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French validation of the M-Back questionnaire: assessing clinicians' knowledge of metabolic syndrome in psychiatry

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Summary

CONTEXT: Physical health is generally poorer in patients with mental illness than in the general population. Cardiovascular diseases linked to metabolic syndrome are the principle issue encountered by these patients. The four-factor M-BACK questionnaire was developed in Australia to measure the barriers, attitudes, confidence and knowledge of health staff in relation to metabolic syndrome. The goal of this study was to assess the psychometric properties of the French translation of the M-Back questionnaire.

METHODS: The French M-Back was completed online by 137 mental health professionals. Internal validity was assessed using Bayesian structural equation modelling, which is halfway between exploratory and confirmatory factor analysis. Concurrent validity was estimated by studying the relationship between the M-Back scores and several important socio-professional variables.

RESULTS: The four-factor model showed good fit to the data. Two items had significant cross-loadings on other dimensions. Hypothesised relationships between M-back scores and socio-professional variables were confirmed.

CONCLUSION: The French M-Back is a valid tool to measure the barriers, attitudes, confidence and knowledge of health staff in relation to metabolic syndrome and could be used to identify training needs in this domain among health professionals.

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Introduction

Physical health is known to be poorer in patients with mental illness than in the general population [1]. Furthermore, mortality rates are higher in people with serious mental illness such as schizophrenia, bipolar disorder and major depressive disorder [2, 3]. This is predominantly because of a higher prevalence of physical comorbidities such as cardiovascular diseases. Patients suffering from a serious mental illness tend to have a higher probability of meeting the criteria for metabolic syndrome [4], such as insulin resistance, high blood pressure, high levels of blood triglycerides, low levels of high-density lipoprotein cholesterol and/or abdominal obesity. In addition to this, people with serious mental illness have higher rates of smoking and obesity while having lower levels of physical activity compared with the general population [5, 6]. It is has also long been known that antipsychotic drugs have several side effects contributing to cardiovascular disease [7].They can lead to hyperlipidaemia [8], glucose dysregulation [9], and induction of weight gain through increased appetite and food intake [10]. It is therefore essential to take care of physical health in patients with serious mental illness and hence to propose appropriate training of the mental health staff in order for them to promote strategies that minimise the risk to develop metabolic syndrome.

The 16 items M-BACK questionnaire was developed to evaluate the impact of specialised training in metabolic health care for mental health nurses [11]. As higher mortality rates in patients with serious mental illness are strongly linked to poorer physical health [1–3], it was deemed important to assess if mental health workers felt capable of implementing the strategies that have been developed to prevent metabolic syndrome among patients with serious mental illness. The tool content and its effectiveness in evaluating training and education on the approach of metabolic health care by mental health clinicians were validated in English [11] in a study including mental health nurses, psychiatrists and psychologists, in order to explore this issue among the main professional groups involved in mental health care.

The aim of our study was to translate the questionnaire into French and verify its psychometric properties.

Materials and methods

Participants

Participants were recruited through an online questionnaire sent by e-mail to all employee of the general psychiatry service (n = 225). A total of 137 (61%) French-speaking mental health professionals participated in the study. Participants were informed about the study and those interested in participating could complete anonymously the online questionnaire. An e-mail reminder was sent 1 week later to motivate professionals who had not yet have filled in the questionnaire.

Measures

Information about age, gender, years of experience, occupation, managerial role, previous work experience in somatic medicine, metabolic syndrome training, training on specific health problems encountered by psychiatric patients, previous experience with metabolic syndrome, previous experience of referral to a specialist for metabolic syndrome and awareness that antipsychotics could increase blood glucose levels were self-reported with multiple choice questions in the initial part of the online questionnaire.

French version of the M-Back

The content of the original M-back questionnaire stemmed from a literature review and that was refined by an expert review panel and validated via a piloting process [11]. Test-retest reliability was satisfactory for all four scores. The M-BACK questionnaire is composed of 16 items, separated in 4 domains related to metabolic syndrome (knowledge, confidence, attitudes and practice barriers in relation to metabolic health), each of them scored on a five-point Likert scale ranging from 'strongly disagree' (scoring 1) to 'strongly agree' (scoring 5). Barriers items (1–4) address various elements that professionals may evoke as hindrance to metabolic screening and intervention, including workload, service user interest, conflict with mental health goals and inability to effect change. Attitudes items (5–8) investigate attitudes regarding metabolic monitoring, the provision of advice regarding smoking cessation, physical activity and nutritional intake. Confidence items (9–12) assess the confidence of respondents in providing interventions to prevent or treat metabolic syndrome, including smoking cessation, physical activity and nutritional interventions. Knowledge items (13–16) assess knowledge about metabolic health, screening, interpreting pathology reports and understanding of the metabolic side effects of antipsychotic medication. The English version of the M-Back questionnaire was translated independently by two persons working in the medical field who are native French speakers and fluent in English; discrepancies were discussed in order to produce a consensus version. The items of the French version are presented in Table 1.

