DOI: https://doi.org/10.30795/jfootankle.2022.v16.1671

Original Article

Translation, cultural adaptation, and validation of the Manchester-Oxford Foot Questionnaire into Brazilian Portuguese

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Abstract

Objective: Translate, culturally adapt and validate the Manchester-Oxford Foot Questionnaire (MOXFQ) into Brazilian Portuguese.

Methods: The translation followed the guidelines standardized in the literature, including initial translation, back-translation, committee review, pre-test phase, and application of the final questionnaire in 50 patients. Intraobserver reproducibility was evaluated by reapplying the final version of the questionnaire 14 days after the first application. The validation of the final MOXFQ translation was assessed by conjoint application with the SF-36 Quality of Life questionnaire; similar domain scores of the two questionnaires were compared and analyzed.

Results: Excellent reproducibility was observed for three domains with statistical significance, the intra-class correlation coefficient (ICC) values were: pain 0.98, walking/standing 0.99, and social interaction 0.98. Internal consistency/reliability obtained excellent values: pain 0.992, walking/standing 0.997, and social interaction 0.992, all with statistical significance ($p<0.001$). In the MOXFQ validation compared to the SF-36, the highest correlations of the study were found between the SF36 physical functioning domain and the MOXFQ walking/standing (-0.72) and social interaction domains (-0.73). Comparing the MOXFQ walking/standing domain, a good correlation was obtained with the SF-36 physical functioning (-0.41), bodily pain (-0.42), vitality (-0.45), and mental health (-0.40) domains. Also a good correlation was obtained on MOXFQ pain domain with the SF-36 physical functioning (-0.45) and social functioning (-0.43).

Conclusion: The MOXFQ Brazilian version proved reliable, valid, and reproducible in measuring the symptoms and functional limitations of patients affected by foot and ankle diseases.

Level of Evidence IV; Therapeutic Studies; Case Series.

Keywords: Pain; Reproducibility of results; Surveys and questionnaires; Translations.

Introduction

Foot and ankle diseases have a great impact on the quality of life of patients[1]. Therefore, surgeries to treat these diseases are quite common in orthopedic practice. However, the evaluation of the results of proposed treatments may be questionable because researchers use different methods and instruments to verify their outcomes[2].

Most questionnaires used to assess the quality of life and treatment results are created in English. They are produced and applied according to the demographic and cultural characteristics of the region[3-5]. Based on the original questionnaire, translation and validation studies are performed in other languages about the characteristics and information established by the initial version[6-9].

The Manchester–Oxford Foot Questionnaire (MOXFQ) was developed by the Department of Public Health at Oxford University in the United Kingdom in 2006. They produced an instrument to evaluate results in foot and ankle surgeries based on patients' complaints. There are 16 questions with five response options to assess the frequency and intensity of the

Study performed at the Centro Universitário, Faculdade de Medicina do ABC, Santo André, SP, Brazil.

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Conflicts of interest: none. **Source of funding:** none. **Date received:** December 13, 2022. **Date accepted:** December 11, 2022. **Online:** November 15, 2022.

How to cite this article: Pessoa GB, Miranda BR, Oliveira LZP, Fernandes HA, Abdul Ghani MBAG, Paula Neto AC, et al. Translation, cultural adaptation, and validation of the Manchester-Oxford Foot Questionnaire into Brazilian Portuguese. J Foot Ankle. 2022;16(3):231-6.

limitation questioned. It evaluates three domains: walking/standing, pain, and social interaction[10].

The use of instruments that assess the pain and quality of life of patients is important to correlate the specific clinical complaints about a condition related to the physical, mental, and social well-being of the patient. The need for a standardized, fast, and easy-to-understand assessment method in the Brazilian Portuguese language supported our intention in this study.

The objective of this study is to translate, culturally adapt and validate the Manchester-Oxford Foot Questionnaire into Brazilian Portuguese.

Methods

The MOXFQ was the basis for the study, which consists of 16 questions addressing three domains: walking/standing, pain, and social interaction. The patients answers the items according to their perception of limitation, varying from 0 no limitation to 4 maximum limitation[10]. The questionnaire was submitted to a strict translation and cultural adaptation protocol, and then its final translated version was applied to the patients and validated.

The study was approved by the institution's research ethics committee and all participants signed the informed consent form.

