

Occupational Therapy Task Observation Scale (OTTOS) and Comprehensive Occupational Therapy Evaluation Scale (COTES): Italian translation, adaptation, and validation

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Abstract

Background. In literature there is a lack of specific evaluation tools for behavior in intellectual disabilities in general and during an activity, this is one of the most important field of the Occupational Therapy intervention.

Objective. Authors developed an Italian version of the Occupational Therapy Task Observation Scale (OTTOS) and an Italian version of the Comprehensive Occupational Therapy Evaluation Scale (COTES) and examined their reliability and validity.

Methods. The original scales were translated from English to Italian using the "Translation and Cultural Adaptation of Patient Reported Outcomes Measures—Principles of Good Practice" guidelines. Both scales were administered to adults with mild and moderate intellectual disabilities. People under eighteen years, with severe and profound intellectual disabilities and deaf people were excluded from the study. Their reliability and validity have been examined. Reliability was analyzed via internal consistency (Cronbach's alpha) and stability (intra/inter-rater coefficient), while validity was investigated via construct validity (p-value) and criterion validity using Pearson's correlation coefficients between them and with the Mini Mental State Examination and the Barthel Index Scale.

Results. The OTTOS and the COTES were administered to 30 subjects. Cronbach's α for the COTES was 0,91 and Cronbach's α for the OTTOS was 0,92. Regarding the criterion of validity, the two scales have numerous statistically positive correlations, particularly with the Mini Mental State Examination in the Orientation and total part. Furthermore, the correlation with the Barthel scale is present in the total scores, the COTES's third subscale, and the OTTOS's first.

Conclusions. The OTTOS and the COTES were reliable and valid outcome measures for assessing behavior in the Italian population. *Clin Ter* 2024; 175 (2):118-124 doi: 10.7417/CT.2024.5043

Keywords: Assessment, Behavior, Disability, Intellectual, Occupational Therapy, Validation

Implication for rehabilitation

The OTTOS and COTES are valid, reliable, easy to understand, and administer.

The scales are useful for evaluating behavior in the Italian population with mild and moderate Intellectual Disability.

Introduction

Intellectual Disability (ID) is an incomplete mental development that limits general abilities compared to individuals of the same age, gender, and socio-cultural context. In the world, ID is present between 1% and 3%.¹ The prevalence is higher in developing countries, marginal contexts, and cultural poverty².

The Diagnostic and Statistical Manual of Mental Disorders (DSM-V)³ groups intellectual disability under Neurodevelopmental Disorders together with Communication Disorders, Autism Spectrum Disorder (ASD), Attention Deficit/Hyperactivity Disorder (ADHD), neurodevelopmental motor skills (including tic disorders) and Specific Learning Disorders⁴. DSM-V also identifies three fundamental clinical criteria for the diagnosis:

Deficits in intellectual functioning like reasoning, problem-solving, planning, abstract thinking, judgment, academic learning, and experiential learning are confirmed by clinical evaluation and intelligence tests; Deficits in adaptive functioning; These limitations occur during the developmental period. DSM-V identifies four levels of severity: mild, moderate, severe and profound.³

An exact diagnosis of Intellectual Disability requires a multi-professional approach and genetic, metabolic and neuro-radiological investigations, also using behavioral scales and validated tests. It includes a clinical assessment (somatic development, sensory functions, endocrine system, etc.), also of cognitive and emotional/relational psychological development and finally an adaption assessment. The evaluations must be carried out in relation to the different clinical pictures and the subject's age.² The time for a correct diagnosis varies according to the severity of the disability, usually the severe forms are diagnosed in the first years of life, while mild forms are diagnosed later, often in school age.⁵

