PROPOSAL AND VALIDITY OF A SCALE OF TEAMWORK'S INTERNAL DYNAMICS IN INDIGENOUS WOMEN*

*PROPOSTA E VALIDADE DA ESCALA DE DINÂMICA INTERNA DO TRABALHO EM EQUIPE EM MULHERES INDÍGENAS***

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Abstract: Teamwork can be understood a process where the members are recognised as a unit, that shows interdependence but works together for a common objective; this practice is relevant to achieve the progress and develop, especially in vulnerable groups. The aim of the study was to evaluate the validity and reliability from the scores obtained of an instrument with three components of internal dynamics in Teamwork (Task Interdependence, Group Potency and Psychological Safety) in indigenous women of Mexico. The sample consisted of 96 participants. Internal consistency was evaluated by using the Cronbach alpha coefficient, the internal structure was determined by using the principal component factorial analysis with Varimax rotation. The scores on each of the subscales showed an acceptable degree of internal consistency (αinter=.712, αgroup=.701, αacceptance=.716 y αsupport=.682). The factor analysis showed that in two of the three sections (Task Interdependence and Group Potency) the items loaded to a component that explained 47.12% and 44.99% of the variance, respectively. In psychological safety, the items were grouped into two components, explaining 60.54 % of the total variance. The version of a scale of Teamwork proposed in this work is a valid and reliable version that could be useful for the evaluation of teamwork in indigenous women.

Keywords: Teamwork; Reliability and validity; Indigenous women; Scale; Internal dynamics.

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Resumo: O trabalho em equipe pode ser compreendido como um processo em que os membros são reconhecidos como uma unidade; que mostra interdependência, mas trabalha em conjunto para um objectivo comum. Esta prática é relevante para alcançar o progresso e o desenvolvimento, especialmente em grupos vulneráveis. O objetivo do estudo foi o de avaliar a validade e a fiabilidade a partir das pontuações obtidas de um instrumento com três componentes de dinâmica interna em trabalho de equipe em mulheres indígenas do México, tais como: interdependência de tarefas, potência de grupos e segurança psicológica. A amostra consistiu em 96 participantes. A consistência interna foi avaliada usando o coeficiente alfa *Cronbach* e a estrutura interna foi determinada usando a análise factorial do componente principal com rotação Varimax. As pontuações em cada uma das subscrições mostraram um grau aceitável de consistência interna (αinter=.712, αgroup=.701, αacceptance=.716 y αsupport=.682). A análise de fatores mostrou que em duas das três seções (Interdependência de Tarefas e Potência de Grupo) os itens carregados a um componente apresentavam 47,12% e 44,99% da variância, respectivamente. Em segurança psicológica, os itens foram agrupados em dois componentes, explicitando 60,54% da variância total. A versão de uma escala de trabalho em equipe proposta neste trabalho é uma versão válida e fiável que poderia ser útil para a avaliação do trabalho de equipe em mulheres indígenas.

Palavras-chave: Trabalho em equipe; Fiabilidade e validade; Mulheres indígenas; Escala; Dinâmica interna.

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Introduction

The United Nations established that the achieve of the Millenium Development Goals requires an unswerving political will, and collective, long-term effort. Therefore, teamwork is an essential process for collective effort.

Social interaction is a crucial element in the life of people, since living in isolate on is not possible, in such a way that from the social networks that the human being generates, a community is capable of creating its universe, where members recognise and revitalise themselves in their daily actions (Gallego, 2011). All this interaction and the generation of networks allow for the existence of resource sharing, turning teamwork into a fundamental

element in the life of the human being which, among other things, allows for the creation of new alternatives for the satisfaction of needs or the resolution of conflicts (Gallego, 2011).

Teamwork can be understood as that in which the members are recognised as a unit, that shows certain interdependence but work together for a common objective, for which they are mutually responsible (Sundstrom, Meuse & Futrell, 1990). Teamwork has been addressed as an input-process-output model, where part of the input consists of resources, organisation, environment and characteristics of the members; processes in the activities that members perform such as communication, planning, conflict resolution; and the output has been analysed as a result seen from performance, creativity, and other approaches (Reiter-Palmon, Sinha, Gevers, Odobez & Volpe, 2017). However, the central element for addressing teamwork relies on the interaction among the members, and that interaction can present itself as a better performance or efficacy of the team, based on this scheme it has been identified that team cohesion regulates team efficacy and performance (Park, Kim & Gully, 2017).