The translation and cultural adaptation of the questionnaire followed a set of guidelines and a series of norms standardized by Guillemin et al.[6]. The process also followed the recommendations proposed in the guidelines established by Reichenheim and Moraes[11], constituting a systematic approach:

a) Initial translation: The MOXFQ was initially translated by two qualified and sworn independent translators, who performed the translation into their mother tongue (Brazilian Portuguese). The translators were aware of the objectives of the questionnaire and the study. Furthermore, they were instructed on the concepts involved in the translation process and cultural adaptation proposed by the protocols followed to offer a more reliable restitution of the intended measure.

b) Back-translation (reverse translation): Each of the first translations was back-translated independently, generating two back-translation versions. The purpose of this stage is to reveal misunderstandings and failures of the first translations and adaptation to the target cultural context of these versions.

The back-translation was performed by two other specialists into their mother tongue (British English), fluent in the expressions and everyday use of the original language from the initial questionnaire and the intended result of the back-translation proposed.

The translators at this stage were not aware of the intentions and concepts of the material and study. The freedom of translation of this phase is free from biases and expectations of the selected professionals. It allows the generated versions to reveal unexpected meanings and interpretations that will be the object of comparison and study, identifying inconsistencies in the definition of the final version.

c) Specialized committee review: A multidisciplinary committee was established to compare and review the two translations and back-translations and define a final document. The group consisted of three bilingual orthopedists and foot and ankle specialists, a sworn independent translator who had not yet participated in the study, an individual of the target population, and a bilingual physiotherapist.

The committee analyzed the documents considering semantic, idiomatic, and conceptual equivalence, sought to eliminate ambiguities, and focused on adapting to the cultural situation of the target population. The final objective of the committee was to ensure that the translation was fully understandable, even if new words were generated or inappropriate terms were rejected.

d) Pre-test phase: The final translation version defined and reviewed by the committee (Figure 1) was submitted to a group of ten patients randomly chosen in the foot and ankle outpatient clinic of the orthopedics and traumatology department. All patients met the inclusion and exclusion criteria proposed by the study.

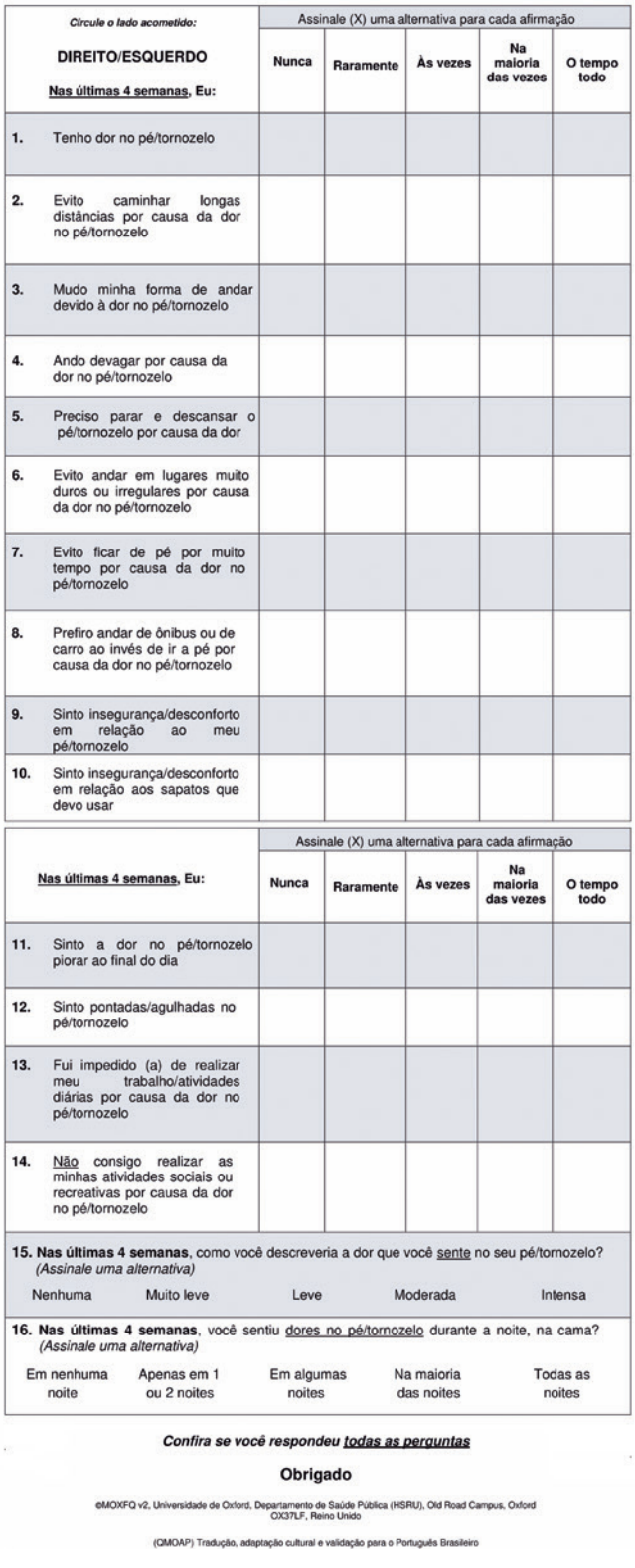
During the application, after each item was answered, the patients were asked about their understanding and could mark the question as "difficult to understand". Aiming that the final questionnaire is understood with the equivalent meaning to the original version, the questions marked as "difficult to understand" by ≥10% were reviewed and re-discussed by the multidisciplinary committee.

