



Contents lists available at ScienceDirect

## Musculoskeletal Science and Practice

journal homepage: [www.elsevier.com/locate/msksp](http://www.elsevier.com/locate/msksp)

Original article

## The association between empathy and the physiotherapy–patient therapeutic alliance: A cross-sectional study

Óscar Rodríguez-Nogueira<sup>a</sup>, Raquel Leirós-Rodríguez<sup>a,\*</sup>, Arrate Pinto-Carral<sup>a</sup>,  
María José Álvarez-Álvarez<sup>a</sup>, Jaume Morera-Balaguer<sup>b</sup>, Antonio R. Moreno-Poyato<sup>c</sup><sup>a</sup> SALBIS Research Group, Department of Nursing and Physiotherapy, Universidad de León, Astorga Ave. 15, 24401, Ponferrada, León, Spain<sup>b</sup> Physical Therapy Department, CEU Universities, Universidad Cardenal Herrera-CEU, Carrer Carmelitas 3, 03203, Elche, Alicante, Spain<sup>c</sup> Department of Public Health, Mental Health and Maternal and Child Health Nursing, Universitat de Barcelona, L'Hospitalet de Llobregat, Barcelona, Spain

## ARTICLE INFO

## Keywords:

Therapeutic alliance  
Evidence-based practice  
Quality of health care  
Person-centred care  
Rehabilitation  
Physical therapy speciality

## ABSTRACT

**Background:** The central component of person-centred care is in having a therapeutic relationship. Furthermore, the empathy of the physiotherapist is one of the most important attributes in achieving a successful therapeutic alliance.**Objective:** The aim of the research was to determine the association between the constructs of empathy and therapeutic alliance in Spanish physical therapists and the possible influence of socio-professional variables on them.**Design:** Cross-sectional research.**Methods:** An electronic survey including the Working Alliance Inventory-Short Form, the Interpersonal Reactivity Index and sociodemographic data with 473 Spanish physiotherapists. A descriptive, bivariate and simple linear regression analysis was carried out.**Results:** Work experience has a positive influence on bonding and the agreement on objectives and tasks ( $0.04 < B > 0.06$ ;  $p < 0.01$ ). The perspective taking dimensions and empathic concern positively influence the agreement on achievement ( $0.14 < B > 0.19$ ;  $p < 0.001$ ). Personal distress inversely influences bonding and the agreement on achievements and tasks ( $-0.13 < B > -0.09$ ;  $p < 0.01$ ).**Conclusions:** The dimensions of perspective taking and empathic concern seem to facilitate successful shared decision making in terms of treating objectives. Furthermore, the physiotherapist's personal distress acts as an obstacle to the development of the three subcomponents of the therapeutic alliance analysed.

## 1. Introduction

The central component of person-centred care is the therapeutic relationship between the patient and the health professional (Mead and Bower, 2000; MoreraBalaguer et al., 2020). In this relationship, trust, caring and mutual respect are fundamental, and there is an exchange of information that will guide the planning, implementation and evaluation of care (Sidani and Fox, 2014). A therapeutic relationship has demonstrated its impact in the field of physiotherapy, both in clinical outcomes (Hall et al., 2010), such as the perception of pain (Kinney et al., 2020; Lawford et al., 2019), the severity of disability (Alodaibi et al., 2021) or mood (Lakke and Meerman, 2016) and in the perceived quality of the service provided by the physiotherapist and the care

received (Wijma et al., 2017) or the establishment of shared decision-making (Hofstede et al., 2013, 2014).

Shared decision-making is part of high-quality, evidence-based, patient-centred clinical practice (Hoffmann et al., 2020). It involves physiotherapists and patients making a shared health-related decision after having discussed different options, always considering the patient's preferences, values and circumstances (Hoffmann et al., 2014). In this sense, communication, the therapeutic relationship and empathy are necessary to gain an in-depth understanding of the circumstances surrounding the patient, allowing them to participate more fully in decision-making related to their health (Jeffrey, 2016; Thompson et al., 2021).

To evaluate a therapeutic relationship in physiotherapy services, the

\* Corresponding author.

E-mail addresses: [orodn@unileon.es](mailto:orodn@unileon.es) (Ó. Rodríguez-Nogueira), [rleir@unileon.es](mailto:rleir@unileon.es) (R. Leirós-Rodríguez), [apinc@unileon.es](mailto:apinc@unileon.es) (A. Pinto-Carral), [mjalva@unileon.es](mailto:mjalva@unileon.es) (M.J. Álvarez-Álvarez), [jmorera.el@uch.ceu.es](mailto:jmorera.el@uch.ceu.es) (J. Morera-Balaguer), [amorenopoyato@ub.edu](mailto:amorenopoyato@ub.edu) (A.R. Moreno-Poyato).<https://doi.org/10.1016/j.msksp.2022.102557>

Received 16 November 2021; Received in revised form 15 March 2022; Accepted 18 March 2022

Available online 23 March 2022

2468-7812/© 2022 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

most commonly used construct is the therapeutic alliance (Besley et al., 2011). Bordin defined therapeutic alliance (TA) as the active relational element of all relationships that are intended to induce change (Bordin, 1979). Its realisation includes the presence of three components or dimensions: the bond; agreement on the goals to be achieved; and agreement on the treatment techniques to be used to achieve these goals (Milot-Lapointe et al., 2020). In this sense, reaching mutual collaborative agreements with the patient is a central aspect for Bordin in the development of TA, underlining the active participation of the patient in the process (Sondenå et al., 2020; Horvath et al., 1994).

