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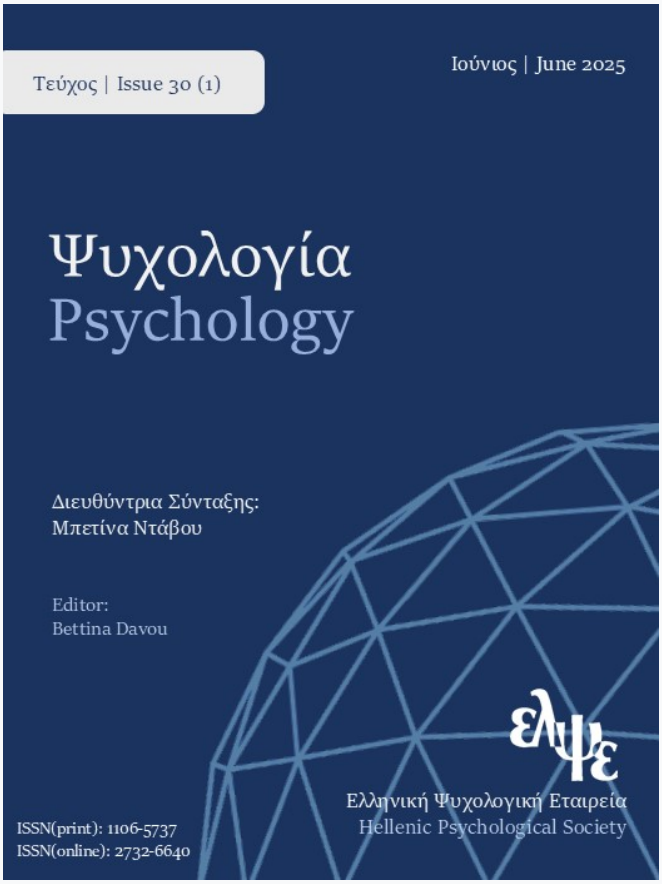

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ΕΜΠΕΙΡΙΚΗ ΕΡΓΑΣΙΑ | RESEARCH PAPER

Development and validation of the PPROQ3-SF: A revised and shorter version of the theory-informed Person's Positive Relating to Others Questionnaire

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KEYWORDS

Person's Positive Relating to Others Questionnaire
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Validity
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ABSTRACT

Relating Theory conceptualizes and assesses relating (both negative and positive) around a two-dimensional model with four main and four intermediate positions/dimensions, graphically represented as an octagon (clockwise: upper neutral, upper close, neutral close, lower close, lower neutral, lower distant, neutral distant, and upper distant). Drawing from this theory and considering the psychometric limitations of the formerly developed, theoretically informed questionnaire (i.e., the Person's Positive Relating to Others Questionnaire; PPROQ), this study aimed to refine its items profoundly and improve its psychometric properties. Undergoing a three-step item construction, refinement, shortening, and three respective validation studies of the sequential versions (i.e., PPROQ2, PPROQ3, and PPROQ3-SF, respectively), the revised and shorter 24-item PPROQ3-SF was eventually developed. The eight-factor structure and the internal consistency of the eight scales were significantly improved across the successive versions. Test-retest reliability was also confirmed for the PPROQ3-SF. High correlations (inter-item, corrected item-total, between pairs of neighboring scales) established convergent validity, whereas low inter-scale correlations between pairs of opposite octant scales, Heterotrait-monotrait ratio of correlation, and differences across gender and chronic disease status, established discriminant validity. The final 24-item shortened version demonstrated good psychometric properties, reflecting the pre-defined eight-factor structure of the interpersonal octagon, and exhibited satisfactory reliabilities, and convergent, and discriminant validity. Being psychometrically robust and conforming well to its grounding octagonal structure, the PROQ3-SF is recommended for use in both research and clinical practice.

Introduction

Positive relationships and well-being

Positive relationships (PR) are crucial in one's life, and the far-reaching beneficial ramifications in all areas of people's lives have been well-documented. Studies have shown a correlation between the strength and quality of

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relationships with mental health and well-being (Kawachi & Berkman, 2001; Mertika et al., 2020; Seligman, 2011, 2018; Waldinger & Schulz, 2023). The WHO Commission on Social Connection (2024–2026) has recognized social connection as 'a global public health priority.' Benefits extend to adult friendships (Pezirkianidis et al., 2023) and romantic relationships (Gómez-López et al., 2019) across all ages (Mertika et al., 2020). Robust theories, such as PERMA (Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment; Seligman, 2011, 2018), have considered positive relationships a pillar of well-being.

Shortfalls in definition, theory, and assessment instruments

Despite its frequent use, the seemingly self-explanatory term **'**positive relationships' lacks an unambiguous and unanimous definition (Mertika et al., 2020; Mitskidou et al., 2021). This may be due to the lack of a comprehensive theoretical background. However, a sound theory would be essential to describe potentially all different types of relationships (e.g., friendship and romantic relationships) and provide a common framework and comparative advantages for research and practice. Moreover, the use of a theory would identify the variables to be measured (deductive or "top-down" approach) (Tay & Jebb, 2017). After all, research-driven inductive or "bottom-up" attempts to agree on the components and dimensionality of the 'positive relationships' have been inconclusive so far (Mertika et al., 2020; Mitskidou et al., 2021).

Theoretically informed, valid, reliable, multidimensional, yet short instruments assessing all aspects of interpersonal relationships across all age groups seem to be lacking, particularly those assessing *positive* relationships. The assessment of positive relationships is often included in general measures (e.g., Scales of Psychological Well-being; Ryff & Keyes, 1995; PERMA Profiler; Butler & Kern, 2016). When considered separately, specific and limited aspects are assessed such as loneliness (the Loneliness Scale; Hughes et al. 2004), social support (Lozano-Hernández et al., 2023), or closeness to another person (the 'Inclusion of the Other in the Self' Scale; Gächter et al., 2015), usually without a theoretical basis. Mitskidou et al. (2021) recently developed and pilot-tested a research-driven self-report tool assessing relationship characteristics (the 35-item Positive Relationships Questionnaire) across four factors with good psychometric properties.

The Relating Theory and respective instruments

Relating Theory provides a framework for describing and measuring relationships (Birtchnell, 1993/1996, 2016a,b). It defines relating as a person's attitude and behavior towards others or a particular person, structured around the positions of two intersecting axes; the horizontal axis represents seeking closeness (called Neutral Close, NC) versus seeking distance (called Neutral Distant, ND), whereas the vertical axis represents relating from an upper position (Upper Neutral, UN) versus a lower position (Lower Neutral, LN). The blending of these creates four intermediate positions (clockwise): upper close (UC), upper distant (UD), lower close (LC), and lower distant (LD). These eight 'states of relating' are graphically represented in a theoretical structure called the Interpersonal Octagon (Birtchnell, 1993/1996). Although it may resemble Leary's interpersonal circle (1957), their differences have been detailed elsewhere (Birtchnell, 2016b). Relating theory posits that all eight positions are equally advantageous. Depending on people's competencies, they can achieve and maintain either positive (i.e., adaptive, inoffensive, respectful, and confident relating) or negative relating (defined as the opposite) across these positions. A positive octagon represents positive relating, and a separate negative octagon represents negative relating across the eight positions (Birtchnell, 1993/1996). The features of these eight positive and eight negative relating types have been extensively described (Birtchnell, 1993/1996, 2016a). Illustrative examples are presented in Figure 1.