e) Evaluation of intraobserver reproducibility and validity of the MOXFQ translated version: After approval by the ethics committee, the final revised and translated questionnaire was applied by the same specialist in a population of 50 patients treated at the foot and ankle outpatient clinic of the orthopedics department in 2019. The chosen patients signed the informed consent form.

The inclusion criteria were: patients over 18 years submitted to foot and ankle surgeries to correct deformity, osteoarthritis, neurological diseases, and ankle instability. Exclusion criteria were: patients submitted to bilateral foot and ankle surgeries or patients with an active infection in the lower limb.

Intraobserver reproducibility was evaluated by reapplying the final version of the questionnaire to 50 patients 14 days after the first application.

To obtain a correlation measure and evaluate the validity of the final translated version, the SF-36 Quality of Life questionnaire was used, which addresses eight categories based on physical and emotional functioning. This questionnaire consists of 36 questions assessing functional capacity, physical aspects, bodily pain, general health, vitality, social and emotional aspects, and mental health, and it has already been translated and validated into Portuguese by other researchers[12].



Circule o lado acometido: DIREITO/ESQUERDO Nas últimas 4 semanas, Eu:	Assinale (X) uma alternativa para cada afirmação				
	Nunca	Raramente	Às vezes	Na maioria das vezes	O tempo todo
1. Tenho dor no pé/tornozelo					
2. Evito caminhar longas distâncias por causa da dor no pé/tornozelo					
3. Mudo minha forma de andar devido à dor no pé/tornozelo					
4. Ando devagar por causa da dor no pé/tornozelo					
5. Preciso parar e descansar o pé/tornozelo por causa da dor					
6. Evito andar em lugares muito duros ou irregulares por causa da dor no pé/tornozelo					
7. Evito ficar de pé por muito tempo por causa da dor no pé/tornozelo					
8. Prefiro andar de ônibus ou de carro ao invés de ir a pé por causa da dor no pé/tornozelo					
9. Sinto insegurança/desconforto em relação ao meu pé/tornozelo					
10. Sinto insegurança/desconforto em relação aos sapatos que devo usar					

Nas últimas 4 semanas, Eu:	Assinale (X) uma alternativa para cada afirmação				
	Nunca	Raramente	Às vezes	Na maioria das vezes	O tempo todo
11. Sinto a dor no pé/tornozelo piorar ao final do dia					
12. Sinto pontadas/agulhadas no pé/tornozelo					
13. Fui impedido (a) de realizar meu trabalho/atividades diárias por causa da dor no pé/tornozelo					
14. Não consigo realizar as minhas atividades sociais ou recreativas por causa da dor no pé/tornozelo					

15. **Nas últimas 4 semanas**, como você descreveria a dor que você sente no seu pé/tornozelo? *(Assinale uma alternativa)*

Nenhuma | Muito leve | Leve | Moderada | Intensa

16. **Nas últimas 4 semanas**, você sentiu dores no pé/tornozelo durante a noite, na cama? *(Assinale uma alternativa)*

Em nenhuma noite | Apenas em 1 ou 2 noites | Em algumas noites | Na maioria das noites | Todas as noites

Confira se você respondeu todas as perguntas

Obrigado

©MOXFQ v2, Universidade de Oxford, Departamento de Saúde Pública (HSRU), Old Road Campus, Oxford OX37LF, Reino Unido

(QMOAP) Tradução, adaptação cultural e validação para o Português Brasileiro

Figure 1. Questionário Mancheste-Oxford para avaliação do pé (QMOAP). Brazilian final version.