As theorised by Rogers and empirically demonstrated by other authors, patients perceive empathy, unconditional acceptance and authenticity as personal characteristics of the therapist necessary to build TA (Rogers, 1951; Aznar et al., 2021; Morera-Balaguer et al., 2018, 2021). In addition, patient-centred interaction styles that provide emotional support and patient participation in the process facilitate TA (Jung et al., 2015). In relation to this, several studies indicate that certain socio-professional variables such as the professional's experience (Alhadidi et al., 2016), educational level (Hughes et al., 2008) or limited time in contact with patients (Alhadidi et al., 2016; Hughes et al., 2008) are significant factors in the ability of health professionals to relate therapeutically with patients.

The empathy of the physiotherapist is one of the most important attributes in achieving a successful TA, both from the theoretical and practical perspective of physiotherapists and patients (Morera-Balaguer et al., 2018, 2021). Empathy can be considered as the intention, on the part of the physiotherapist, to remain within the patient's frame of reference, understanding their feelings and demonstrating this understanding in detail (Starr et al., 2020a). It has been suggested that empathy, in turn, involves two clearly differentiated phenomena: cognitive empathy, or the process of adopting the perspective of the other; and emotional empathy, which would involve experiencing emotions such as being attentive, concerned, or becoming distressed as a result of experiencing another's situation (Davis, 2018).

In spite of the value that TA is beginning to have in the field of physiotherapy, its study in this discipline is still in its infancy compared to the development identified in other specialties such as psychology or nursing (Miciak et al., 2018). Thus, studies that measure empathy quantitatively in physiotherapists are limited (Starr et al., 2020a; Quince et al., 2016).

The aim of our research was to determine the association between the constructs of empathy and TA in Spanish physiotherapists and the possible influence of socio-professional variables on them. With the previous hypothesis that both are related and influenced by socio-professional variables.

## 2. Materials and methods

### 2.1. Study design and sample

A cross-sectional survey of Spanish physiotherapists was carried out. The inclusion criteria were that the physiotherapists should be members of any of the 17 professional associations in Spain (Spain is divided into 17 autonomous communities, territorial entities endowed with autonomy, each with its own professional association of physiotherapists).

In 2020 there were 59,592 registered physiotherapists, according to data from the General Council of Physical Therapy Colleges of Spain (General Council of Colleg, 2021). Finally, 472 physiotherapists participated.

### 2.2. Procedure

The study was carried out in accordance with the guidelines set out in the Declaration of Helsinki, and approved by the University of XXXX Ethics Committee' (code: 032-2019). The data were treated confidentially and informed consent was obtained from all subjects involved in

the study.

The participation of the 17 professional associations of physiotherapists in Spain was requested by email. Google Forms was used as a platform to create the survey, activating the option of one response per user to avoid duplicate responses.

The electronic form included a questionnaire with the physiotherapist's sociodemographic and professional data and measurement instruments. The sociodemographic and professional variables included were: sex, age, years of work experience, training (Graduate/Master's Degree/PhD), shift (part time/full time), system (public/private), work status (employed person/self-employed).

The measurement instruments included were the Working Alliance Inventory short form (WAI-S) and the Interpersonal Reactivity Index (IRI). The WAI-S scale (Horvath and Greenberg, 1989) contains 12 items, and each item is evaluated using a scale that ranges from 1 (never) to 7 (always). This questionnaire is made up of three subscales of four items each: (a) Bonding, the development of an affective bond between the patient and the professional; (b) Goals, the agreement between the patient and the professional in terms of goals; and (c) Tasks, the agreement between the patient and professional on tasks or activities. The greater the score, the stronger the TA. The WAI-S is the most widely used instrument for measuring TA, the one that has been translated into the most languages and the one with the most data on its reliability in different populations (Harris and Panozzo, 2019). The Spanish version of the WAI-S has demonstrated good reliability and validity, with Cronbach's alpha values of 0.85 for the bonding subscale, 0.81 for the goals subscale, 0.9 for the tasks subscale and 0.93 for the total scale (Andrade-González and Fernández-Liria, 2016).