The 92-item Person's Relating to Others (PROQ; Birtchnell et al., 1992) and its shorter half-item version (PROQ3; Birtchnell et al., 2013; Kalaitzaki et al., 2015) were the first tools to measure *negative* relating. They feature eight scales corresponding to the eight octants/eight negative relating traits of the octagon (i.e.,

abbreviated as UN, UC, NC, LC, LN, LD, ND, and UD). Both versions have satisfactory psychometric properties (Birtchnell et al., 2013; Hammond, 2016; Kalaitzaki & Birtchnell, 2016; Kalaitzaki & Nestoros, 2003; Kalaitzaki et al., 2015) and have been widely used in research and therapy (e.g., Kalaitzaki & Birtchnell, 2014; Kalaitzaki et al., 2010, 2020). A software-generated octagon visualizes negative relating as shaded areas across the respective octants and facilitates the quick and explicit understanding of the relating deficiencies. Examples of software-generated results can be found elsewhere (e.g., Birtchnell et al., 2013; Kalaitzaki et al., 2009, 2016), and the software is available on request from the senior author.

The Person's Positive Relating to Others Questionnaire (PPROQ)

Inspired by Positive Psychology, Kalaitzaki & Hammond (2016) developed and pilot-tested the 40-item Person's Positive Relating to Others Questionnaire (PPROQ). It was the first instrument to measure *positive* relating across the theory's eight constructs/scales. Although convergent, divergent, and discriminant validity were confirmed in a sample of 439 Greek university students, its eight-factor structure was weaker than that of the PROQ3, and reliability coefficients were below .70 for six scales, of which, unacceptably low (<.60) for LC and LD (Table 2). The authors suggested using PPROQ with this caveat pending further elaboration (Kalaitzaki & Hammond, 2016).

Aim of the study

Given the relative psychometric soundness of the PPROQ and the robustness of its respective theory to thoroughly and meaningfully describe relating (positive and negative, qualitative and quantitative; Birtchnell, 1993/1996, 2016a,b), a profound revision of the PPROQ was attempted. This study aimed to address the shortcomings of the PPROQ by refining its items and improving its psychometric properties.

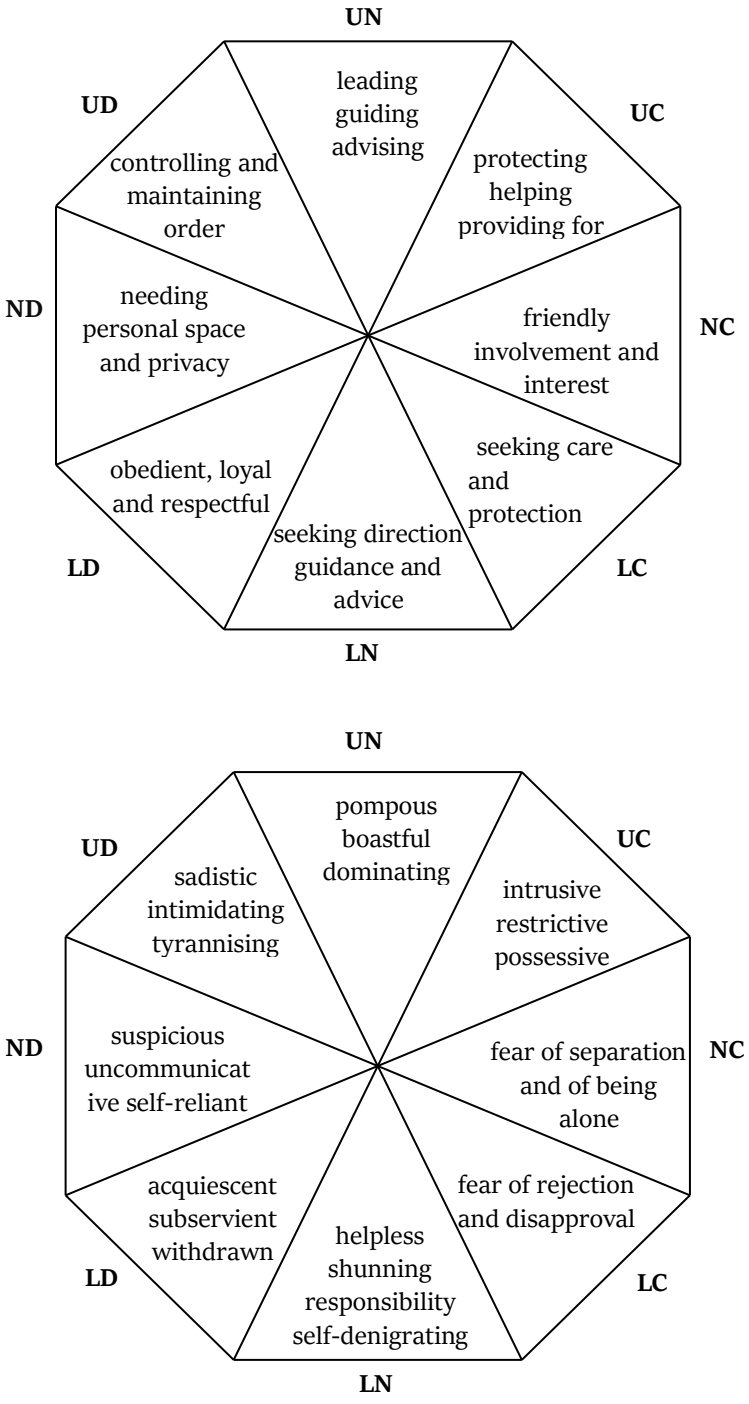
Methods

A revised questionnaire was initially developed (the PPROQ2) and tested on a target sample (n = 381). Considering its factor structure and Cronbach alphas when any items were deleted, 16 items were further refined and the resulting PPROQ3 was re-tested on another sample (n = 141). The same procedure (factor analysis and reliability testing) suggested the elimination of two items per scale, and finally, the psychometric properties of the shorter version (the PPROQ3-SF) were examined. The detailed process is presented below.