The SF-36 questionnaire was applied concomitantly with MOXFQ for the same patients, and the scores of similar domains from the two questionnaires were compared and analyzed.

f) Methodology of statistical analysis: Initially, a descriptive analysis of all study variables was performed. Then, the qualitative variables were presented in their absolute and relative values, and the quantitative variables in their central tendency and dispersion values[13]. The Kolmogorov-Smirnov and Levene tests were used to evaluate the adherence to the normal curve and the homogeneity of the variances[13].

The Kappa coefficient was used to evaluate the agreement and intraobserver reproducibility (test and retest) of the MOXFQ for each domain, with its respective 95% confidence interval[13,14]. Cronbach's alpha coefficient[13,14] was used to assess internal consistency.

Spearman's correlation coefficient (most non-parametric variables) was used to evaluate the correlation between the SF-36 and the MOXFQ domains[13,15]. The significance level was 5%. The statistical package used was SPSS 24.0 for Windows (IBM Corp., Armonk, New York, USA).

Results

Population Characteristics

Fifty patients with various foot and ankle diseases were included in the study. It is observed that most are women, married, and with complete high school. The mean age of the study was 54.52 years (14.49 Standard Deviation (SD)). The female representation was 78% compared to the total population. The demographic characteristics of the patients are shown in table 1.

Demographic information complementary to the epidemiological profile can be seen in Tables 2 and 3. Most participants were housewife/men or general assistants, white, and catholic (Table 2). Also, most patients were non-smokers, had already undergone physical therapy, did not practice physical activity, and had some comorbidity or personal history (Table 3).

Visual Analog Scale (VAS), Body Mass Index (BMI), and laterality

The group VAS mean was 7.82 (2.17 SD), ranging from 2 to 10 points, and the group BMI mean was 29.67 (4.87 SD), ranging from 20.31 to 40.58. The laterality of the patients that presented pathology and pain; 21 (42%) were left, 18 (36%) right, and 11 (22%) bilateral.

Intraobserver reproducibility (test and retest)

The reproducibility of the translated MOXFQ questionnaire was evaluated in the two applications using the Kappa coefficient based on the analysis of the intra-class correlation coefficient (ICC) with its respective 95% confidence interval. The ICC values for the domains were: pain 0.98, walking/standing 0.99, and social interaction 0.98. The reproducibility for the three domains was excellent and statistically significant (Table 4).

Internal consistency/reliability

Internal consistency was tested by Cronbach's alpha coefficient analysis. All three domains presented values above 0.9 and excellent internal consistency and reliability (Table 5).

MOXFQ validation

Table 6 shows the Spearman correlation analysis between the SF-36 and MOXFQ domains. There is an inversely proportional correlation between the MOXFQ domains (pain, walking/standing, social interaction) and SF-36 (functional capacity, physical aspects, bodily pain, general health, vitality, social and emotional aspects, and mental health).

Discussion

Questionnaires that assess the quality of life and the impact of a disease on the patient's well-being play an important role as a complementary instrument in measuring the success of treatment. In this context, there is a growing need to translate, culturally adapt and validate specific scales known to be efficient and well-accepted in the scientific community to standardize the evaluation method.

The MOXFQ is an objective and well-developed questionnaire by Dawson et al.[10]. The present study aimed to create a MOXFQ in Brazilian Portuguese for the first time. The process was performed according to the guidelines and standards recommended for the validation process[6,11].