Empathy was measured using the Spanish adaptation of the IRI. This instrument is one of the most widely used instruments to measure empathy and has been rated as grade A (strong adequacy) in a recent review of empathy measurement instruments (Lima and Osório, 2021). It consists of four dimensions, two are cognitive responses and two are affective responses. The cognitive responses are: the Perspective Taking, tendency to adopt the psychological point of view of others; and the Fantasy, the ability to imagine the situation and feelings of others. The affective responses are: Empathetic Concern, the tendency to experience feelings oriented towards others, such as compassion; and Personal Distress, concern and the tendency to react emotionally to the suffering of others (Davis, 1980). The first three dimensions (perspective taking, fantasy and empathetic concern) are favourable for developing greater empathy in healthcare contexts, whereas greater Personal Distress would be an unfavourable factor (Davis, 1983). Each dimension comprises seven items using a 5-point Likert scale. The scores on each subscale can vary from 0 to 27. This instrument has been validated in Spanish, and Cronbach's alpha values vary between 0.63 and 0.71 across the four factors (Mestre et al., 2004).

### 2.3. Data analysis

A descriptive analysis of all the quantitative variables was carried out by calculating the average values (to determine the central tendency) and the standard deviation (as a measure of dispersion). The categorical variables were expressed as the number and percentage.

The variables showed a normal distribution according to the Kolmogorov-Smirnov test ( $p > 0.05$ ), and there was a homogeneity of variances, applying the Levene test. The association between the quantitative variables was evaluated using Pearson's correlation coefficient. The relationship between quantitative and dicotomical variables was determined using the Student's t-test. The relationship between quantitative and categorical variables was determined using the analysis of variance (ANOVA). All of the effect sizes were interpreted using the benchmarks provided by Cohen (1988) (Cohen's  $d$ : small  $<0.5$ , medium  $>0.5$  and  $<0.8$ , and large  $>0.8$ ;  $\eta^2p$  and  $\omega$  (Morera-Balaguer et al., 2020): small  $<0.06$ , medium  $>0.06$  and  $<0.14$ , and large  $>0.14$ ).

Finally, simple linear regression models were used for the WAIS

subscales as dependent variables and the IRI and professional experience as independent variables.

Statistically significant results were established with a p-value of  $p < 0.05$  in all of the analyses carried out. The STATA v. 13 program (State Corp., College Station, TX, USA) was used for the statistical analysis.

### 3. Results

The mean age of all those surveyed was  $33.4 \pm 8.2$  years, and the 68.3% were female (Table 1). The mean of professional experience of the physiotherapists was  $10.7 \pm 7.8$  years y 34.9% of them had post-graduate studies.

The work characteristics showed that 26% worked in the public health system and 74% in the private sector, the most frequent work schedule was full time (56.2%) and the most frequent work status was that of an employee (69.8%). There were no differences between the sexes in any of the variables shown in Table 1.

The assessment instruments used obtained significantly different results in both sexes in three subscales of the IRI with none of the WAI-S (Table 2). The results were significantly higher in females in the Fantasy ( $p = 0.0009$ ;  $d = -0.33$ ), Empathic Concern ( $p < 0.0001$ ;  $d = -0.5$ ) and Personal Distress variables ( $p = 0.0005$ ;  $d = -0.35$ ). In contrast, the three subscales representing TA and the Perspective Taking subscale related to empathy were similar between both sexes ( $p > 0.05$ ).

A correlation analysis was carried out between age and the study variables, with significant results for the IRI subscales of Perspective Taking and Fantasy ( $r = -0.3$ ;  $p = 0.03$ , for both variables) and for the WAI-S subscales of Tasks and Bonding ( $r = 0.4$ ;  $p < 0.009$ , for both variables). When applying the same analysis differentiated by sex, it was found that, in the case of men, only the correlation of the Tasks subscale was maintained ( $r = 0.6$ ;  $p < 0.0001$ ). On the other hand, in the specific analysis of women, only the correlation of the Fantasy subscale remained ( $r = -0.3$ ;  $p < 0.01$ ). The same correlation analysis, but with years of work experience, showed significant results with the subscales of Fantasy ( $r = -0.3$ ;  $p = 0.04$ ), Goals and Bonding ( $r = 0.3$ ;  $p < 0.001$ , for both variables). The differential analysis of men showed significant results in the variable Tasks ( $r = 0.6$ ;  $p = 0.0001$ ) and Bonding ( $r = 0.3$ ;  $p = 0.03$ ). The differential analysis of women, on the other hand, showed significant results in the variable Bonding (with the same magnitude of association) and Fantasy ( $r = -0.3$ ;  $p = 0.03$ ).

The ANOVA analysis between the results of the IRI and the different response options of the training variable only found significant results in the subscale of Empathetic Concern ( $p = 0.04$ ;  $\eta^2 p = 0.1$ ) with lower results in physiotherapists who only completed undergraduate training ( $26.3 \pm 3.9$  points) compared to those who completed at least a Master's Degree ( $27.2 \pm 3.8$  points). The variable setting showed significant

**Table 1**  
Demographic and work characteristics of the sample.

	ALL (n = 473)	WOMEN (n = 323)	MEN (n = 150)
Age (years)	33.4 ± 8.2	33.5 ± 0.4	33.1 ± 0.7
Work experience (years)	10.7 ± 7.8	11.1 ± 7.8	9.8 ± 9
Training (category):			
Graduate	308 (65.1%)	214 (66.3%)	94 (62.7%)
Master's Degree	150 (31.7%)	100 (31%)	50 (33.3%)
PhD	15 (3.2%)	9 (2.7%)	6 (4%)
Shift (category):			
Part time	207 (43.8%)	137 (42.4%)	70 (46.7%)
Full time	266 (56.2%)	186 (57.6%)	80 (53.3%)
System (category):			
Public	123 (26%)	92 (28.5%)	31 (20.7%)
Private	350 (74%)	231 (71.5%)	119 (79.3%)
Status (category):			
Employee	330 (69.8%)	232 (71.8%)	98 (65.3%)
Self employed	143 (30.2%)	91 (28.2%)	52 (34.7%)

Data provided for Age and Work experience: mean ± standard deviation.  
Data provided for categorical variables: n (percentage).