Procedure

In order to assess the internal validity of the French-language M-Back scores, we tested the original four-factor M-Back model. In order to estimate the concurrent validity, we examined the relationship between M-Back scores and socio-professional variables. We hypothesised that having a senior role, having previously worked in somatic medicine, work experience and training would be related to higher scores on the knowledge, attitude and confidence dimensions, and lower scores on the barriers dimension.

Ethics approval and consent to participate

Written informed consent was obtained from all participants and all methods were carried out in accordance with the recommendations of the Declaration of Helsinki.

Statistical analysis

Internal validity

Internal validity was estimated using Bayesian structural equation modelling (BSEM) [12]. More precisely, we wanted to estimate factor loadings between the 16 items and the 4 dimensions taking into account the expected loadings, namely between items 1–4 and barriers, items 5–8 and attitudes, items 9–12 and confidence, and items

Table 1:
French version of the M-Back.

No.	Items	Dimension
1	Ma charge de travail m'empêche de faire des activités de promotion de santé avec les patients.	Barrières
2	Les patients atteints d'une maladie mentale grave ne souhaitent pas améliorer leur santé physique.	Barrières
3	Informer les patients sur les effets que les médicaments pourraient avoir sur leur santé physique augmenterait la non-adhérence.	Barrières
4	Le dépistage du syndrome métabolique et les interventions de santé physique inutiles puisque de mauvais résultats en terme de santé physique sont inévitables.	Barrières
5	Le dépistage de la santé métabolique est une partie importante de mon rôle de médecin en santé mentale.	Attitudes
6	Donner des conseils pour arrêter de fumer est une partie importante de mon rôle en tant que médecin en santé mentale.	Attitudes
7	Encourager les patients à augmenter leur taux d'activité physique est une partie importante de mon rôle de médecin en santé mentale.	Attitudes
8	Discuter de l'apport nutritionnel est une partie importante de mon rôle en tant que médecin en santé mentale.	Attitudes
9	J'ai confiance en ma capacité à dépister le syndrome métabolique.	Confiance
10	Je suis confiant dans le fournissement de conseils de sevrage tabagique aux patients.	Confiance
11	Je suis confiant dans la prescription d'interventions physiques pour prévenir / traiter le syndrome métabolique.	Confiance
12	Je suis confiant dans l'utilisation d'interventions alimentaires pour prévenir / traiter le syndrome métabolique chez les patients.	Confiance
13	J'ai une bonne connaissance du syndrome métabolique.	Connaissances
14	Je comprends comment dépister le syndrome métabolique.	Connaissances
15	Je comprends comment lire les rapports de pathologie pour les résultats des lipides et du glucose.	Connaissances
16	Je comprends les profils des effets secondaires métaboliques des différents médicaments neuroleptiques.	Connaissances

Note: Je ne suis pas du tout d'accord = 1; Je ne suis pas d'accord = 2; Neutre = 3; Je suis d'accord = 4; Je suis entièrement d'accord = 5.

13–16 and knowledge. With classical confirmatory factor analysis, almost all cross loadings between latent variables and measures are fixed to zero in order to allow the model to be identified [13, 14]. However, inappropriate zero cross-loadings can contribute to poor model fit, distorted factors and biased factor correlations; most importantly, they do not necessarily faithfully reflect theory because small but nonzero cross-loadings could be equally compatible with theory [12]. BSEM estimation combines prior distributions (i.e., what we expect before conducting the study) for parameters with new collected data (the new study data) and forms posterior distributions (what we ultimately believe after taking the new data into account and combining it with our prior beliefs) for parameters through the Bayes theorem. We used diffuse non-informative priors with a zero mean and an infinite variance for the expected loadings and Informative priors with a zero mean and a small variance (0.05) for the unexpected loadings ('cross-loadings'). Correlations between residuals were also estimated in order to gain potential insight on the measurement model [15, 16]. For that purpose a prior with a zero mean and a small variance (an inverse-Wishart distribution with 100 degrees of freedom) was chosen. Globally, BSEM is halfway between exploratory and confirmatory factor analysis because all relationships between items and dimensions were estimated and a priori knowledge was incorporated. BSEM has a better performance on small sample sizes because it does not rely on asymptotic large-sample normality of the estimates [17, 18].