Step 1-Item development (the PPROQ2)

Through focus group sessions, a panel of three female mental health professionals (panel A: mean age 28.5, *SD* = 3.7) and the lead author engaged in a meticulous process of item review for the eight constructs of positive relating. They used a summary definition and illustrative examples for each construct to decide whether items should be retained, eliminated, replaced, or reworded. The items were designed on the premise that they represent the meaning of the relating features defined by the corresponding octant/position of the octagon assumed to belong. Axiomatically, the dimensionality of the eight octants correspondingly to the eight positions of the octagon was retained, ensuring that each scale had the same number of items and the same scoring (a four-point Likert scale ranging from 3 = *nearly always true* to 0 = *rarely true*) as its negative variant (PROQ3). This approach aimed to make the questionnaires comparable and consistent with the theory. Most items were replaced with new ones, whereas those that were retained were reworded to address issues such as ambiguity, similarity of content, and lack of discrimination. This process resulted in the pre-final PPROQ2 with 40 potentially theory-relevant items (five for each scale).

Figure 1. *Positive (upper diagram) and negative (lower diagram) forms of relating for each octant*



**Note.* Adapted from *The interpersonal octagon: An alternative to the interpersonal circle*, by J. Birtchnell, 1994, p. 518 and 524. Copyright The Tavistock Institute. Reproduced with permission.

Assessment of face and content validity. Three different experts (panel B: mean age 31.2, *SD* = 2.5) (a) evaluated the items for relevance to the content of each construct/scale on a 3-point Likert scale (1 = *necessary*, 2 = *useful but not necessary*, and 3=*unnecessary*) and (b) allocated them to the eight scales presumably pertained thereby judging whether the items reflected the intended definition of the relating construct. The content validity index (CVI; Lynn, 1986) was calculated by dividing the number of items rated as 1 (*necessary*) by the total number of items (i.e., 40), and the intraclass correlation coefficient (ICC; Weir, 2005) assessed inter-rater reliability between the experts. ICCs ranged from .78 to .86, and an 84% agreement among the experts suggested satisfactory agreement in conceptualizing the meaning of the items and correctly classifying them.

Item refinement. Another round of focus group discussions with both panels and the lead author re-examined the items, agreeing to reorder/reclassify three items into different scales and further elaborate on four others.

Study 1

Sample and procedure. The psychometric properties of the PPROQ2 were examined using exploratory factor analysis (principal axis factoring) and Cronbach's alpha. A sample of 381 community residents (Mean age = 32.6, *SD* = 10.6), mostly female (65.6%) and single (64.4%), from the 13 regions of Greece, participated (Table 1). The PPROQ2 was administered online via Google Forms, and background information was collected. The link was shared through web pages and social media, with regular reminders to increase response rates (Edwards et al., 2009). Information about the study, eligibility criteria, and informed consent were presented upon clicking the link. The study adhered to the Declaration of Helsinki and was approved by the Ethics Committee of the Hellenic Mediterranean University.

Results

Descriptive statistics. The means and SDs of the eight scales and total scores are presented in Table 2.

Internal consistency. Alpha values were relatively low (<.70) for four scales (i.e., UN, LN, ND, and UD) and unacceptable for LN (.56) and ND (.58) (see Table 2). Examining Cronbach's alpha values when any items were deleted suggested that deleting at least one item from UN, LN, ND, and UD would increase reliability (Supplementary 1).

Structural validity. The forced eight-factor EFA (principal axis factoring; item loadings ≥ .30) explained 55.7% of the total variance (Figure 2). Factor loadings ranged from .30 to .76, but items ND23 and ND27 failed to load above .30. All five NC and UC items, and four LD and LC items, were correctly allocated to their respective factors. There were three cross-loadings (i.e., UN34, NC11, and LC20) and 10 items were misclassified (i.e., UN15, UN29, LN21, LN25, LN33, LD26, UD5, UD24, UD28, UD39), making particularly the UN, LN, ND, and UD factors, in particular, unclear and not readily interpretable (Supplementary 2). Based on these findings, 16 items were revised (UN: 4, 15, 29, 34; LN: 7, 21, 25, 33; ND: 23, 27, 37; and UD: 5, 14, 24, 28, 39). Items were revised if they loaded on a different factor than expected or had cross-loadings (Supplementary 1).

Step 2 – Refining the questionnaire (the PPROQ3)

Based on Study 1's findings, panel A experts conducted another round of item refinement for the 16 items, following the same procedure and instructions as in Study 1.

Assessment of validity. Panel B followed the same procedure to evaluate the questionnaire's validity. Items were rephrased or replaced until agreement was reached among the experts. ICCs ranged from .88 to .95, and experts correctly grouped items (99% agreement).

Study 2

Sample and procedure. The refined version (PPROQ3) underwent validation using the same methodology as Study 1. One hundred and forty-one adults (mean age 27.6, *SD* = 12.5), mostly female (77.3%), university students (57.4%), and single (73%) completed the survey (Table 1). The same statistical analyses (i.e., reliability test and EFA) were conducted.

Results. The means and SDs of the eight scales of the PPROQ3 are presented in Table 2.

Internal consistency. Cronbach's alpha reliabilities significantly improved for UN and ND (although still low), whereas UD remained relatively low (<.70) and LN unacceptably low (.58) (Table 2). Deleting items UC18, NC11, LC20, LN7, LN25, ND13, and ND27 would increase Cronbach's alphas (Supplementary 1).