**Table 2**

Scores obtained in the Interpersonal Reactivity Index and Working Alliance Inventory Short Form (data provided: mean ± standard deviation).

	ALL (n = 473)	WOMEN (n = 323)	MEN (n = 150)
<b>Interpersonal Reactivity Index</b>			
Perspective taking	23 ± 3.4	23.1 ± 3.4	22.7 ± 3.4
Fantasy	24 ± 4.6	24.4 ± 4.6***	22.9 ± 4.5***
Empathic concern	26.6 ± 3.9	27.2 ± 3.8***	25.3 ± 3.7***
Personal distress	17.8 ± 4.3	18.2 ± 4.2***	16.7 ± 4.4***
<b>Working Alliance Inventory Short Form</b>			
Bond	23.5 ± 2.4	23.4 ± 2.3	23.7 ± 2.4
Goals	19.8 ± 3.2	19.9 ± 3.2	19.6 ± 3.1
Tasks	22.4 ± 2.9	22.3 ± 3	22.6 ± 2.6

t-test between sexes: \*p value < 0.05; \*\*p value < 0.01; \*\*\*p value < 0.001.

results in the Personal Distress subscale between physiotherapists working in the public sector ( $18.6 \pm 4.3$  points) and the private sector ( $17.5 \pm 4.3$  points): physiotherapists in the public sector showed significantly superior results ( $p = 0.004$ ;  $d = -0.3$ ). The status variable also found significant results in the subscales of the WAI-S Bonding ( $p = 0.007$ ;  $d = 0.3$ ) and Tasks ( $p = 0.005$ ;  $d = 0.3$ ) and the subscale of the IRI Personal Distress ( $p = 0.01$ ;  $d = -0.2$ ). Specifically, in the Bonding and Tasks subscales, self-employed physiotherapists obtained significantly higher scores; on the other hand, in the Personal Distress subscale, it was the employed physiotherapists who obtained the higher scores.

Simple linear regression analysis showed the influence of years of work experience and empathy components on the components determining the degree of TA (Table 3). The results showed a positive influence of work experience on the three WAI-S subscales ( $0.04 < B > 0.06$ ;  $p < 0.01$ ). The Perspective Taking and Empathetic Concern skills exerted a positive influence on the Goals ( $0.14 < B > 0.19$ ;  $p < 0.001$ ). On the other hand, Personal Distress had an inverse influence on the three TA components analysed ( $-0.13 < B > -0.09$ ;  $p < 0.01$ ). In contrast, the Fantasy subscale did not show significant results with any of the WAI-S subscales ( $p > 0.05$ ). Similarly, the Taking Perspective and Empathetic Concern subscales did not show significant results with either Bond or Task ( $p > 0.05$ ).

### 4. Discussion

The aim of the research was to determine the association between the constructs of empathy and TA in Spanish physiotherapists and the possible influence of socio-professional variables on them. The results obtained indicate that both constructs are related and conditioned by several socio-professional aspects.

Specifically, higher levels of Perspective Taking and Empathetic Concern seem to lead to better agreements between the patient and the physiotherapists in terms of goals. This finding could be of value since a precondition for shared-decision-making is the necessary acknowledgement and understanding of patients' views and perceived needs, to set meaningful and relevant goals in the patient's own environment (Melin et al., 2021). Perspective Taking is essential because it allows the other's point of view to be adopted without emotional involvement (Blatt et al., 2010; Drwecki et al., 2011), which would allow the physiotherapist to actively listen to the patient without the patient feeling judged, thus facilitating agreement and consensus on the purpose of the treatment to be carried out. At the same time, empathic concern mobilizes the desire to help others, the desire to help the patient establish the best therapeutic objectives based on his or her preferences (Reynolds and Scott, 1999). Therefore, it is congruent that both capabilities have proved to be conditioning factors and promoters of a good agreement in terms of therapeutic objectives.

On the other hand, personal distress negatively conditioned the development of the three components of TA analysed. These results are congruent with previous research which indicate that the perception of stress on the part of the health professional increases the feeling of

**Table 3**  
Coefficient of regression of the simple linear regression models for Working Alliance Inventory Short Form (continuous variables) adjusted for age and sex.