There are varieties of instruments that allow for the evaluation of some teamwork characteristics (Table 1), some of the approaches include personal abilities to work as a team (Bonavia, Molina & Puchol, 2015; Britton, Simper, Leger & Stephenson, 2015), specific technical skills (Slootewg et al., 2014; Weller et al., 2013). Other approaches evaluate the fulfilled roles, attitudinal and mental models (Costa, Passos & Bakker, 2014; Mendo-Lázaro, Polo-del-Río, Iglesias-Gallego, Felipe-Castaño & León-del-Barco, 2017) or the processes or behaviours that can exist on the inside of a team (Lower, Newman & Anderson-Butcher, 2015; Silva, et al., 2016), among others; the approaches that have been used make its application in a community setting difficult, which is why adequacy to culture and the modification of the approach become necessary.

Specific conditions of underdevelopment that exist in indigenous communities make teamwork fundamental, where there is limited access to healthcare services, transport routes, resources, and even education, apart from being in a situation of social marginalisation, making it a complicated scenario (Mackie, 2012). Thus, resource exchange is fundamental, and support networks between neighbours or family members are often constant and allow for the satisfaction of the needs that emerge due to the restrictions and limitations which they continually face (Gallego 2011; Valencia & Correa, 2006). In this way, teamwork is of utmost importance, because this is the way they need to work to achieve their survival and development objectives (Gallego, 2011; Valencia & Correa, 2006; Avant, Rich-Rice & Copeland, 2013), including health-disease processes.

Taking up some essential aspects on a excellent teamwork performance, the proposal for its analysis in a community environment considers three crucial concepts for teamwork, with a focus on the interaction among the members, such vital concepts are task interdependence, group potency and psychological safety (Ortega, Sánchez-Manzanares, Gil & Rico, 2013; Van den Bossche, Gijselaers, Segers & Kirschner, 2006).

1 Task interdependence

Task interdependence, understood as the degree to which the members of a team identify with, and have the intention of helping each other, through actions and providing resources (Kiggundu, 1981). Coordination processes are essential, and task interdependence can even stimulate cohesion and trust among team members (Gil, Rico & Sánchez-Manzanares, 2008). Elements that allow for an environment with better cooperation such as responsibility, confidence and a good work team cohesion are immersed within this conception; the former allows for a good team performance and also favours conflict resolution inside work teams (Ortega, et al., 2013; Van den Bossche, et al., 2006; Kiggundu, 1981; Lee 2015).

2 Group potency

Group potency, defined by Guzzo, Yost, Campbell & Shea (1993) as the collective belief that a group can be effective, under that belief, team members are willing to make an effort to work and reach the objective, instead of focusing on personal goals. A positive influence from these beliefs has been reported regarding team results (Gully, Incalcaterra, Joshi, & Beaubien, 2002), this can be associated with the perception that they have of being able to influence and improve their organisational context, of the resources they have or of the abilities that the members of the team show. Seen differently, the collective belief that a particular task can be performed influences the decision of the team members to start an action, as well as on the effort needed and even on the persistence and temporality of that effort (Stajkovic, Lee & Nyberg, 2009).

3 Psychological safety

It is defined by Edmondson (1999) as 'The shared belief among the members that a team is a safe place to assume interpersonal risks'. Maintaining a safe environment, is the result of an interaction among the individual and the context and it allows for a continuous co-building of meaningful and productive experiences, and for favouring a sense of identity, and it mainly allows individuals to look for opportunities to enable them to develop (Wanless, 2016). Within a team, a feeling of psychological safety from the members makes them more committed, prone to participate, to learn, and make decisions and develop more actively, obtaining a more significant commitment and development of the team, even in different working teams (Singh, Winkel & Selvarajan, 2013).