Intellectual disability fully concerns the person, involving every area of life, such as personal interests, autonomy, daily life activities, orientation in time and space, adaptation and everything related to the social sphere. For this reason, to evaluate the impact that disability has on people's lives, different evaluation scales are used, each one for a specific area of life. However, most of the scales proposed in Italy do not appear to be specific for intellectual disability but more generic and with a more heterogeneous user base. As regards the assessment of the performance of activities of daily living, authors find Activities of Daily Living (ADL), Instrumental activities of daily living (IADL), Barthel ADL Index and the Functional Independence Measure (FIM). On the contrary, with regards to cognitive functioning, adaptive and behavioral we find Mini-Mental State Examination (MMSE), Short Portable Mental Status Questionnaire (SPMSQ), also called Pfeiffer, WHO Disability Assessment Schedule 2.0 (WHODAS 2.0), Canadian Occupational Performance Measure (COPM) and Occupational Performance History Interview OPHI-II⁶.

The Occupational Therapy Task Observation Scale (OTTOS)⁷ and the Comprehensive Occupational Therapy Evaluation Scale (COTES)⁸ were chosen because, during the research prior to this work it was evident the lack of specific evaluation scales for behavior in intellectual disabilities in general and during an activity, which is one of the most important aspects of the Occupational Therapy intervention.

The objective of this study is the translation, cultural adaptation and validation of the assessment scales OTTOS⁷ and COTES⁸.

Methods

This study was initiated based on the 2005 "Translation and Cultural Adaptation of Patient Reported Outcomes Measures – Principles of Good Practice guidelines", i.e., guidelines available in the literature for translation and cultural adaptation⁹. Before starting the study, it was necessary for the "project manager" to request permission to use the tools, in this case the OTTOS⁷ and the COTES⁸, from the copyright holders. Moreover for validation of the tool CONsensus-based Standards for the selection of health Measurement INstruments (COSMIN) have been followed.¹⁰

The study was carried out by the research group Riabilitazione Evidenze e Sviluppo of Sapienza University of Rome.

Instruments

The Occupational Therapy Task Observation Scale (OTTOS) is an English assessment tool developed at Johns Hopkins University (Baltimore, Maryland) in 1996¹. It is divided into two sub-scales: Part 1 Task Behavior and Part 2 General Behavior. The first part consists of 10 items and is specific for evaluating the patient's functions and behavior during the performance of the activities. The second instead, of 5 items, is focused on the evaluation of the patient's general behavior and way of presenting himself. Each item of the OTTOS scale can be assigned a score ranging from 0 (dysfunctional) to 10 (functional), obtaining a maximum

partial score of 100 in both parts. The scale's total score can be obtained by adding the two partial scores; the greater this result, the more functional the user behavior will be. This scale is based on the observation of the patient by the occupational therapist.

The Comprehensive Occupational Therapy Evaluation Scale (COTES) was developed in 1975 by five occupational therapists, a psychiatrist and a psychologist². It is an assessment tool of 25 items in English and subsequently validated also in Chinese. This version, chosen for this thesis study, consists of 26 items⁹. These items are divided into 3 sub-scales: I General Behavior, II Interpersonal Communication and III Task Behavior.

The 7 behaviors in the first part provide general information about the patient's habits and routines. The 6 behaviors listed in the second part concern communication and interaction skills; these can be assessed as the occupational therapy environment offers the patient the opportunity to interact with other users and operators during structured and unstructured activities. Finally, the third part of the scale comprises 13 behaviors concerning skill during the performance, a fundamental area in occupational therapy. For each of the 26 items, it is possible to give a score ranging from 0 to 4 in order of severity: 0 no problem, 1 minimal, 2 mild, 3 moderate and finally 4 severe. The total score is given by the sum of the partial score of the three sub-scales, thus obtaining a maximum total score of 104: the higher the score, the lower the

Translation and cultural adaptation

The first stage in the adaptation was forward translation: i.e., the translation from the original language. For this study, three independent translations were done for both the scales from the original English language into Italian by three distinct figures, one of whom was a native speaker. Subsequently, the three versions were merged for both scales into one. A native speaker external to the previous translations carried out the translation into the original language of the new version obtained (in our case in Italian). The back-translated versions of instruments were compared with the originals to highlight and analyze differences and any discrepancies. In the harmonization phase, a comparison was made between the different versions of the scales in the various languages into which they have been translated. In this case, the OTTOS scale does not present other translations; COTES presents the Chinese version the author sent to the "project manager".