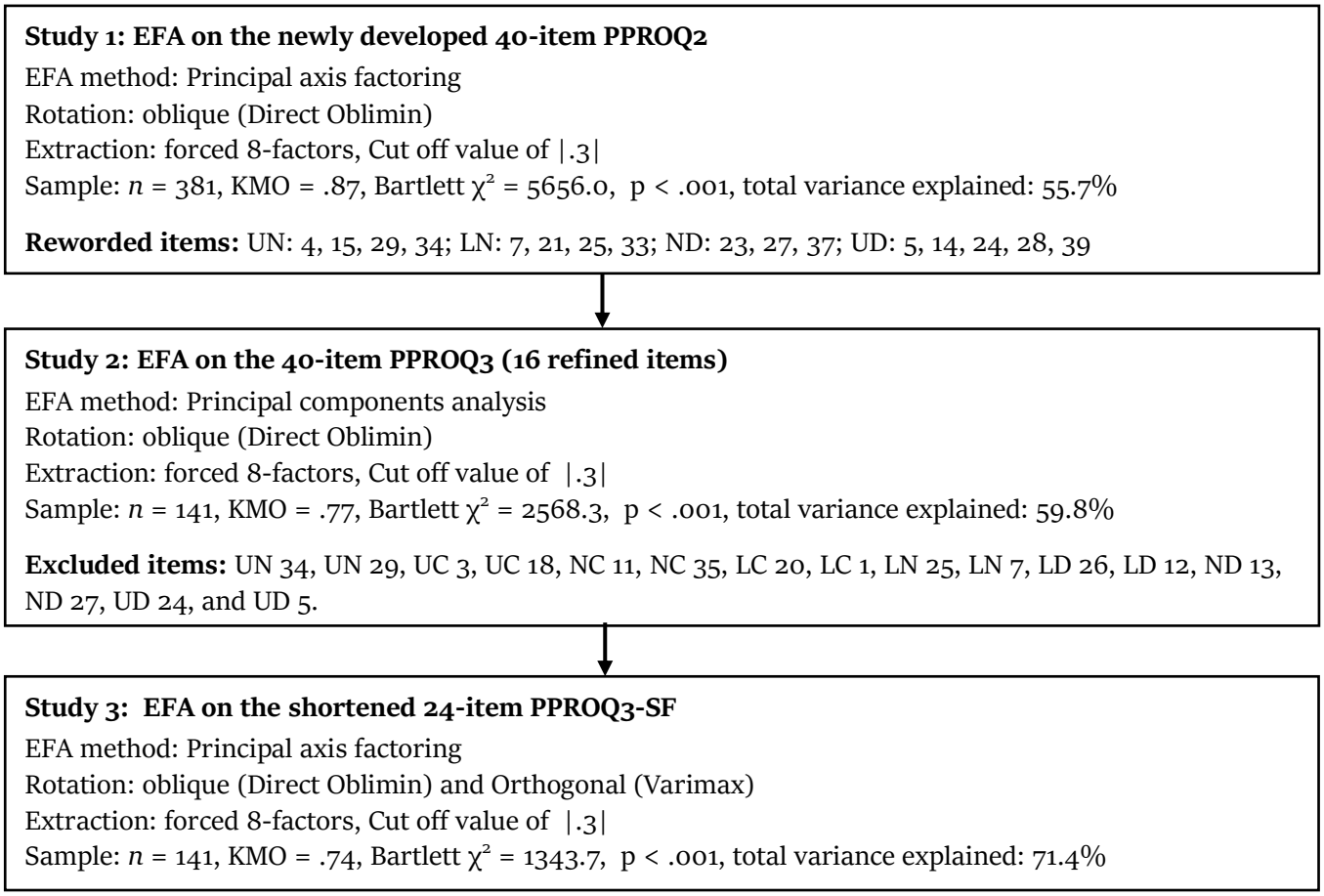
Structural validity. The EFA explained 59.8% of the total variance (Figure 2). Communality estimates were >.39 for all items except item UD24 (.33) and LD38 (.38), with factor loadings ranging from .30 to .90. There were four cross-loadings (i.e., LN21, ND6, UD28, NC35), six items were allocated on scales other than those intended (i.e., NC11, LC20, LN7, ND13, ND27, UD5), whereas UD24 failed to load above .30. The results improved sufficiently; all UN, LD, and UC items (and a few others), four NC, three ND and UD were correctly allocated, whereas four LC and four LN were equally allocated to the same factor. LN and LC were the least clear scales (Supplementary 3).

Table 1. *Demographic characteristics of the participants presented as Means±SD or N (%)*

Characteristics	Study 1 (*n* = 416)	Study 2 (*n* = 141)	Re-test sample (*n* = 18)
Age (years)	32.9 ± 10.6	27.6 ± 12.5	30.8 ± 12.8
Gender			
Male	130 (34.1)	32 (22.7)	4 (22.2)
Female	251 (65.9)	109 (77.3)	14 (77.8)
Educational level			
Primary and secondary	132 (34.6)	49 (34.7)	2 (11.1)
University/MSc/PhD	249 (65.4)	92 (65.3)	16 (88.8)
Family status			
Single	246 (64.6)	103 (73.0)	11 (61.1)
Married	113 (29.7)	33 (23.4)	6 (33.3)
Divorced	20 (5.2)	4 (2.8)	1 (5.6)
Other	2 (0.5)	1 (0.7)	0 (0)
Employment			
Student	87 (22.8)	81 (57.4)	7 (38.9)
State employee	58 (15.2)	20 (14.2)	6 (33.3)
Private employee	139 (36.5)	25 (17.7)	1 (5.6)
Freelancer	80 (21.0)	8 (5.7)	3 (16.7)
Retired	5 (1.3)	2 (1.4)	1 (5.6)
Other	12 (3.1)	5 (3.5)	0 (0)
Residence			
Urban area	348 (91.3)	95 (67.4)	15 (83.3)
Semi-urban area	0 (0)	25 (17.7)	1 (5.6)
Rural area	33 (8.7)	21 (14.9)	2 (11.1)

**Note.* Urban area: >10.000 inhabitants; Semi-urban area: 2.000-10.000 inhabitants; Rural area: <2.000 inhabitants.

Figure 2. *Flow chart of the Exploratory factor analyses conducted across the three studies*



Step 3 – Item reduction (the PPROQ3-SF)

Based on the findings of Study 2, the reduction of the items was decided. In keeping with the premise of maintaining an equal number of items per scale, panel A experts considered deleting two items per scale, primarily based on Cronbach's alpha if any items were deleted and secondarily based on low EFA loadings and/or cross-loadings (Supplementary 1).

Study 3

Sample and procedure. Analyses in this study were conducted on the same sample of 141 participants. In addition, a test-retest reliability analysis was conducted four weeks later on a random subsample of 18 participants (mean age 30.8, *SD* = 12.8; 7.8% female, 88.8% university student, and 61.1% single). The sociodemographic characteristics of both samples are presented in Table 1.

Results. The Ms and SDs of the eight scales of the PPROQ3-SF can be seen in Table 2.

Structural validity. The 24 items (three per scale) of the shorter version (PPROQ3-SF) underwent EFA (Figure 2) using both Varimax (Table 3) and Oblimin rotation (Supplementary 4). Since the solutions were similar, the Varimax solution (Pedhazur & Schmelkin, 1991) is presented in Table 3. The solution explained 71.4% of the total variance, with loadings ranging from .39 to .98 (KMO = .74, Bartlett χ^2 = 1343.7, p < .001). The final communality estimates were high (>.39) for all items except No.38 (.30) and No.16 (.34). The results improved significantly; the 24 items were allocated to eight readily interpretable factors: UN (4, 15, 17); UC (10, 30, 36); NC (8, 19, 31); LC (9, 32, 40); LN (16, 21, 33); LD (2, 22, 38); ND (6, 23, 37); and UD (14, 28, 39). Only five cross-loadings were observed, with LN21 being the most significant, followed by UD14, UD28, ND6, and LN33. As all items except LN21 had a higher primary loading on the intended factor than on the other, they were considered

to be correctly allocated. Although LN21 had a slightly higher cross-loading on another factor, because it was an adjacent scale with a similar meaning, it was considered to belong to its respective factor.