Based on the preceding it is possible to understand the role of the task interdependence, group potency and psychological safety have within teamwork, in a specific way as a central element of the processes that take place in it. Thereby, the incorporation of these three elements allows for the analysis of the internal dynamic of a work team in a community environment and it could later be incorporated into the evaluation of performance of the team, taking a cultural adjustment and a modification of its approach into account (Lower, et al., 2015).

Thus, the goal of the current investigation was to evaluate the psychometric properties of a self-reporting measure (tool) designed to assess the internal teamwork dynamic stemming from task interdependence, group potency and psychological safety among a sample of indigenous women (Ortega et al. 2013; Van den Bossche et al. 2006). The extent to which valid and reliable instruments are available in a vulnerable population, such as the indigenous community: community participation processes will be able to be studied, as they are essential for the development and achievement of the health of communities.

4 Methods

The design of this study was cross-sectional, with a convenience sample, obtaining a final sample of 96 indigenous women who accepted to take part in the project. The inclusion criteria were: indigenous women who spoke and wrote the Spanish language, and who gave their written informed consent. Data collection took place from July 2014 to May 2015.

5 Procedure

As an initial step, the present work was submitted to one of the Bioethics and Research Committee of Mexico for approval. To recruit the participants, we went to the places where they live, where they were informed about the project through community forums; those who were interested were given the provided with a letter of consent for them to sign in order to obtain their permission to participate. The questionnaire was self-applied and administered at a later date. The average time it took them to answer the questionnaire was 5 minutes.

6 Instrument

The instrument used was generated based on three other instruments validated in labour contexts, each of which incorporates a variable that according to the literature are important for teamwork: task interdependence, group potency and psychological safety. An adaptation of the language and the terms employed in the original instruments was made to the indigenous community context, in such a way that the understanding of the questions was assured. The instruments used are described as follows:

Task interdependence: Task interdependence is the degree to which the members of a team depend and interact with each other to reach a common objective (Kiggundu, 1981). The scale has five items and four answer options in Likert scale (4= Strongly agree, 3= Agree, 2= Disagree, 1= Strongly disagree), were developed by Van der Vegt, Emans & Van den Vliert (2001), and a high score shows high interdependence.

Group potency: refers to the efficacy perceived by the members of the team to successfully face any task (Guzzo, et al., 1993). These researchers developed a scale that was translated to Spanish by Alcover & Gil (1998). The instrument contains seven items and four answer options in Likert scale (4= Strongly agree, 3= Agree, 2= Disagree, 1= Strongly disagree), and for its evaluation, because it is a group concept, the average of the individual measures which have punctuation that provides the measure of group potency should be used.

Psychological safety: Defined as 'the shared belief among the members that the team is a safe place to assume interpersonal risks', includes seven items and four answer options in Likert scale (4= Strongly agree, 3= Agree, 2= Disagree, 1= Strongly disagree) developed by Edmondson (1999) were used.

In this way, the instrument applied in the present work was made up of three sections: task interdependence, group potency and psychological safety.

7 Data Analysis

Internal structure analysis

Since the sample size was of 96 participants, results are shown as a pilot test for the validation of the instrument.

First, reliability of the scale was calculated by using the Cronbach alpha coefficient, considering a value of ≥ 0.6 as adequate and analysing the existence of a similarity using the half split (Hair et al. 2009). Then, an exploratory factorial analysis with Varimax rotation was done to analyse the internal structure of the scale since it was looking to examine the number and composition of the latent variables (factors) which were necessary to explain the common variance.

Internal validity was carried out by calculating the correlation index of each item or corrected element – total correlation. It was deemed as an item with a good item-scale correlation index from 0.30. The items that after being removed elevated the internal consistency coefficient were eliminated (Hair et al., 2009, Ferrando & Lorenzo-Seva, 2014).

Varimax rotation was chosen for the factorial analysis of the items since the aim was to analyse the structure that each of the instruments showed to extract the minimum number of factors that makes up the scales.

Components with a self-level greater than one were considered. To consider an item within a factor, and because the population size was close to 100, it was decided that the cut-off point for the pilot test would be a factorial load of .55 to achieve according to the size of the population (Hair et al., 2009).

Furthermore, the items that loaded in more than one factor with that minimum weight were eliminated or incorporated onto a factor according to its content; in order to keep a factor, it had to include a minimum of three items, or else; if not, it was eliminated (Hair et al., 2009; Ferrando & Lorenzo-Seva, 2014).