Items were considered categorical ordinal and model estimation was performed using three chains with 50,000 iterations. The first half of the chains were discarded as a burn-in phase, and the second half was used to estimate the posterior distribution. Convergence was monitored using the potential scale reduction (PSR) criterion (<1.05) and model fit was assessed with the posterior predictive p-value (PPP), where a value close to 0.5 indicates a good fit [12]. Parameters were considered to be significant when the 95% credibility interval of the parameter did not cover zero.

Concurrent validity

The relationships between the M-back scores and socio-professional variables were estimated. For the type of training, three groups were compared, namely medical doctors, nurses and others (which included caregivers, dietitians, physiotherapist, psychologists, educators, animator, and occupational therapists). Sex, age and number of years of professional experience were also compared. Furthermore, we explored if having the role of senior doctor, having previously worked in somatic medicine, being previously trained on the metabolic syndrome or on health problems encountered by psychiatric patients led to different scores. We also explored if the knowledge that antipsychotics can increase blood glucose would have an impact on the four dimensions and if people who were able to observe this phenomenon would have scores different from those who had never encountered such kind of problem. Lastly, we wanted to know if the fact of having referred a patient to a specialist for metabolic syndrome in the past would lead to different results.

Nominal variables were used to define groups and either t-test or analysis of variance (ANOVA) were used to compare the M-Back scores. For continuous variables we used Person's correlations between the M-BACK scores and those variables.

Results

Internal validity

The model fit was good (PPP = 0.545). The factor loadings of the M-Back are presented in table 2. All expected loadings were successfully backed-up by the data. Two additional cross-loadings were detected (items 5 and item 9 loaded on their respective factor and on the knowledge factor as well). For this reason, we included a modified knowledge score (referred to as knowledge score 2) with these two additional items for the concurrent validity analysis.

Factor correlations indicated that the barriers factor was independent of the three other dimensions. The three remaining factors were positively correlated with each other. No correlation between error terms was detected, indicating correlations between items could be solely accounted for by the four factors.

Concurrent validity

All results are summarised in table 3. Age was negatively correlated with barriers ($r = –0.228$, $p = 0.015$) and positively correlated with confidence ($r = 0.238$, $p = 0.012$) and knowledge (score 1: $r = 0.215$, $p = 0.022$; score 2: $r = 0.233$, $p = 0.013$). Analysis revealed no significant difference regarding gender for any of the four M-back dimensions.

Years of experience were negatively correlated with barriers ($r = –0.329$, $p < 0.001$) and positively correlated with confidence ($r = 0.221$, $p = 0.011$). The knowledge scores were the only ones to differ across professions. Scores were higher for physicians and nurses (score 1: $F(2,130) = 35.286$, $p < 0.001$, difference between physicians and other occupation $d = 1.88$; difference between nurses and other occupations $d = 1.20$; score 2: $F(2,130) = 30.124$, $p < 0.001$, difference between physicians and other occupation $d = 1.71$; difference between nurses and other occupations $d = 1.11$).

Managerial role was related to lower barriers scores ($t(135) = 3.823$, $p < 0.001$, $d = 0.74$) and higher knowledge scores (score 1: $t(135) = –1.998$, $p = 0.048$, $d = 0.36$; score 2: $t(135) = –2.203$, $p = 0.029$, $d = 0.40$).

Previous work experience in somatic medicine was related to higher confidence ($t(133) = –2.660$, $p = 0.009$, $d = 0.46$) and higher knowledge (score 1: $t(135) = –4.045$, $p < 0.001$, $d = 0.70$; score 2: $t(135) = –4.126$, $p < 0.001$, $d = 0.71$).

Metabolic syndrome training was related to less barriers ($t(135) = 2.231$, $p = 0.027$, $d = 0.38$), more confidence ($t(133) = –2.865$, $p = 0.005$, $d = 0.51$) and higher knowledge (score 1: $t(135) = –4.608$, $p < 0.001$, $d = 0.83$; score 2: $t(135) = –4.700$, $p < 0.001$, $d = 0.85$).

Training on specific health problems encountered by psychiatric patients was related to less barriers ($t(134) = 3.020$, $p = 0.003$, $d = 0.52$) and higher knowledge (score1:

Table 2:
Factor loadings and factor correlations of the French M-Back.