Variable	Bond			Goals			Tasks		
	B	95% CI	$\omega$ (MoreraBalaguer et al., 2020)	B	95% CI	$\omega$ (MoreraBalaguer et al., 2020)	B	95% CI	$\omega$ (MoreraBalaguer et al., 2020)
Taking of perspective	0.04	-0.02-0.1	0.02	0.19**	0.1-0.27	0.04	0.07	-0.01-0.14	0.03
Fantasy	0.002	-0.04-0.05	0.02	0.03	-0.03-0.09	0.004	-0.02	-0.08-0.04	0.02
Empathetic concern	0.03	-0.03-0.08	0.02	0.14**	0.07-0.22	0.03	0.03	-0.04-0.1	0.02
Personal distress	-0.1**	-0.15-0.06	0.06	-0.13**	-0.19-0.06	0.03	-0.09*	-0.15-0.03	0.04
Work Experience	0.04**	0.02-0.07	0.02	0.04*	0.04-0.07	0.02	0.06**	0.03-0.09	0.02

B: coefficient of regression; 95% CI: 95% confidence interval;  $\omega^2$ : omega squared \*p < 0.01; \*\*p < 0.001.

having to make hasty decisions or, at least, without sufficient reflection on the matter (Moreno-Poyato and Rodríguez-Nogueira, 2021; Haas et al., 2015). Thus, both when establishing a bond with the patient, and when defining the necessary objectives and treatment techniques together with the patient, the physiotherapists should give importance to self-knowledge and emotional regulation (Morera-Balaguer et al., 2018; Moreno-Poyato et al., 2016), since a professional who is stressed may be perceived as lacking in self-confidence, and it appears that this is associated with lower TA (Keijsers et al., 2000).

In this regard, it should be noted that physiotherapists working in the public versus the private sector settings and, of the latter, those working as employees, obtained significantly higher personal distress scores. As regards the public environment, the results may be due to the high proportion of women working in public sector, and to the significant gender differences identified in empathy (women scored higher on personal distress, fantasy and empathic concern), in line with previous research (Moreno-Poyato et al., 2020; Gleichgerrcht and Decety, 2013). This may be due to the fact that, in practice, women seem to show faster and more accurate emotional perception (limbic processing: first level) than men (predominantly prefrontal processing: second level) (Whittle et al., 2011; Di Tella et al., 2020; Adenzato et al., 2017, 2019). As regards the high personal distress of employed workers, this could be due to their working conditions; however, we have not found any studies on this subject. We suggest the need for research into the influence of work characteristics on both empathy components and TA, since the results of this study further indicated that self-employed physical therapists had higher scores on the subscales of bonding and tasks, so presumably they will perform better TA.

Furthermore, work experience was shown to have a positive influence on all three TA determinant subscales. This finding is compatible with other studies in which experience is associated with improvements in treatment and agreement on treatment goals and techniques (Moreno-Poyato and Rodríguez-Nogueira, 2021; Moreno-Poyato et al., 2021). Nevertheless, the self-confidence and experience that comes from years of clinical practice can lead to a reduction in personal distress (de Paiva et al., 2017).

Although previous studies have demonstrated the importance of empathy in the construction of the TA (McAllister et al., 2019; Nienhuis et al., 2018), to date, none has analysed it in physiotherapists. Therefore, the results obtained are not comparable. In particular, Lawford et al. (2019) studied the degree of TA in both physiotherapists and their patients, identifying higher scores in all subscales than in the present research. Specifically, the goals subscale, which scored the lowest in this study, is the one with the greatest difference to the results of Lawford et al. (2019). This could indicate the difficulties of Spanish physiotherapists in establishing joint objectives with their patients. On the other hand, to our knowledge, there is only one study that analysed empathy levels quantitatively in physiotherapists (Starr et al., 2020b). This study used the Jefferson Scale of Empathy-Health Provider Version, which defines empathy based on three components: perspective-taking,

compassionate care and the ability to "put oneself in the patient's place", so it is not possible to compare the results with it.

These findings should be considered by the health and educational institutions responsible for the clinical management and training of physiotherapists in Spain. Furthermore, we suggest the need for research into the influence of work characteristics on both empathy components and TA, since the nature of employment and work organisation may well be stressors (and need to find out in future).

This study has several limitations that should be considered: the lack of longitudinal data prevents us from analysing the effect of variables such as professional experience and establishing causal relationships between the findings. Likewise, it should be considered that the evaluation of the TA was carried out as a general measure and only from the perspective of physical therapists. The authors have not found official data on the proportion of men and women and by age subgroups in the population of Spanish physical therapists. Consequently, the authors are uncertain about the representativeness of the sample analysed in this research. Finally, we must recognize that we have not taken into account all of the socio-professional variables that could influence AT and empathy. Having data on the level of health care (primary or secondary) as well as the area of health care (orthopedics, neurology, pediatrics, gynecology, psychiatry, etc.) would have added value to this research. Therefore, these variables represent two extraneous variables that may have influenced the results obtained. Future research should take all of these aspects into account to deepen the existing knowledge.

Nevertheless, this research is the first to analyse empathy, TA and their association in physiotherapists. Despite this, it is unlikely that the results could be extrapolated to other countries in which the training plans and care settings differ from those of Spain. In this sense, it would be advisable to replicate the study at an international level.