To adapt the translated version to Italian culture, a multidisciplinary committee of experts who compare previous translations applies special techniques, according to international guidelines^{9,10}, to resolve any doubts or discrepancies and evaluate the opportunity to modify or eliminate irrelevant or ambiguous entries.

Population

We chose to evaluate a population of 30 individuals according to the following inclusion criteria: diagnosis of intellectual disability ranging from mild to moderate levels of severity and age greater than 18 years. The exclusion cri-

teria are instead levels of severity of severe and very severe intellectual disability and hypoacusia and cophosis.

All individuals were evaluated twice 14 days apart. During the first evaluations were administered the Barthel scale, the Mini Mental State Examination and simultaneously between two operators also the OTTOS⁷ and the COTES⁸. For the assessment of behavior, a central topic in both scales of our interest, group activities of interest and stimulating for the patients (chosen by them) were identified, such as recreational activities, cooking and sewing workshops, reading, writing and understanding the text. The second evaluation was performed by only one operator using only the OTTOS and COTES

All the people involved in the study were informed about the purpose of the study, the duration and the privacy protection procedures.

Reliability

By reliability, we mean the possibility that a scale used by several observers in different contexts and times allows to repeat the evaluation of the same phenomenon with substantially similar results. The reliability of the tools under examination will be evaluated by considering internal consistency and stability. The internal consistency is evaluated with Cronbach's alpha coefficient, which measures the global correlation between the elements (items) within a scale. An alpha coefficient of 0.70 is considered the minimum acceptable level of internal consistency for newly created tools, while 0.80 is the minimum acceptable for already designed tools. Test-retest is frequently evaluated with the intra-class correlation coefficient, it evaluates if a scale is reliable in time; a coefficient greater than 0.70 indicates an acceptable level of stability.¹⁰ It was also possible to evaluate the interclass correlation coefficient through two independent administrations by two operators.

Validity

Validity refers to how accurately a test measures what it purports to measure. Criterion validity is evaluated by the

calculation of a Pearson correlation coefficient, which is used for demonstrating the accuracy of one measurement by comparing it with another measure whose validity has already been demonstrated based on the calculation of correlation coefficients between the scale of interest and other scales.¹¹

Results

From 8 September 2022 to 17 October 2022, 30 people were evaluated and re-evaluated after 14 days in three Italian rehabilitation centers in Rome. The 30 participants in this study have an age range from a minimum of 19 to a maximum of 71 years and were defined as eligible because they met the inclusion and exclusion criteria. The following personal data were recorded for each participant: gender, age, diagnosis, type of access, caregiver and the possible presence of assistive devices. 53.3% of the sample is female and the total average age is 43 ± 16 (range 19-71 years). The characteristics of the sample are shown in Table 1.

Consent from author was obtained on June 8, 2022, for the translation and cultural adaptation of the OTTOS; consent was obtained from author Shu-Chun Lee of the Chinese version of the scale team on July 29, 2022, so we proceeded with the translation and cultural adaptation of the COTES.

Three individuals, including a native English speaker, translated from English to Italian the two scales, obtaining three independent versions. Subsequently, the three versions were analyzed, compared, and combined, resulting in a translated version. This version was then reported in English by an external English-speaking person, only partially aware of the objectives and use of the scales.

A multidisciplinary committee of experts, including two occupational therapists, compared the various translations, highlighting errors and inconsistencies by evaluating the opportunity to modify irrelevant or ambiguous items.