Loadings (median)	**Barriers**		**Attitudes**		**Confidence**		**Knowledge**	
	CI 95%		**CI 95%**		**CI 95%**		**CI 95%**	
Item 1	**{0.430}**		0.041		-0.047		0.014	
	0.294	**0.630**	-0.151	0.241	-0.275	0.167	-0.321	0.363
Item 2	**{0.762}**		-0.038		-0.004		0.101	
	0.390	**1.013**	-0.238	0.133	-0.201	0.188	-0.344	0.558
Item 3	**{0.463}**		0.023		0.069		-0.097	
	0.137	**0.797**	-0.172	0.219	-0.143	0.299	-0.437	0.301
Item 4	**{0.411}**		-0.008		0.008		-0.296	
	0.059	**0.763**	-0.202	0.178	-0.202	0.213	-0.603	0.101
Item 5	-0.061		**{0.485}**		-0.051		**0.319**	
	-0.215	0.070	**0.347**	**0.657**	-0.239	0.121	**0.070**	**0.552**
Item 6	0.002		**{0.786}**		0.016		0.007	
	-0.115	0.120	**0.591**	**0.985**	-0.143	0.181	-0.278	0.280
Item 7	0.03		**{0.876}**		-0.014		-0.042	
	-0.105	0.110	**0.700**	**0.983**	-0.167	0.131	-0.342	0.238
Item 8	0.004		**{0.857}**		0.047		-0.036	
	-0.096	0.108	**0.674**	**1.036**	-0.083	0.207	-0.321	0.237
Item 9	0.010		0.003		**{0.307}**		**0.658**	
	-0.084	0.101	-0.107	0.115	**0.192**	**0.478**	**0.463**	**0.811**
Item 10	-0.034		-0.006		**{0.718}**		-0.112	
	-0.183	0.103	-0.186	0.172	**0.423**	**1.042**	-0.485	0.206
Item 11	0.003		0.013		**{0.776}**		-0.142	
	-0.135	0.138	-0.162	0.185	**0.484**	**1.089**	-0.516	0.182
Item 12	0.014		0.041		**{0.859}**		-0.099	
	-0.098	0.133	-0.104	0.206	**0.585**	**1.135**	-0.458	0.237
Item 13	0.001		-0.040		0.038		**{0.879}**	
	-0.091	0.093	-0.157	0.067	-0.077	0.172	**0.760**	**0.981**
Item 14	0.002		0.002		0.003		**{0.929}**	
	-0.073	0.078	-0.090	0.100	-0.092	0.113	**0.814**	**1.011**
Item 15	0.012		0.032		0.060		**{0.752}**	
	-0.101	0.130	-0.098	0.171	-0.082	0.230	**0.570**	**0.897**
Item 16	-0.058		0.052		-0.085		**{0.716}**	
	-0.201	0.070	-0.098	0.211	-0.275	0.080	**0.523**	**0.898**
Factor correlations								
	Barriers		**Attitudes**		**Confidence**		**Knowledge**	
Barriers	–							
Attitudes	-0.245		–					
	-0.571	0.193						
Confidences	-0.076		**0.570**		–			
	-0.502	0.403	**0.294**	**0.758**				
Knowledge	-0.287		**0.424**		**0.610**		–	
	-0.733	0.376	**0.074**	**0.672**	**0.236**	**0.819**		

Loadings in curly brackets were freely estimated. Other loadings were estimated with approximate zero priors. Loadings in bold are considered significant; CI = credibility interval.

Table 3:
Relationship between the M-Back scores and socio-professional variables.

	Barriers	**Attitudes**	**Confidence**	**Knowledge (both scores)**
Age	–		+	+
Gender				
Years of experience	–		+	
Occupation other than physician or nurse				–
Managerial role	+			+
Previous work experience in somatic medicine			+	+
Metabolic syndrome training	–		+	+
Training on specific health problems encountered by psychiatric patients	–			+
Previous experience with metabolic syndrome				+
Previous experience of referral to a specialist for metabolic syndrome		+	+	+
Awareness that antipsychotics increase blood glucose levels		+	+	+

Note: – negative relationship; + positive relationship.

t(134) = –3.766, p <0.001, d = 0.65; score 2: t(134) = –3.484, p = 0.001, d = 0.60).

Previous experience with metabolic syndrome was related to higher knowledge (score 1: t(122.457) = –4.004, p <0.001, d = 0.69; score 2: t(135) = –3.841, p <0.001, d = 0.65).

Previous experience of referral to a specialist for metabolic syndrome was related to higher attitude (t(134) = –2.303, p = 0.023, d = 0.41), higher confidence (t(133) = –2.271, p = 0.025, d = 0.40) and higher knowledge (score 1: t(135) = –4.033, p <0.001, d = 0.71; score 2: t(135) = –4.449, p <0.001, d = 0.78).