### 5. Conclusion

The dimensions of perspective taking and empathic concern seem to facilitate successful shared decision-making in terms of treatment goals between physiotherapists and patients. Furthermore, the personal distress of the physiotherapist acts as an obstacle to the development of the three subcomponents of the TA analysed.

These findings have significant implications since knowledge of the detected influence of these empathic responses of professionals on TA should be taken into account to design interventions in both the work and educational environments in order to improve the physiotherapist-patient relationship and enable the establishment of person-centred care.

### Funding

This article has received funding by a private contest for emerging groups on behalf of the CEU Cardenal Herrera University and the San Pablo University-Santander Foundation (FUSP) (PCC11/201).

## Ethics approval

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the University of León (code: 032-2019).

## Consent to participate

The data were treated confidentially, and an informed consent was obtained from all subjects involved in the study.

## Consent to publication

Not applicable.

## Availability of data and material

The dataset used and analysed during the current study are available from the corresponding author.

## Code availability

Not applicable.

## Author contributions

Ó.R.-N., R.L.-R., A.P.-C., M.J.Á.-Á, J.M.-B. and A.R.M.-P. conceptualized and designed the study, drafted the initial manuscript, designed the data collection instruments, collected data, carried out the initial analyses, and critically reviewed the manuscript for important intellectual content. All authors have read and agreed to the published version of the manuscript.

## Declaration of competing interest

The authors report no conflict of interest.