A confirmatory factor analysis (CFA) with maximum likelihood was then carried out to determine whether the eight-factor PPROQ3-SF proposed by EFA provided a good fit to the data. Model fit was assessed using chi-square (x2), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMSR), Tucker Lewis Index (TLI), Goodness of fit Index (GFI), and comparative fit index (CFI) (Hu & Bentler, 1999). The model adequately fit the data (χ^2 = 332.4(224), p < .01, CMIN/DF = 1,484, RMSEA = .059, SRMR = .0693, TLI = .885, GFI = .853 and CFI = .906). The Modification Indices showed no misspecified error covariances. Factor loadings ranged from .46 to .95 (Figure 3).

Descriptive statistics. The means of the 24 items ranged from 1.40 to 2.51 (M = 1.82, SD = 0.84) (Supplementary 5). The means of the eight scales are presented in Table 2.

Internal consistency. Cronbach's alpha reliabilities significantly improved for four scales (UC, LN, ND, and UD), remained relatively the same for three scales (UN, NC, and LC), and slightly decreased only for LD (.67) (Table 2). Only LN (.65) and LD (.67) had alphas below .70.

Test-retest reliability. The intraclass correlation coefficient (ICC) values (2-way mixed-effects model for measurements; type: Absolute Agreement) showed "moderate" reliability (.50 to .75) for four scales (UC: .71, p = .007; LC: .65, p = .021; LD: .68, p = .015; ND: .65, p = .02), "good" reliability (.75 to .90) for three scales (UN: .86, p < .001; LN: .75, p= .004; UD: .86, p < .001), and "excellent" reliability for NC (.94, p < .001) (Koo & Li, 2016).

Convergent validity. Inter-item and corrected item-total correlations were computed to establish convergent validity (Supplementary 6). All items had inter-item correlations with their hypothesized scale above .40, except LD2-LD38 (.32), LN16-LN21 (.26), and ND6-ND37 (.29). Only two items correlated higher with an item from another scale (ND6 with UD39 and UD14 with UN17). Comparing the 24 inter-item correlations for the eight scales (3 per scale) with the remaining inter-item correlations (268 overall), the former averaged .52 and the latter .14, confirming convergent validity. The mean inter-item correlations for each scale are presented in Table 4. The corrected item-total correlations ranged from .18 (LN16) to .53 (UC30, UC36, and UD39) (M = 0.38, SD = 0.11). Items LN16 (.18), LD2 (.19), and ND37 (.17) made small contributions to the total score.

Inter-scale and scale–total correlations. Table 4 presents inter-scale and scale-total correlations. As expected, high positive correlations were found between all pairs of adjacent octant scales (e.g., UN-UC; boldfaced across the diagonal and the last boldfaced value in the UN column) except LD-ND, indicating convergent validity. Low correlations between the remaining octant pairs suggested discriminant validity. The mean adjoining scale correlations were higher than the rest of the correlations (.31 vs. .16). The correlations of the eight scales with the total score (Table 4) ranged from .38 to .69 (p < .01). The LD and ND scales had the lowest correlations (.43 and .38, respectively).

Heterotrait-Monotrait Ratio. The Heterotrait-monotrait ratio of correlation (HTMT) with values below .85 or .90 (Henseler et al., 2015) showed that the PPROQ3-SF scales were differentiated constructs and established discriminant validity (Table 4).

Demographic differences. Age was positively correlated with PPROQ3-SF's total sore, UN, NC, and UD scales (Table 4), suggesting increased positive relating with age. Males scored significantly higher than females on the UN scale (5.5 ± 2.6 *vs* 4.4 ± 2.3; t(139) = -2.27, p = .025, d = 0.44), whereas females scored significantly higher than males on the ND scale (5.8 ± 2.2 *vs* 4.7 ± 2.1; t(139) = 2.46, p= .015, d = 0.52). Participants with a self-reported chronic disease (n = 12) scored significantly higher on the LC scale than the rest of the sample (n = 124) (7.0 ± 1.9 *vs* 5.5 ± 2.1; U = 413.0, z = -2.567, p = .01, r = .22).

Figure 3. *Confirmatory factor analysis for the eight-factor model of the Greek Person's Positive Relating to Others Questionnaire – short form (PPROQ3-SF)*

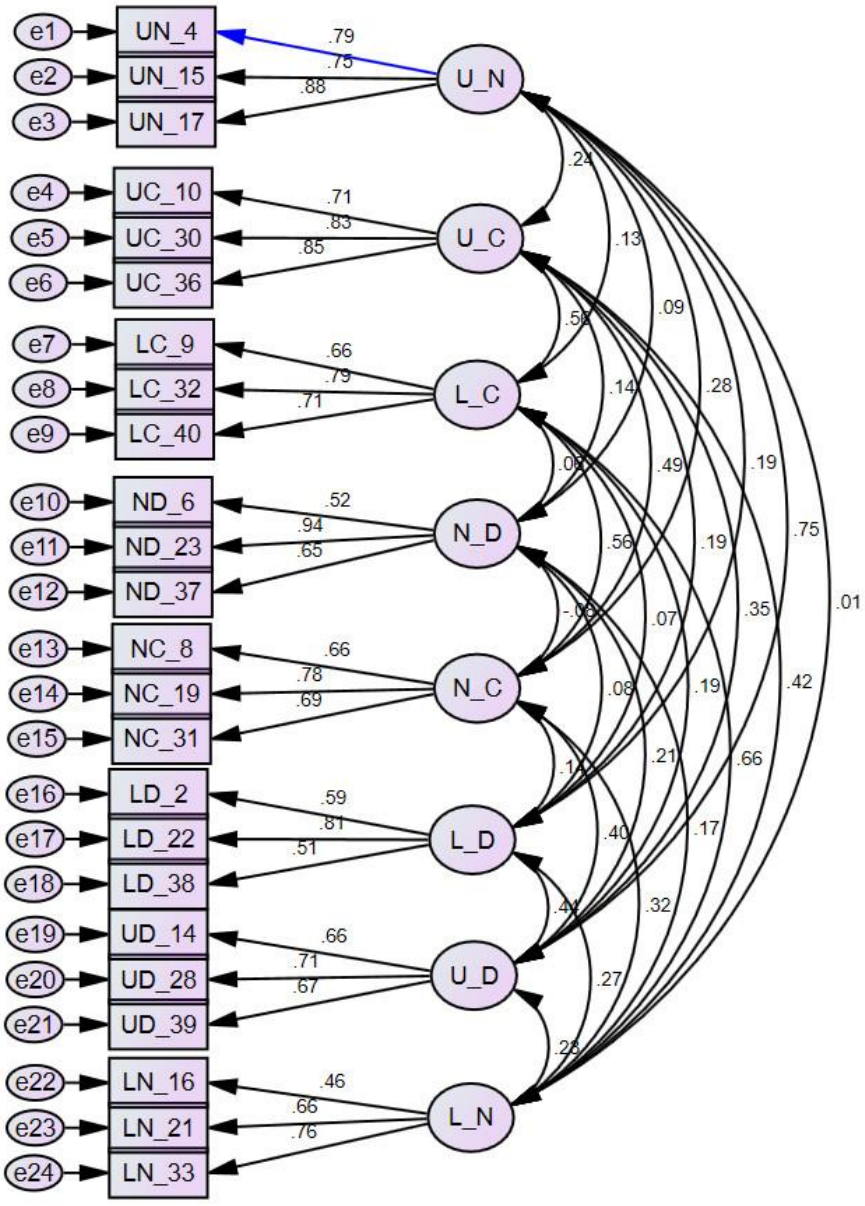


Table 2: *Means, standard deviations, z-scores, and Cronbach's alphas of the scales of the original PPROQ and its three revised versions (PPROQ2, PPROQ3, PPROQ3-SF)*