Lastly, the Cronbach alpha coefficient was obtained for each of the factors so as not to overestimate the internal consistency of the scale and a final version of the scale was formed as indicated in previous studies. Data were processed using the Statistical Package for Social

Sciences for Windows (SPSS) software version 18. A post hoc power analysis was conducted using the software package, GPower 3.1.9.4 version (Faul & Erdfelder 1992).

8 Results

Context of the indigenous population

Participating indigenous women were residents of different localities within the Huasteca Potosina, Mexico; which had marginalisation levels ranging from high to very high. Marginalisation is an index of ten socioeconomic indicators (deficit variables) like lack of access to education, inadequate housing conditions (no access to potable water, drainage, electricity and overcrowding), and low monetary income (8 EUR or less) per the day per family. The final index includes five categories of marginalisation: very low, low, medium, high and very high. Besides, 54.89% of the population over 15 years of age does not have completed elementary education and 40.42% do not have social security.

Initial internal consistency*:* After performing, the reliability analysis of each of the sections good correlations were found among the items in each section, because of this, only one item was eliminated in Group Potency section.

Factorial analysis*:* Bartlett´s sphericity test was significant for all three sections as was the Kaiser-Meyer-Olkin index, showing a good relation among the variables: Task interdependence (x^2= 89.20, 0.05, *gl*=10, $p < .001$, KMO=.716), Group potency (x2= 134.78, 0.05, gl=21, p < .001, KMO= .777) and Psychological safety (x^2= 166.98, 0.05, *gl*=21, $p < .001$, KMO=.779).

In the Task Interdependence and the Group Potency sections, all items were grouped into one single component that explains the 47.12% and the 44.99% of the variance, respectively. In the section of Psychological Safety items were grouped into two components that explain the 60.54% of the variance, Table 2 shows the 16 items with a Likert-type scale of the final questionnaire with their factorial weights, each section was analysed independently.

Final internal consistency: After the internal consistency analysis, no item requiring elimination was found, acceptable alpha Cronbach and half-split values were also found, resulting in 16 items.

After executing the reliability analyses it was found that the teamwork scale shows an acceptable internal consistency in each of its dimensions (α_{Inter}=.712, α_{Group}=.701,

$\alpha_{Acceptance}$=.716 y $\alpha_{Support}$=.682) just as it is presented on Table 3, the obtained structure is found on Table 4. Post hoc power analysis indicated that the power to detect obtained results at the 0.05 level was.

9 Discussion

The objective of this work was to evaluate validity and reliability of an instrument that could measure teamwork in indigenous women, in general, it was found that the structure coincided with the original scales, except the psychological safety.

The first section of the instrument showed a uniform behaviour, in such a way that all items loaded a single component which explains that the members of the team must share materials, information or experience to achieve the proposed goal. That component is what Van der Vegt defines as 'Task interdependence', and Rosseau defines as 'Collaborative behaviour' related to tasks (Rosseau et al. 2006; Van der Vegt et al. 2001). On the other hand, Hastie et al. (2014) identified them as the necessary skills to make a high-quality contribution to the team project.

The second factor identified involved most of the items included in the study performed by Guzzo et al. (1993), which are focused on the group beliefs about their successful performance capacity in their tasks. Some of these items coincide with the instrument of Hastie et al. (2014) and Britton et al. (2015) which are grouped in the dimension they call 'teamwork promotion', defines as social and emotional abilities that promote a sense of trust and inclusion for each of the team members.

Items belonging to the psychological safety section obtained a factorial structure in two components, despite belonging to a scheme where safety to be able to take interpersonal risks is provided (Edmondson, 1999). This section of the instrument identifies some of the defined elements as 'Emerging States' since they are dynamic elements that appear during the teamwork process, and, that vary in time, being elements that are associated with the presence of cohesion among team members (Park et al. 2017).