OTTOS: Item 6 was changed from "non si impegna per procedere nel compito vs. procede senza incoraggiamento" to "non si impegna per portare a termine il compito vs. procede senza incoraggiamento"; item 7 was changed

Table 1. demographic characteristics of the population

		Frequency	Percentage
Gender	Female	16	53.3
	Male	14	46.7
Access	Semi-residential	2	6.7
	Residential	28	93.3
Caregiver	Home Assistant	1	3.3
	Parents	7	23.4
	Mother	10	33.3
	Operators house-family	8	26.7
	Father	3	10.0
	Sister	1	3.3
Aids	Electric wheelchair	2	6.7
	Manual wheelchair	1	3.3
	Walker	3	10.0

from “non opera decisioni o scelte vs. prende decisioni indipendentemente” to “non prende decisioni o scelte vs. prende decisioni indipendentemente”; In item 12 the term “mansione” was changed to “compito”; item 14 was changed from “si rifiuta di partecipare, nessuna risposta allo stimolo e alle limitazioni vs. conforme al programma di trattamento, nessuna limitazione o incoraggiamento necessario” to “si rifiuta di partecipare, nessuna risposta a stimoli o ai contenimenti vs. conforme al programma di trattamento, nessun contenimento o incoraggiamento necessario”.

COTES: The term “focused attention” in item III B has been modified from “attenzione modificata” to “concentrazione” as the latter term is simpler and clearer; the term “learning” in item III H has been modified from “conoscenza” to “apprendimento” as deemed appropriate highlight how the item wanted to refer to ability to learning of the patient and not to knowledge already acquired; the expression “decision-making” in item III K has been changed from “prendere una decisione” to “processo decisionale”, a simpler and less literal form.

From the administration of the Barthel scale, a minimum score range of 20 and a maximum of 95 was obtained, while a minimum score of 6 and a maximum of 21 was noted after the administration of the Mini Mental.

The reliability of the two scales was evaluated through internal consistency with Cronbach’s alpha and stability with the intraclass correlation coefficient, analyzing the degree of correlation between items measuring the same construct. An interval of 14 days was considered appropriate for the study population.

The analysis of Cronbach’s alpha found that both scales have excellent internal consistency, visible in Table 2. The total COTES was found to have a Cronbach’s alpha value of 0.91, while the total OTTOS was 0.92. The analysis of all subscales also showed values >0.70 except in subscale II in COTES (interpersonal communication). If an item were eliminated, analysis of Cronbach’s alpha shows that all items are important for both scales. An alpha coefficient of 0.70 is considered the minimum acceptable level of internal consistency for newly created tools, while 0.80 is the minimum acceptable for already designed tools.

Stability is evaluated with the intraclass correlation coefficient; a coefficient greater than 0.70 indicates an acceptable level of stability.

Table 3 shows the intra-rater reliability, i.e., sub-scale values and totals of the OTTOS and COTES in the two times T0 and T1. The table shows that all sub-scales are stable after repeated administrations 14 days apart. While in Table 4 the interoperability reliability is reported, the scores obtained by the simultaneous administration of the same scales by two operators in a completely independent way are evident. As seen in the table, all the subscales are stable between the administrations of two operators.

Criterion validity is used to demonstrate the accuracy of a scale by comparing it with another scale whose validity has already been demonstrated. As shown in Table 5, the two scales under examination have numerous statistically positive correlations, particularly with the Mini Mental State Examination in the Orientation and total part. Furthermore, the correlation with the Barthel scale is present in the total