	Original PPROQ (Kalaitzaki & Hammond, 2016)			**Revised versions of the PPROQ**									
				Study 1: PROQ2 (*n* = 381)			**Study 2: PROQ3** (*n* = 141)			**Study 3: PROQ3-SF** (*n* = 141)			
	M* ± *SD	**z-score**	**α**	***M*± *SD***	**z-score**	**α**	***M*± *SD***	**z-score**	**α**	***M*± *SD***	**z-score**	**α**	**Items omitted**
UN	10.3 ± 2.9	0.09	.69	11.0 ± 2.5	0.19	.66	8.5 ± 3.7	-0.72	.87	4.7 ± 2.4	-0.84	.85	29 and 34
UC	12.0 ± 2.7	1.55	.76	13.1 ± 2.2	2.33	.80	12.7 ± 2.5	2.05	.80	7.6 ± 1.7	2.31	.84	3 and 18
NC	11.3 ± 2.8	0.95	.71	10.4 ± 2.9	-0.42	.74	9.3 ± 3.2	-0.19	.77	5.1 ± 2.3	-0.41	.76	11 and 35
LC	10.0 ± 3.0	-0.17	.56	10.5 ± 2.9	-0.32	.77	10.3 ± 2.8	0.47	.76	5.5 ± 2.2	0.03	.76	1 and 20
LN	10.6 ± 2.8	0.34	.69	9.9 ± 2.4	-0.93	.56	8.8 ± 2.4	-0.52	.58	5.5 ± 1.8	0.03	.65	7 and 25
LD	10.1 ± 2.6	-0.09	.58	10.7 ± 2.6	-0.11	.71	9.8 ± 2.6	0.14	.73	5.2 ± 1.7	-0.30	.67	12 and 26
ND	8.6 ± 2.8	-1.37	.68	10.2 ± 2.6	-0.62	.58	9.7 ± 2.9	0.07	.67	5.5 ± 2.2	0.03	.73	13 and 27
UD	8.7 ± 2.9	-1.29	.67	10.7 ± 2.6	-0.11	.66	7.6 ± 2.6	-1.31	.62	4.7 ± 2.0	-0.84	.72	5 and 24
Total	n.a.	-	n.a.	86.5 ± 13.7	-	.89	76.8 ± 13.4	-	.87	43.8 ± 9.0	-	.83	**-**

**Note.* Study 1: the 40-item PPROQ2; Study 2: the 40-item refined PPROQ3; Study 3: the 24-item PPROQ3-SF. n.a.=not available. Scales' score range: 0-15; Total score range: 0-120.

Table 3. *Exploratory Factor Analysis for the 24-item PPROQ2-SF (Study 3; n=141)*

Item No (intended construct)	Item wording	Eight-factor solution [a]							
		Factor 1 (UN)	**Factor 2 (UC)**	**Factor 3 (LC)**	**Factor 4 (ND)**	**Factor 5 (NC)**	**Factor 6 (LD)**	**Factor 7 (UD)**	**Factor 8 (LN)**
Q4 (UN)	Μου αρέσει να είμαι «αρχηγός» παρά «οπαδός». *I like being a "leader" rather than a "follower"*	.82							
Q17 (UN)	Μου αρέσει να αναλαμβάνω ηγετική θέση όταν χρειάζεται. *I like to take a leading position when needed*	.81							
Q15(UN)	Αισθάνομαι άνετα να καθοδηγώ τους άλλους. *I feel comfortable leading others.*	.76							
Q36 (UC)	Δείχνω συμπόνια για τους συνανθρώπους μου. *I show compassion for my fellow humans*		.80						
Q10 (UC)	Μου αρέσει να βοηθάω τους άλλους. *I enjoy helping others*		.74						
Q30 (UC)	Έχω την τάση να νοιάζομαι για τους άλλους. *I tend to care about others*		.73						
Q40 (LC)	Με ευχαριστεί να με παρηγορούν οι άλλοι. *I enjoy being comforted by others*			.75					
Q32 (LC)	Απολαμβάνω τη συμπαράσταση των άλλων. *I enjoy the support of others*			.67					
Q9 (LC)	Με ανακουφίζει να με ηρεμούν και να με καθησυχάζουν. *It comforts me to be calmed and reassured*			.58					
Q21 (LN)	Μου αρέσει να με βοηθάνε όταν το χρειάζομαι. *I like to be helped when I need it*			~~.48~~					.39
Q23 (ND)	Μερικές φορές με ευχαριστεί να «ξεφεύγω»/απομακρύνομαι από τους ανθρώπους. *I sometimes enjoy "getting away" from people*				.99				
Q37 (ND)	Απολαμβάνω να περνάω χρόνο μόνος/η μου. *I enjoy spending time alone*				.62				
Q6 (ND)	Παίρνω απόσταση από τους άλλους όταν το έχω ανάγκη. *I distance myself from others when I need to*				.48			~~.37~~	
Q31 (NC)	Μου είναι εύκολο να εκφράζω τα συναισθήματά μου. *I find it easy to express my feelings*					.71			
Q8 (NC)	Αφήνω τους άλλους να με πλησιάζουν συναισθηματικά. *I let others get close to me emotionally*					.68			
Q19 (NC)	Μπορώ να δημιουργήσω μια στενή σχέση. *I can create a close relationship*					.61			
Q22 (LD)	Ακολουθώ τις οδηγίες των ανωτέρων μου. *I follow the instructions of my superiors*						.78		
Q2 (LD)	Μου αρέσει να συμμορφώνομαι με τους κανόνες που μου δίνονται. *I like to abide by the rules given to me*						.62		
Q38 (LD)	Σέβομαι αυτούς που έχουν εξουσία. *I respect those in authority*						.52		
Q39 (UD)	Μπορώ να επιβάλλω όρια ή/και περιορισμούς στους άλλους όταν πρέπει. *I can impose limits and/or restrictions on others when I have to*							.70	
Q28 (UD)	Είμαι ικανός/ή να βάλω κανόνες στους άλλους και να τους κάνω να τους τηρούν. *I am able to set rules for others and make them follow them*	~~.42~~						.51	
Q14 (UD)	Μερικές φορές το θεωρώ απαραίτητο να επιβάλω την πειθαρχία. *I sometimes find it necessary to enforce discipline*	~~.41~~						.43	
Q33 (LN)	Μου αρέσει να με καθοδηγούν όταν το χρειάζομαι. *I like to be guided when I need it*			~~.35~~					.62
Q16 (LN)	Μπορώ να αφήνω τους άλλους να έχουν τον έλεγχο των καταστάσεων όταν χρειάζεται. *I can let others be in control of situations when needed*								.61
	Eigenvalues	5.29	3.11	2.14	1.80	1.48	1.27	1.07	0.98
	% of variance explained	22.06	12.95	8.91	7.48	6.15	5.29	4.48	4.07
	Cumulative percentage	22.06	35.01	43.92	51.40	57.55	62.84	67.32	71.39