Table 1. Descriptive demographic analysis

Variables	Total (N = 50)
Age (years)	
Mean (SD)	54.52 (14.49)
Minimum – Maximum	19 – 78
Sex (N)%	
Female	39 (78.0)
Male	11 (22.0)
Marital status (N)%	
Single	9 (18.0)
Married	32 (64.0)
Divorced	7 (14.0)
Widow	2 (4.0)
Educational level (N)%	
Secondary level incomplete	15 (30.0)
Secondary level complete	5 (10.0)
High school incomplete	4 (8.0)
High school complete	17 (34.0)
University incomplete	5 (10.0)
University complete	3 (6.0)
Not informed	1 (2.0)

SD: Standard deviation.

The original questionnaire was translated and generated two independent versions that subsequently underwent a back-translation into the original language, resulting in two other versions. Finally, with the five documents in hand, the multidisciplinary committee met to discuss cross-cultural adaptation correcting erroneous interpretations in the process in the face of the Brazilian social and cultural context, and deciding the final version of the translation with good conceptual equivalence.

Table 2. Descriptive analysis of occupation, race, and religion

Variables	Nº	%
Occupation		
Retired	7	14.0
Housewife/man	9	18.0
Health care worker	5	10.0
Housekeeper	2	4.0
General assistant	9	18.0
Construction worker	3	6.0
Salesperson	3	6.0
Other	12	24.0
Race		
White	21.0	42.0
Brown	18.0	36.0
Black	8.0	16.0
Not informed	3.0	6.0
Religion		
Catholic	32.0	64.0
Spiritism	3.0	6.0
Evangelist	10.0	20.0
None	5.0	10.0

Table 3. Descriptive analysis of habits, physical activities, physiotherapy, and comorbidities

	Nº	%
Habits		
Smoker	5	10.0
Ex-smoker	3	6.0
No smoker	42	84.0
Physical activity		
Yes	11	22.0
No	39	78.0
Physiotherapy		
Yes	32	64.0
No	18	36.0
Comorbidities		
Yes	38	76.0
No	12	24.0
Personal history		
Yes	38	76.0
No	12	24.0

Table 4. Intra-class correlation coefficient of the MOXFQ domains

Domains	MOXFQ		ICC (95%CI)	p-value
	First evaluation	Second evaluation		
	Mean (SD)			
Pain	14.14 (3.97)	13.76 (4.15)	0.98 (0.97 – 0.99)	p<0.001
Walking/standing	20.38 (7.73	20.50 (8.06)	0.99 (0.98 – 1.00)	p<0.001
Social interaction	10.48 (4.48)	10.30 (4.73)	0.98 (0.97 – 0.99)	p<0.001

SD: Standard deviation; ICC: Intra-class correlation coefficient; 95%IC: 95% Confidence interval

Table 5. Cronbach's alpha coefficient analysis of MOXFQ domains

Domains	Cronbach's alpha	Level of significance
Pain	0.992	p<0.001
Walking/standing	0.997	p<0.001
Social interaction	0.992	p<0.001

Table 6. Portuguese MOXFQ validation according to Spearman correlation analysis between the SF-36 and MOXFQ domains

SF-36 domains	MOXFQ domains		
	Pain	Walking/standing	Social interaction
Functional capacity	-0.45**	-0.72**	-0.,73**
Physical aspects	-0.26	-0.41**	-0.51**
Bodily pain	-0.32*	-0.42**	-0.46**
General health	-0.27	-0.20	-0.22
Vitality	-0.36*	-0.45*	-0.35*
Social aspects	-0.43**	-0.33*	-0.42**
Emotional aspects	-0.29*	-0.29*	-0.37**
Mental health	-0.32*	-0.40**	-0.34**

*: p<0.05; **: p<0.01

The results showed that the MOXFQ Brazilian version is a reliable, valid, and reproducible instrument to measure the symptoms and functional limitations of patients affected by foot and ankle diseases.

The results of intraobserver reproducibility (test and re-test) were excellent. The ICC value for the respective domains was: pain 0.98, walking/standing 0.99, and social interaction 0.98, all with statistical significance (p<0.001). Internal consistency/reliability assessed from Cronbach's alpha coefficient obtained excellent values: pain 0.992, walking/standing 0.997, and social interaction 0.992, all with statistical significance (p<0.001).

