulness episodes among the extremely absentminded.

Finally, it may be noted that the AMQ may only tap subjective memory in three memory domains, i.e. persons, locations and codes/addresses, and would possibly benefit from an inclusion of 3–4 items related to verbal episodic (narrative) or working memory.

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APPENDIX

Item 16 of the AMQ

16. Händer det att du går in i ett rum för att hämta en sak, för att sedan stanna upp och undra vad det var du skulle hämta?

(Does it happen that you walk into a room in order to get something, but then stop wondering what you should fetch?)

- Nej, händer aldrig
- Någon gång om året
- En gång i månaden
- Ett par gånger i månaden
- En gång i veckan
- Ett par gånger i veckan
- Ja, varje dag