**Note.* [a] Forced eight-factor solution with principal axis factoring and Direct Oblimin rotation; Factor loadings ≥ .35 are presented; UN=upper neutral. UC=upper close. NC=neutral close. LC=lower close. LN=lower neutral. LD=lower distant. ND=neutral distant. UD=upper distant.

Table 4. *Inter-scale correlations (shaded panel below the diagonal), Heterotrait-Monotrait ratio of correlations (white panel above the diagonal), scale–total correlations, mean inter-item correlations within each scale of the PPROQ3-SF, and correlations with age*

	UN	**UC**	**NC**	**LC**	**LN**	**LD**	**ND**	**UD**
UN	1	.24	.28	.14	.01	.20	.10	.75
UC	**.18***	1	.49	.57	.42	.19	.16	.35
NC	.22**	**.37****	1	**.56**	**.31**	**.14**	**-.06**	**.40**
LC	.10	.44**	**.43****	1	.66	.07	.03	.20
LN	.02	.31**	.23**	**.47****	1	.27	.17	.23
LD	.17*	.15	.12	.05	**.17***	1	.07	.45
ND	.16	.13	-.08	.01	.06	**.07**	1	.22
UD	**.58****	.26**	.27**	.16	.18*	.29**	**.26****	1
Scale-total	.59**	.62**	.60**	.60**	.52**	.43**	.38**	.69**
Inter-item (mean)	.66	.64	.51	.52	.39	.40	.47	.46
Age	.20*	.04	.23**	.05	-.06	.14	-.05	.25**

**Note.* UN=upper neutral. UC=upper close. NC=neutral close. LC=lower close. LN=lower neutral. LD=lower distant. ND=neutral distant. UD=upper distant. Pairs of adjoining octant correlations are bold-faced. *$p < .05$; **$p < .01$.

Discussion

The imperfect eight-factor structure and low reliabilities for six scales (particularly weak for LC and LD) of the formerly developed PPROQ (Birtchnell et al., 2013; Kalaitzaki et al., 2015) necessitated this study. The thorough revision of the 40 items (PPROQ2), the further elaboration of 16 items (PPROQ3), and the shortening of the questionnaire (PPROQ3-SF) resulted in increased alpha reliabilities (mean alphas: .67, .69, .73, and .75, respectively). Although the alpha reliabilities for the whole questionnaire slightly decreased for the successive versions (.89, .87, and .83, for PPROQ2, PPROQ3, and PPROQ3-SF, respectively) -as would be expected for shorter questionnaires (Hammond, 2016)-, they were still high. The revisions (PPROQ2, PPROQ3, PPROQ3-SF) reduced the number of scales with reliabilities below .70 from six scales in the original version to four, three, and two scales, respectively.

In the final PPROQ3-SF, the reliabilities of all scales increased (particularly LC, followed by UN, LD, and UC). The initial limitations (reliabilities below .60 for LC and LD) were corrected (.76 and .67), though LD's reliability remained below .70. Despite significant improvements through the revisions (.71 and .73), LD's reliability unexpectedly (and rather unwarrantedly) dropped in the shortened version, though it was still better than the original (.58). This was disappointing, similar to previous negative versions (Birtchnell et al., 2013; Kalaitzaki & Nestoros, 2003). Also disappointing was that the increase of LN's reliability in the final version fell slightly short of the original's (.69 vs. .65).

The procedure of eliminating items with low factor loadings and those that would increase alpha reliability may not have been successful. Removing LD38 instead of LD12 (both of which had the same alpha value) may have retained the LD scales' reliability, as LD38 had low communality (.30) and low inter-item and inter-scale correlations. Unfortunately, the assumption that young people might have difficulty conceptualizing the negative LD scale (i.e., being at the same time low and distant; Birtchnell et al., 2013; Kalaitzaki et al., 2015) was also confirmed for its modified and shorter positive versions. Similarly, LN16 was rather weak (loading higher to LC than its intended factor, low correlation with LN21, low corrected item-total correlation), and its replacement or rewording could be tested in further revisions.

A major challenge of this study was confirming the eight-factor structure of the revised PPROQ, correspondingly to the theoretical (predetermined) eight-factor structure of the Interpersonal Octagon

(Birtchnell, 1993/1996). Previous studies on the respective negative measure had suggested a four- or eight-factor solution (e.g., Hammond, 2016; Kalaitzaki & Nestoros, 2003). In this study, the eight-factor solution of the abbreviated positive version (PPROQ3-SF) significantly improved across its versions, explaining a significant proportion of the variance (71.3%) and aligning well with the octagon theory. Suffice it to say that all 24 items were allocated to eight readily interpretable factors with the five cross-loadings of insignificant value (except perhaps LN21), and CFA confirmed the octagonal structure according to the theory.

The PPROQ3-SF showed quite satisfactory validity. Consistent with the expectations, high inter-item and corrected item-total correlations suggested that the items of each scale were measuring the same construct, thus establishing convergent validity. High positive correlations between pairs of neighboring scales further supported convergent validity. This was as expected since the intermediate scales come from the blending of their adjacent scales (Birtchnel, 1993/1996). Studies on the negative variants of the longer (PROQ2) and shorter versions (PROQ3) showed similar results (e.g., Birtchnell et al., 2013; Kalaitzaki & Nestoros, 2003). It was reassuring that there were no significant negative correlations between seemingly opposite scales, consistent with previous findings (Birtchnell et al., 2013). This supports the Relating theory's assumption that high scores on one scale from one side of the octagon do not preclude high scores on a scale from the opposite side (Birtchnel, 1993/1996).

Importantly, the discriminant validity of the scales was confirmed. Whereas it might have been expected that intermediate scales resulting from the merging of the scales on either side of them would not be distinct, low inter-scale correlations between opposite scales, suggested discriminant validity, similar to the negative variant (Birtchnell et al., 2013). The Heterotrait-Monotrait Ratio (HTMT) further supported discriminant validity. Reasonably enough, people with chronic diseases scored significantly higher on LC (seeking care and protection) than the rest of the population (Birtchnel, 1993/1996). Lastly, the mean octant/scale scores of the later versions slightly differed from the original PPROQ, though the UC remained the scale with the highest score and ND or UD with the lowest (or the second lowest) across all three versions. The score differences could be attributed to the different sample composition (the validation sample for the PPROQ3/PPROQ3-SF primarily comprised students).