The first component identified from the dimension of psychological security, integrates situations regarding behavioural disposal of respect and tolerance for all the ideas of the team members, to what Bonavia defines as 'Acceptance', an element that refers to an individual factor that favours teamwork (Bonavia et al. 2015). The second component refers to the support of abilities that allow for the interaction of the team to be effective in the progress

of the plan of the project (Hastie et al. 2014), or in providing motivation, trust, support, as well as valuing talent, skills and contributions of team members. Rosseau et al. (2006) define those abilities as 'Psychological support', Mendo-Lázaro et al. (2017) interpret them as social and emotional attitudes, and Britto et al. interpret them as the 'Facilitation' of other contributions.

Based on the preceding, it is possible to conceive the extent of the study of the elements of the teamwork in the implementation of health or social programs where community participation is crucial. Task interdependence, group potency and psychological safety, are elements that are undergone within the teamwork processes and after the obtained results, such concepts can also be evaluated in community environments, in this case, in women indigenous. This work is relevant due to the tendency of generating programs directed towards the indigenous population to address several problems and promote social inclusion. Once the importance of teamwork on indigenous communities has been identified, it is essential to enhance it and address interventions that are based on it (Avant, et al., 2013; Gallego, 2011; Valencia & Correa, 2006), therefore, it is essential to generate valid instruments that allow the evaluation of teamwork in vulnerable populations. In such a way, the generation of strategies should be accord to their cultural system, where community empowerment is promoted, and their management capacity and sustainability can be improved.

It has also been identified that the reinforcement of the sense of community and in the internal environment of the population in the design, implementation and evaluation on the intervention for health education is crucial because they allow for an impulse to participation and empowerment (Hughey, Peterson, Lowe & Oprescu, 2008). Efforts in community based health education, provide evidence indicating that the existence of social networks represents a significant influence on health related behaviours (Gesell, Barkin, Sommer, Thompson & Valente,2016).

Considering the effectiveness that group based interventions are having and due to the positive results that elements such as the generation of networks and cohesion for behaviour modification have (Gesell et al., 2016); the instrument presented allows the analysis of the internal dynamics of the team. Therefore, it could facilitate a correct driving of the interventions and could be promising for the obtainment of the desired results especially with a community based approach (Gesell et al., 2016; Hughey, et al., 2008).

The findings of this work allowed the recognition of some essential elements of teamwork in a vulnerable population and a situation of social, health and economic disadvantage. The instrument presented in this work refers to a particular context, so must be

analysed before it is used, thereby avoiding mistakes in the generation and interpretation of the information due to the instrument.

10 Limitations, Future Research, and Applications

One of the limitations of this work is the sample size; however, in this type of population, it is difficult to recruit a large number of participants that fulfill the inclusion criteria and agree to participate. It is suggested for male indigenous participants to be included, to allow the evaluation of the teamwork process of this specific group, to increase sample size and so that the validation of this instrument does not remain at a pilot study level. A reliability test-retest evaluation would be important to understand the stability of the measurement throughout time better. Future research focused on examining the relationships among teamwork effectiveness, and the internal dynamics of the teamwork (task interdependence, group potency and psychological safety) and the real performance of the teamwork will be vital for this line of research.

Conclusions

After the performed analysis a brief, reliable and valid proposal of a scale that allowed for the evaluation of components of teamwork in indigenous women was obtained; this scale facilitates the generation of evidence to sustain strategies based on teamwork in vulnerable populations, which will enable us to address community settings not only with a risk approach but also with an opportunity approach.

The scale showed a factorial structure similar to the one presented in the original studies, which indicates a good theoretical foundation in the elaboration of the foundations of the instrument; however, the context became a participant in the psychological safety section.

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Table 1 - Validated instruments used for the measurement of teamwork