The result obtained at this analysis stage differed slightly from the main studies that performed the MOXFQ translation and cultural adaptation [2,8,9]. We attributed this difference to the short time interval in which the questionnaire was reapplied (14 days), the fact that the patients in our population had not undergone any procedure or surgical intervention during the performance of all stages of the study. In addition, the researcher responsible for the application was experienced and had previous knowledge of the target population that could have generated a regularity in the responses of the MOXFQ questionnaire in the two moments applied.

For the validation stage, the correlation with the SF-36 domains was analyzed. The results of our study were comparable to those of Dawson et al. in most aspects[10]. The highest correlations of the study were between the SF-36 physical functioning domain and the MOXFQ walking/standing (-0.72) and social interaction (-0.73) domains. It is worth noting that the results obtained were very close to Dawson et al.[10], which also found its greatest correlation when comparing the MOXFQ walking/standing with SF-36 physical functioning (-0.677).

Comparing the MOXFQ walking/standing domain, a good correlation with the SF-36 physical aspects (-0.41), bodily pain (-0.42), vitality (-0.45), and mental health (-0.40) domains were found. Again, similar results to the study by Dawson et al.[10] were found, who also had a good correlation between the MOXFQ walking/standing with the SF-36 physical aspects (-0.579) and bodily pain (-0.543) domains.

A good correlation was also obtained between the MOXFQ pain domain and SF-36 functional capacity (-0.45) and social aspects (-0.43) domains. Dawson et al.[10] obtained a similar correlation between the MOXFQ pain domain with SF-36 functional capacity (-0.457).

Even with so many similarities between the studies, some differences were observed when comparing the MOXFQ and SF-36 pain domain; in our study was (-0.32), while in Dawson et al. was (-0.528). Furthermore, analyzing the MOXFQ social interaction domain of our study, a good correlation was observed in comparison with the SF-36 physical aspects (-0.51), bodily pain (-0.46), and social aspects (-0.42) domains, and in this comparison, stronger correlations were found than the study by Dawson et al.[10], which respectively obtained in the SF-36 physical aspects (-0.308), bodily pain (-0.273), and social aspects (-0.134).

It is possible to attribute some of the differences between the studies to the study population number and the sociodemographic characteristics that vary between the different populations and regions, such as the female population, which, in our study, was 78%, and Dawson et al. was 95%. Another important factor is to compare a specific questionnaire for

foot and ankle pathologies (MOXFQ) with a generic quality of life questionnaire that can assess different pathologies (SF-36).

One of the limitations of our study, compared to Dawson et al., was that we did not perform a correlation with a third questionnaire, such as the American Orthopaedic Foot and Ankle Society (AOFAS). Also, our study population had different foot and ankle pathologies, and the patients were not submitted to procedures during the application of the questionnaires, while Dawson et al.[10] selected only patients with halux valgus and compared them with other questionnaires applied before and after the surgical intervention.

Conclusion

The MOXFQ Brazilian version proved reliable, valid, and reproducible in measuring the symptoms and functional limitations of patients affected by foot and ankle diseases.

Authors' contributions: Each author contributed individually and significantly to the development of this article: GBP *(https://orcid.org/0000-0003-4632-9672) Conceived and planned the activities that led to the study, interpreted the results of the study, participated in the review process, data collection, bibliographic review, formatting of the article, approved the final version; BRM *(https://orcid.org/0000-0002-5306-2972) Conceived and planned the activities that led to the study, approved the final version; LZPO *(https://orcid.org/0000-0002-5306-2972) Participated in the review process, bibliographic review; HAF *(https://orcid.org/0000-0001-9920-5636) Conceived and planned the activities that led to the study, interpreted the results of the study; MBAGAG *(https://orcid.org/0000-0003-0007-5574) Interpreted the results of the study, participated in the review process; ACPN *(https://orcid.org/0000-0003-0007-5574) Formatting of the article, approved the final version; ADPF *(https://orcid.org/0000-0001-5808-1788) Data collection; bibliographic review DRCN *(https://orcid.org/0000-0003-0227-2440) Approved the final version, formatting of the article; TMF *(https://orcid.org/0000-0002-8328-1893) Data collection, statistical analysis; RSB *(https://orcid.org/0000-0002-2870-2261) Conceived and planned the activities that led to the study; approved the final version; data collection; bibliographic review; formatting of the article. All authors read and approved the final manuscript. *ORCID (Open Researcher and Contributor ID).

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