In summary, the Greek shortened version (PPROQ3-SF) showed satisfactory psychometric properties, better than those of its revised longer version (PPROQ3), and much superior to those of the original version (PPROQ). Of note is that, even though the LD scale's psychometrics were weaker than those of the other seven scales, they, admittedly, improved compared to those of the original version (PPROQ; Kalaitzaki & Hammond, 2016). In addition, test-retest reliability confirmed the PPROQ3-SF's stability over time.

The study's limitations should be acknowledged. The use of convenience sampling may have unintentionally resulted in response bias. The online format of the self-report questionnaire may have also introduced selection bias and social desirability. The specific demographics of the present sample (i.e., relatively young adults, mostly female, university educated, and single) limit the generalizability of the findings. Although KMO and Bartlett's test showed that the data were adequate for factor analysis, future analyses should be conducted on larger samples. Concurrent validity could have also been established with other validated instruments, including the PROQ3. Ideally, the CFA should have been conducted on a different sample from the one used for the EFA (Thompson, 2004). The complexity of human relationships can make it difficult to fully understand them using questionnaires; clinical observation and interviews should complement the results of questionnaire as they can reveal additional information that the self-report questionnaires alone cannot.

These limitations notwithstanding, the results significantly contribute to a psychometrically sound and theoretically driven robust instrument that meaningfully represents its underlying theory. A key strength was the use of a deductive approach to generating items (the accurate definition of the constructs made the items unlikely to be challenged), combined with an inductive approach to refining them and ascertaining that they align with the theory. In support of the usefulness of a positive relating measure (Kalaitzaki & Hammond, 2016), a shorter version of the PPROQ is preferred to increase response rate and data quality (Sharma, 2022). An

additional advantage is that since the PPROQ3-SF shares the same structure as its negative variant, the same scoring program can be used with minor modifications.

Hopefully, other translations of the PPROQ3-SF will emerge soon. Validation in an English-speaking sample would increase its usefulness and applicability. Future studies should examine its efficacy in tracking advancements in research and therapeutic settings; the software-generated graphica; representation of the octagon could provide a readily conceivable understanding of one's relating and could be the first step in therapy and counseling. Building upon or enhancing relating skills might be key to optimal relating functioning. For example, positively relating from the UN with a partner (e.g., guiding and leading) could be practiced and taught to be implemented with others (e.g., colleagues). Positive Psychology approaches are progressively incorporated into conventional therapy practice (Jankowski et al., 2020). Therefore, a questionnaire measuring positive relating could be particularly useful for therapists who adopt a strengths-based approach to promoting one's positive attributes, abilities, internal strengths, and resources. Since Relating theory aligns well with existing approaches, the theory and respective measures could be easily integrated into any psychotherapy practice (Birtchnell 1993/1996, 2013). In conclusion, the PPROQ3-SF is a valid and reliable instrument for measuring positive relating, which aligns well with its grounding theory. Given its strong psychometric properties, it is recommended for use in research and clinical practice.

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ΕΜΠΕΙΡΙΚΗ ΕΡΓΑΣΙΑ | RESEARCH PAPER

Δημιουργία και επικύρωση του PPROQ3-SF: ένα θεωρητικά βασισμένο, αναθεωρημένο και συντομότερο ερωτηματολόγιο των θετικών σχέσεων του ατόμου με τους άλλους

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Διαπροσωπικές σχέσεις
Ψυχομετρικές ιδιότητες
Εγκυρότητα
Αξιοπιστία
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ΠΕΡΙΛΗΨΗ

Η Θεωρία του Σχετίζεσθαι κατανοεί και αξιολογεί τη σχέση (αρνητική και θετική) σε ένα δισδιάστατο μοντέλο με τέσσερις κύριες και τέσσερις ενδιάμεσες θέσεις/διαστάσεις, που αναπαρίστανται γραφικά ως οκτάγωνο (δεξιόστροφα: ουδέτερη θέση ισχύος, εγγύτητα από θέση ισχύος, ουδέτερη εγγύτητα, εγγύτητα από θέση αδυναμίας, ουδέτερη θέση αδυναμίας, απόσταση από θέση αδυναμίας, ουδέτερη απόσταση και απόσταση από θέση ισχύος). Βασιζόμενοι σε αυτή τη θεωρία και λαμβάνοντας υπόψη τους ψυχομετρικούς περιορισμούς του ερωτηματολογίου που είχε προηγουμένως δημιουργηθεί (δηλ. του Person's Positive Relating to Others Questionnaire-PPROQ), η παρούσα μελέτη είχε ως στόχο να βελτιώσει τα στοιχεία και τις ψυχομετρικές του ιδιότητες. Το αναθεωρημένο και συντομότερο PPROQ3-SF 24 στοιχείων δημιουργήθηκε σε τρία στάδια κατασκευής στοιχείων, βελτίωσης , συντόμευσης και σε τρεις αντίστοιχες μελέτες επικύρωσης των διαδοχικών εκδόσεων (δηλ. PPROQ2, PPROQ3 και PPROQ3-SF). Η δομή των οκτώ παραγόντων και η εσωτερική συνέπεια των οκτώ κλιμάκων βελτιώθηκαν σημαντικά στις διαδοχικές εκδόσεις. Η αξιοπιστία επαναληπτικών μετρήσεων επιβεβαιώθηκε επίσης για το PPROQ3-SF. Οι υψηλές συσχετίσεις (μεταξύ στοιχείων, μεταξύ στοιχείων-συνολικής βαθμολογίας, μεταξύ ζευγών γειτονικών κλιμάκων) επιβεβαίωσαν τη συγκλίνουσα εγκυρότητα, ενώ οι χαμηλές συσχετίσεις μεταξύ ζευγών αντίθετων κλιμάκων, ο λόγος των συσχετίσεων Heterotrait-monotrait και οι διαφορές μεταξύ φύλου και κατάστασης χρόνιας νόσου, επιβεβαίωσαν τη διακριτική εγκυρότητα. Η τελική συντομευμένη έκδοση των 24 στοιχείων είχε καλές ψυχομετρικές ιδιότητες, αντανακλώντας την προκαθορισμένη οκταπαραγοντική δομή του διαπροσωπικού οκταγώνου, και παρουσίασε ικανοποιητική αξιοπιστία, συγκλίνουσα και διακριτική εγκυρότητα. Το PROQ3-SF, όντας ψυχομετρικά αξιόπιστο και συμβατό με την οκταγωνική δομή του, προτείνεται για χρήση τόσο στην έρευνα όσο και στην κλινική πρακτική.

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