Table 2. Internal consistency of the scales: analysis of Cronbach’s alpha

	Cronbach’s alpha if an item is deleted	Alpha of sub-scale
COTES I A	.823	.831
COTES I B	.838	
COTES I C	.792	
COTES I D	.817	
COTES I E	.787	
COTES I F	.798	
COTES I G	.796	
COTES II A	.613	.612
COTES II B	.554	
COTES II C	.588	
COTES II D	.474	
COTES II E	.598	
COTES II F	.569	
COTES III A	.824	.841
COTES III B	.814	
COTES III C	.840	
COTES III D	.808	
COTES III E	.829	
COTES III F	.834	
COTES III G	.826	
COTES III H	.822	
COTES III I	.820	
COTES III J	.828	
COTES III K	.843	
COTES III L	.852	
COTES III M	.840	
OTTOS I 1	.869	.881
OTTOS I 2	.898	
OTTOS I 3	.860	
OTTOS I 4	.859	
OTTOS I 5	.875	
OTTOS I 6	.860	
OTTOS I 7	.865	
OTTOS I 8	.864	
OTTOS I 9	.871	
OTTOS I 10	.866	
OTTOS II 11	.824	.795
OTTOS II 12	.791	
OTTOS II 13	.670	
OTTOS II 14	.741	
OTTOS II 15	.726	

scores, in the COTES’s third subscale and in the OTTOS’s first.

Construct validity refers to how well a scale measures the specific construct for which it was designed. The following

Table 3. intra-rater reliability, intraclass correlation index.

			Correlation between classes	Confidence interval 95%	
	Test mean±standard deviation T0	Retest mean±standard deviation T1		Lower limit	Upper limit
COTES I	16.00±4.50	16.33±4.11	.907	.805	.956
COTES II	15.53±3.63	14.97±3.48	.830	.642	.919
COTES III	36.67±6.23	35.97±6.40	.944	.883	.973
COTES total	68.20±12.87	67.23±12.83	.932	.857	.968
OTTOS I	55.20±8.73	54.37±7.94	.949	.893	.976
OTTOS II	60.93±10.40	60.73±8.98	.963	.922	.982
OTTOS total	116.13±18.40	115.10±16.34	.969	.935	.985

COTES I: General Behavior

COTES II: Interpersonal Communication

COTES III: Task Behavior

OTTOS I: Task Behavior

OTTOS II: General Behavior

Table 4. Inter-rater reliability, intraclass correlation index

			Correlation between classes	Confidence interval 95%	
	Rater 1 mean±standard deviation	Rater 2 mean±standard deviation		Lower limit	Upper limit
COTES I	16.00±4.50	15.87±4.54	.896	.781	.950
COTES II	15.53±3.63	14.93±3.33	.823	.629	.916
COTES III	36.67±6.23	35.07±8.98	.870	.727	.938
COTES Total	68.20±12.87	64.97±15.94	.857	.700	.932
OTTOS I	55.20±8.73	52.50±12.47	.864	.715	.935
OTTOS II	60.93±10.41	59.67±12.70	.939	.872	.971
OTTOS totaled	116.13±18.40	112.83±23.71	.929	.852	.966

COTES I: General Behavior

COTES II: Interpersonal Communication

COTES III: Task Behavior

OTTOS I: Task Behavior

OTTOS II: General Behavior

ranges were considered in interpreting the results: $\rho > 0.70$ = strong correlation, $0.50 < \rho < 0.70$ = moderate correlation and $\rho < 0.50$ = weak correlation. The significance level was set as a p-value less than or equal to 0.05.

Discussion

On 17 November the two translated, culturally adapted and validated scales were sent to their respective authors. The culturally-adapted versions of the OTTOS and the COTES proved to be valid, reliable and easy to understand and administer, useful for observing and evaluating behavior. Regarding the COTES scale, its ICC values from 0.83 to 0.96

were similar to those obtained in 2020 from the Test-Retest reliability study in people with Schizophrenia (Authors En-Chi Chiu, Shu Chun Lee, Kuan-Yu Lai, Fang Yu Gu) from which ICC values emerged for the overall scale and the three subscales ranging from .91 to .97.¹¹

While as regards the OTTOS scale, this was the first study to evaluate the following aspects. It was interesting to note, through the Pearson correlation index in Table 5, how the Barthel scale is closely correlated with the COTES and OTTOS scale scores and with subscales I of the OTTOS and III of the COTES related to behavior during the activities. In the adult and elderly population with intellectual disabilities, daily activities are important to measure as physical and cognitive abilities condition them.¹³ The correlation