Finally, awareness that antipsychotics can increase blood glucose levels was related to higher attitude (t(134) = 2.476, p = 0.015, d = 0.21), higher confidence (t(133) = 2.132, p = 0.035, d = 0.24) and higher knowledge (score1: t(135) = 5.913, p <0.001, d = 1.11; score 2: t(135) = 5.867, p <0.001, d = 1.10).

Discussion

On the basis of this research, the French version of the M-Back is validated. Our results showed that the four-factor French version of the M-Back is adequate and similar to the original English version. In addition, we found that M-Back scores differed between professions, which is to be expected given the different roles of these professionals. These differences suggest that the training needs regarding metabolic syndrome may vary depending on profession. The more professionals are advanced in their practice, the more likely they appear to be able to promote prevention and to deal with metabolic syndrome issues, suggesting a greater training effort should be made during undergraduate training and the early years of professional practice in order to minimise this delay.

The four-factor model showed good fit to the data. Two items had significant cross-loadings on the knowledge latent variable. In other words, one attitude item and one confidence item were likely to be influenced by knowledge as well. That is why we included these two items in a six-item variation of the knowledge score. Nevertheless, the two scores yielded a very similar pattern of results with regard to concurrent validity and relationship with professional variables. For the sake of simplicity, the usage of the original fouritem scale rather than the sixitem alternative appears reasonable. Deleting those two items also appeared to be a poor alternative, given that the attitude and confidence scores would be less reliable with only three items. Barriers were not correlated to other dimensions, suggesting these items may be context dependant. Attitude, knowledge and confidence were positively correlated, which suggests training and knowledge are linked to higher confidence regarding capacity to promote strategies to mitigate the risk of metabolic syndrome.

Our hypotheses regarding potential relationships between M-back scores and socio-professional variables were confirmed and some important points emerged from the analysis of the results in this regard. The profession of medical doctor seems to lead to higher knowledge about metabolic syndrome as compared with nurses and other professions, and this is enhanced in senior doctors or in those who have previously worked in somatic medicine. As the higher feeling of knowledge and confidence were also found in older subjects and in individuals with more years of professional experience, in those who received training on metabolic syndrome or on health problems encountered by psychiatric patients, or in those who have knowledge of the side effects of antipsychotic drugs, it seems important to train people on all these subjects earlier in their careers in order to minimise delay in providing good treatment to patients. Moreover, those who have a good knowledge of the problem will also have a tendency to send the patient to a specialist because of their ability to recognise their limits and the importance of the problem. Lastly, and quite intuitively, those who have already observed the phenomenon have higher knowledge about the subject, or at least have this feeling.

Our study has some limitations. Firstly, the sample size was moderate and it has been shown that sample sizes below 100 to 150 could lead to increased over-rejection rates for indices of goodness of fit [19, 20]. This was one motivation to use the BSEM approach, which has a better performance with small sample sizes. In the present study, the hypothesised four-factor structure was well recovered and goodness of fit was good, which increases the confidence we have in our results. Secondly, regarding the comparison between professions, medical doctors constituted a small number of individuals and the group of others was heterogeneous. However, nurses and medical doctors were both homogeneous groups and results were therefore quite representative. Thirdly, it is possible that people with less knowledge regarding this issue may have been less interested in answering the questionnaire. Fourthly, although the M-Back was translated and discussed by two professionals, an additional expert committee to review and finalise the translation was not involved. Fifth, additional and larger studies are needed to disentangle the contributions of occupational differences and years of experience more thoroughly. Lastly, competences regarding metabolic syndrome were self-evaluated, and scores may not reflect to the actual level of knowledge participants had in this domain.

Conclusions

This study validated the French version of the M-Back questionnaire. Our results suggest that the French M-Back is a valid tool to measure the barriers, attitudes, confidence and knowledge of health staff regarding metabolic syndrome and that it could be used to identify training needs about this subject among health professionals. The increase in knowledge and confidence with years of practice and its dependence on type of profession suggest that a particular effort should be made to provide training to all professions and to do so early in their careers in order to maximise chances of patients being well taken care of in this regard. Because of the amount of time they spend with patients, nurses stand out as a group where such early and intensive training might have the most impact on patient care.

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Competing interests
No potential conflict of interest relevant to this article was reported.

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Author contributions
PG and PC designed this research. MC acquired the data. PG and MC analysed and interpreted the data. PG and MC drafted the first version of the manuscript. PC, CBE critically revised the manuscript for important intellectual content. All authors have read and approved the manuscript.

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