## References

- Adenzato, M., Brambilla, M., Manenti, R., et al., 2017. Gender differences in cognitive theory of mind revealed by transcranial direct current stimulation on medial prefrontal cortex. *Sci. Rep.* 7 (1), 1–9.
- Adenzato, M., Manenti, R., Gobbi, E., Enrici, I., Rusich, D., Cotelli, M., 2019. Aging, sex and cognitive theory of mind: a transcranial direct current stimulation study. *Sci. Rep.* 9 (1), 1–10.
- Alhadidi, M.M.B., Abdalrahim, M.S., Al-Hussami, M., 2016. Nurses' caring and empathy in Jordanian psychiatric hospitals: a national survey. *Int. J. Ment. Health Nurs.* 25 (4), 337–345.
- Alodaibi, F., Beneciuk, J., Holmes, R., Kareha, S., Hayes, D., Fritz, J., 2021. The relationship of the therapeutic alliance to patient characteristics and functional outcome during an episode of physical therapy care for patients with low back pain: an observational study. *Phys. Ther.* 101 (4) pzb026.
- Andrade-González, N., Fernández-Liria, A., 2016. Spanish adaptation of the working alliance inventory-short (WAI-S). *Curr. Psychol.* 35 (1), 169–177.
- Aznar, A., Cardo Vila, G., Vives, T., Valera, M.R., Leyva, J.M., Moreno, A.R., 2021. Unconditional acceptance in the nurse-patient therapeutic relationship as a whole: an exploratory qualitative study in the context of mental health services. *Rev Española Enfermería Salud Ment* 14, 1–8.
- Besley, J., Kayes, N.M., McPherson, K.M., 2011. Assessing therapeutic alliances in physiotherapy: literature review. *N. Z. J. Physiother.* 39 (2).
- Blatt, B., LeLacheur, S.F., Galinsky, A.D., Simmens, S.J., Greenberg, L., 2010. Does perspective-taking increase patient satisfaction in medical encounters? *Acad. Med.* 85 (9), 1445–1452.
- Bordin, E.S., 1979. The generalizability of the psychoanalytic concept of the working alliance. *Psychother. Theory Res. Pract.* 16 (3), 252–260.
- Cohen, J., 1988. *Statistical Power Analysis for the Behavioural Sciences*. Laurence Erlbaum Associates, Hillsdale, NJ.
- Davis, M.H., 1980. A multidimensional approach to individual differences in empathy. *JSAS Catalog. Select. Doc. Psychol.* 10, 85.
- Davis, M.H., 1983. Measuring individual differences in empathy: evidence for a multidimension approach. *J. Pers. Soc. Psychol.* 44 (1), 113–126.
- Davis, M.H., 2018. *Empathy: A Social Psychological Approach*. Routledge, Abingdon.
- de Paiva, L.C., Canário, A.C.G., de Paiva, E.L.C., Gonçalves, A.K., 2017. Burnout syndrome in health-care professionals in a university hospital. *Clinics* 72 (5), 305–309.
- Di Tella, M., Miti, F., Ardito, R.B., Adenzato, M., 2020. Social cognition and sex: are men and women really different? *Pers. Individ. Differ.* 162, 110045.
- Drwecki, B.B., Moore, C.F., Ward, S.E., Prkachin, K.M., 2011. Reducing racial disparities in pain treatment: the role of empathy and perspective-taking. *Pain* 152 (5), 1001–1006.
- General Council of Colleges of Physiotherapists of Spain, 2021. *General Council of Colleges of physiotherapists of Spain*. <https://www.consejo-fisioterapia.org>. (Accessed 14 June 2021).
- Gleichgerrcht, E., Decety, J., 2013. Empathy in clinical practice: how individual dispositions, gender, and experience moderate empathic concern, burnout, and emotional distress in physicians. *PLoS One* 8 (4), e61526.
- Haas, B.W., Anderson, I.W., Filkowski, M.M., 2015. Interpersonal reactivity and the attribution of emotional reactions. *Emotion* 15 (3), 390.
- Hall, A.M., Ferreira, P.H., Maher, C.G., Latimer, J., Ferreira, M.L., 2010. The influence of the therapist-patient relationship on treatment outcome in physical rehabilitation: a systematic review. *Phys. Ther.* 90 (8), 1099–1110.
- Harris, B.A., Panozzo, G., 2019. Therapeutic alliance, relationship building, and communication strategies for the schizophrenia population: an integrative review. *Arch. Psychiatr. Nurs.* 33, 104–111.
- Hoffmann, T.C., Legare, F., Simmons, M.B., et al., 2014. Shared decision making: what do clinicians need to know and why should they bother? *Med. J. Aust.* 201 (1), 35–39.
- Hoffmann, T.C., Lewis, J., Maher, C.G., 2020. Shared decision making should be an integral part of physiotherapy practice. *Physiotherapy* 107, 43–49.
- Hofstede, S.N., Marang-van de Mheen, Perla, J., Wentink, M.M., et al., 2013. Barriers and facilitators to implement shared decision making in multidisciplinary sciatica care: a qualitative study. *Implement. Sci.* 8 (1), 1–11.
- Hofstede, S.N., van Bodegom-Vos, L., Wentink, M.M., et al., 2014. Most important factors for the implementation of shared decision making in sciatica care: ranking among professionals and patients. *PLoS One* 9 (4), e94176.
- Horvath, A.O., Greenberg, L.S., 1989. Development and validation of the working alliance inventory. *J. Counsel. Psychol.* 36 (2), 223.
- Horvath, A.O., 1994. Empirical validation of Bordin's pantheoretical model of the alliance: the working alliance inventory perspective. In: Horvath, A.O., Greenberg, L.S. (Eds.), *The Working Alliance: Theory, Research and Practice*. Wiley and Sons, New York.
- Hughes, E., Wanigaratne, S., Gournay, K., et al., 2008. Training in dual diagnosis interventions (the COMO study): randomised controlled trial. *BMC Psychiatr.* 8 (1), 12–19.
- Jeffrey, D., 2016. Empathy, sympathy and compassion in healthcare: is there a problem? Is there a difference? Does it matter? *J. R. Soc. Med.* 109 (12), 446–452.
- Jung, E., Wiesjahn, M., Rief, W., Lincoln, T.M., 2015. Perceived therapist genuineness predicts therapeutic alliance in cognitive behavioural therapy for psychosis. *Br. J. Clin. Psychol.* 54, 34–48.
- Keijsers, G., Schaap, C., Hoogduin, C., 2000. The impact of interpersonal patient and therapist behavior on outcome in cognitive-behavior therapy: a review of empirical studies. *Behav. Modif.* 24 (2), 264–297.
- Kinney, M., Seider, J., Beaty, A.F., Coughlin, K., Dyal, M., Clewley, D., 2020. The impact of therapeutic alliance in physical therapy for chronic musculoskeletal pain: a systematic review of the literature. *Physiother. Theory Pract.* 36 (8), 886–898.
- Lakke, S.E., Meerman, S., 2016. Does working alliance have an influence on pain and physical functioning in patients with chronic musculoskeletal pain; a systematic review. *J. Compassionate Health Care* 3 (1), 1–10.
- Lawford, B., Bennell, K., Campbell, P., Kasza, J., Hinman, R., 2019. Therapeutic alliance between physiotherapists and patients with knee osteoarthritis consulting via telephone a longitudinal study. *Osteoarthritis Cartilage* 27, S303–S304.
- Lima, F.F., Osório, F.L., 2021. Empathy: assessment instruments and psychometric quality – a systematic literature review with a meta-analysis of the past ten years. *Front. Psychol.* 12.
- McAllister, S., Robert, G., Tsianakas, V., McCrae, N., 2019. Conceptualising nurse-patient therapeutic engagement on acute mental health wards: an integrative review. *Int. J. Nurs. Stud.* 93, 106–118.
- Mead, N., Bower, P., 2000. Patient-centredness: a conceptual framework and review of the empirical literature. *Soc. Sci. Med.* 51 (7), 1087–1110.
- Melin, J., Nordin, Å., Feldthusen, C., Danielsson, L., 2021. Goal-setting in physiotherapy: exploring a person-centered perspective. *Physiother. Theory Pract.* 37, 863–880.
- Mestre, V., Frias, M.D., Samper, P., 2004. La medida de la empatía: análisis del interpersonal reactivity index. *Psicothema* 255–260.
- Miciak, M., Mayan, M., Brown, C., Joyce, A.S., Gross, D.P., 2018. The necessary conditions of engagement for the therapeutic alliance in physiotherapy: an interpretive description study. *Arch. Physiother.* 8 (1), 1–12.
- Milot-Lapointe, F., Le Corff, Y., Savard, R., 2020. Factor structure of the short version of the working alliance inventory and its longitudinal measurement invariance across individual career counseling sessions. *J. Career Assess.* 28 (4), 693–705.
- Moreno-Poyato, A.R., Montesó-Curto, P., Delgado-Hito, P., et al., 2016. The therapeutic alliance in inpatient psychiatric care: a narrative review of the perspective of nurses and patients. *Arch. Psychiatr. Nurs.* 30 (6), 782–787.
- Rodríguez-Nogueira, O., Moreno-Poyato, A.R., Álvarez-Álvarez, M.J., Pinto-Carral, A., 2020. Significant socio-emotional learning and improvement of empathy in physiotherapy students through service learning methodology: a mixed methods research. *Nurse Educ. Today* 90, 104437.
- Moreno-Poyato, A.R., Rodríguez-Nogueira, Ó., MiRTCIME. CAT working group, 2021. The association between empathy and the nurse-patient therapeutic alliance in