Author/Year	Measurement. Dimensions y Items	Population
Bonavia, Molina & Puchol, 2015	Individual Behavior Analysis (IBA). 1) Communicative skills. 2) Emotional expression. 3) Acceptance. 36 items.	771 nursing employees, physiotherapy, medicine, psychology and social work
Britton et al. 2015	Team-Q. 1) Contributes to teamwork. 2) Facilitates other´s contributions. 3) Planning and management. 4) Promote a team climate. 5) Handles potential conflict. 14 items.	70 theatrical history students and literature.
Mendo-Lázaro et al. 2017	Questionnaire on attitudes towards work in learning teams. 1) Academic attitudes. 2) Social and emotional attitudes.	750 preschool and elementary education university students
Weller et al. 2013	Structured teamwork measurement tool. 1) Leadership and team coordination. 2) Shared situational information. 3) Monitoring of mutual performance. 23 items.	40 intensive care teams (one physician and three nurses)
Silva et al. 2016	Team Climate Inventory (TCI). 1) Team participation. 2) Support of new ideas 3) Team goals. 4) Task orientation. 38 items.	497 workers of health teams (physicians, nurses, social workers, dentists, etc).
Costa et al. 2014	Team Work Engagement Scale (TWE).1) Vigor. 2) Dedication. 3) Assimilation. 9 items	Students and employees of several companies 20-36 years
Slotweg et al. 2014	Teamwork in Teaching Teams (TeamQ). 1) Task experience. 2) Team experience. 3) Team decision making. 4) Program direction. 5) Cultural feedback. 6) Team results. 7) Resident engagement. 8) Resident empowerment. 48 items.	114 hospital work team
Lower et al. 2015	Teamwork Scale for Youth. 10 items.	460 assistant students from a summer program

Source: Prepared by the author.

Table 2 - Factorial loads showed after the factorial analysis of the teamwork scale in the indigenous population

Section 1: Task Interdependence		
Item	Factorial load	
When they give me a task, I need information and advice from other people to perform the task that was given to me correctly.	.807	
When we have had tasks, we frequently communicate among team members about issues related to the given tasks.	.734	
I need to collaborate with other members of the team to develop our work well.	.660	
I need to exchange information, ideas and advice among members of the team to perform our work well.	.630	
I perform the task that they left to me with the help of others.	.576	
Section 2: Group Power		
Item	Factorial load	
This team expects to be known as a high performance team.	.807	
In light of future tasks, this team is capable of doing a high quality job.	.726	
This team can solve any obstacle	.681	
This team is capable of going a long way.	.561	
Section 3: Psichological Safety		
Item	Factorial load	
	Acceptance	*Psychological support*
This team accepts the opinions and ideas of all of its members.	.872	
I can ask for help from the members of this team.	.792	
The members of this team support my efforts.	.552	
I trust the members of this team when I talk about my personal situations.		.825
This team talks about problems and difficult situations during the sessions.		.702
The members of this team value my knowledge and experiences.		.567
The members of this team support my opinions.		.561

Source: Prepared by the author.

Table 3 - Internal consistency of the teamwork scale in indigenous population

Initial Scale					
	Dimension name	Number of items	Alpha	Half split	
Factor I	Task interdependence	5	.712	.622	.556
Factor II	Group power	7	.745	.557	.590
Factor III	Psychological safety	7	.788	.606	.711
	Total	19	-	-	-

Final Scale					
	Dimension name	Number of items	Alpha	Half split	
Factor I	Task interdependence	5	.712	.622	.556
Factor II	Group power	4	.701	.396	.656
Factor III	Psychological safety	7	.788	.606	.711
Factor III.I	*Acceptance*	*3*	*.716*	*.743*	*1.000*
Factor III.II	*Psychological support*	*4*	*.682*	*.633*	*.395*
Final questionnaire		*9*	-	-	-

Source: Prepared by the author.

Table 4 - Proposed structure for the teamwork scale

Teamwork
Section 1: Task Interdependence
When they give me a task, I need information and advice from other people to perform the task that was given to me correctly.
When we have had tasks, we frequently communicate among team members about issues related to the given tasks.
I need to collaborate with other members of the team to develop our work well.
I need to exchange information, ideas and advice among members of the team to perform our work well.
I perform the task that they left to me with the help of others.
Section 2: Group Power
This team expects to be known as a high performance team.
In light of future tasks, this team is capable of doing a high quality job.
This team can solve any obstacle
This team is capable of going a long way.
Section 3: Psychological Safety
Acceptance
This team accepts the opinions and ideas of all of its members.
I can ask for help to the members of this team.
The members of this team support my efforts.
Psychological support
I trust the members of this team, when I talk about my personal situations.
This team talks about problems and difficult situations during the sessions.
The members of this team value my knowledge and experiences.
The members of this team support my opinions.

Source: Prepared by the author.