Table 5. Construct validity, Pearson correlation index

Correlations														
	Barthel Index	MME-Orientation	MME-Registration	MME-Recall	MME-Language	MME-con-structive practice	MME Total	CO-TES I	CO-TES IIE	CO-TES III Edda	CO-TES total Edda	OT-TOS I Edda	OTTOS II Edda	OT-TOS total Edda
COTES I	-.316	-.595**	-.081	-.021	-.015	-.042	-.423*					-.645**	-.689**	-.691**
COTES II	-.200	-.563**	.019	-.144	.114	-.132	-.361*					-.650**	-.585**	-.636**
COTES III	-.423*	-.593**	-.153	-.038	-.149	-.293	-.472**					-.813**	-.674**	-.766**
COTES Total	-.372*	-.654**	-.097	-.066	-.046	-.194	-.478**					-.802**	-.732**	-.792**
OTTOS I	.409*	.655**	.060	.123	.245	.255	.572**	-.645**	-.650**	-.813**	-.802**			
OTTOS II	.297	.543**	.017	.162	.162	.128	.487**	-.689**	-.585**	-.674**	-.732**			
OTTOS total	.363*	.620**	.041	.149	.214	.193	.551**	-.691**	-.636**	-.766**	-.792**			

*The correlation is significant at the 0.05 level (two-tailed).

**The correlation is significant at the 0.01 level (two-tailed)

COTES I: General Behavior

COTES II: Interpersonal Communication

COTES III: Task Behavior

OTTOS I: Task Behavior

OTTOS II: General Behavior

MMSE: Mini mental state examination

between dependency in carrying out daily activities and physical condition was analyzed in various studies from which it emerged that a low level of physical condition, in particular grip strength and balance, not only influences the user's addiction but is also a predictive sign of a decline in the person's general abilities^{12,13}. At the same time, it is known that cognitive abilities influence activities of daily living. According to one study, older adults with intellectual disabilities face a marked decline in daily functioning over a 3 years.¹⁴ Such people often experience lifelong dependence on others and that is why important to maintain as much independence as possible.¹⁵

Furthermore, in Table 5 it is possible to note how the Orientation subscale of the Mini Mental State Examination and its total score are scrupulously correlated with the Occupational Therapy Task Observation Scale and Comprehensive Occupational Therapy Evaluation Scale, therefore with the user's behavior in general and during the performance of activities. People with intellectual disabilities appear more vulnerable to developing behavioral problems such as "defiant behavior", aggression, tantrums, yelling and self-harm. This makes it difficult for the individual, family and support staff to relate functionally and effectively to the point of social isolation and limited opportunities to participate in daily social activities. Furthermore, users with mild and moderate intellectual disabilities, i.e., the users of this thesis study, have a higher frequency of problematic behavioral aspects; these people may reflect more on their life situation.¹⁷ To conclude, this study has identified two new tools lacking in Italy for assessing the behavioral profile of the population

with intellectual disabilities. It is hoped to be able to validate the same two scales for psychiatric pathologies.

Conclusion

In conclusion, the culturally adapted OTTOS and COTES show themselves to be valid and reliable scales to measure behavior in the Italian population with intellectual disabilities; they were not available prior to this study. This work provides a new tool for Italian professionals to measure and capture this important outcome. The occupational therapist now has a method to measure this invisible barrier to quality of life and independence in people with intellectual disabilities, and they will be able to make informed decisions when setting treatment for this population. The COTES and OTTOS also provide researchers with a tool in an important and relevant study area for future research.

Disclosures

Conflicts of interest

All authors declare no conflicts of interest.

Ethics statement

All procedures were performed in accordance with the ethics standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki

Declaration of 1975, as revised in 2008. Ethics committee approval was not required for this study, this research involves data which is provided without any identifier or group of identifiers which would allow attribution of private information to an individual. Informed consent was obtained from all participants for being included in the study.

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Availability of data and material

Data that support the findings of this study are available from the corresponding author upon reasonable request.

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