- mental health units: a cross-sectional study. *J. Psychiatr. Ment. Health Nurs.* 28 (3), 335–343.
- Moreno-Poyato, A.R., Casanova-Garrigos, G., Roldán-Merino, J.F., Rodríguez-Nogueira, Ó., 2021. MiRTCIME. CAT working group. Examining the association between evidence-based practice and the nurse-patient therapeutic alliance in mental health units: a cross-sectional study. *J. Adv. Nurs.* 77 (4), 1762–1771.
- Morera-Balaguer, J., Botella-Rico, J.M., Martínez-González, M.C., Medina-Mirapeix, F., Rodríguez-Nogueira, Ó., 2018. Physical therapists' perceptions and experiences about barriers and facilitators of therapeutic patient-centred relationships during outpatient rehabilitation: a qualitative study. *Braz. J. Phys. Ther.* 22 (6), 484–492.
- Morera-Balaguer, J., Botella-Rico, J.M., Catalán-Matamoros, D., Martínez-Segura, O., Leal-Clavel, M., Rodríguez-Nogueira, Ó., 2021. Patients' experience regarding therapeutic person-centered relationships in physiotherapy services: a qualitative study. *Physiother. Theory Pract.* 37 (1), 17–27.
- Rodríguez-Nogueira Ó, Morera Balaguer, J., Nogueira López, A., et al., 2020. The psychometric properties of the person-centered therapeutic alliance in physiotherapy scale. *PLoS One* 15 (11), e0241010.
- Nienhuis, J.B., Owen, J., Valentine, J.C., et al., 2018. Therapeutic alliance, empathy, and genuineness in individual adult psychotherapy: a meta-analytic review. *Psychother. Res.* 28 (4), 593–605.
- Quince, T.A., Kinnersley, P., Hales, J., et al., 2016. Empathy among undergraduate medical students: a multi-centre cross-sectional comparison of students beginning and approaching the end of their course. *BMC Med. Educ.* 16 (1), 1–10.
- Reynolds, W.J., Scott, B., 1999. Empathy: a crucial component of the helping relationship. *J. Psychiatr. Ment. Health Nurs.* 6 (5), 363–370.
- Rogers, C.R., 1951. *Client-centered Therapy: its Current Practice, Implications, and Theory.* Constable & Robinson Ltd, London.
- Sidani, S., Fox, M., 2014. Patient-centered care: clarification of its specific elements to facilitate interprofessional care. *J. Interprof. Care* 28 (2), 134–141.
- Søndenå, P., Dalusio-King, G., Hebron, C., 2020. Conceptualisation of the therapeutic alliance in physiotherapy: is it adequate? *Musculoskelet Sci. Pract.* 46, 102131.
- Starr, J.A., Holmes, M.B., Riley, E., et al., 2020a. A quantitative measurement of physical therapists' empathy and exploration of the relationship with practice setting and work engagement. *Eval. Health Prof.* 43 (4), 255–263.
- Starr, J.A., Holmes, M.B., Riley, E., et al., 2020b. A quantitative measurement of physical therapists' empathy and exploration of the relationship with practice setting and work engagement. *Eval. Health Prof.* 43 (4), 255–263.
- Thompson, J., Gabriel, L., Yoward, S., Dawson, P., 2021. The advanced practitioners' perspective. Exploring the decision-making process between musculoskeletal advanced practitioners and their patients: an interpretive phenomenological study. *Musculoskel. Care. epub ahead of print.*
- Whittle, S., Yücel, M., Yap, M.B., Allen, N.B., 2011. Sex differences in the neural correlates of emotion: evidence from neuroimaging. *Biol. Psychol.* 87 (3), 319–333.
- Wijma, A.J., Bletterman, A.N., Clark, J.R., et al., 2017. Patient-centeredness in physiotherapy: what does it entail? A systematic review of qualitative studies. *Physiother. Theory Pract.* 33 (11), 825–840.