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Dispositional Optimism is Unidimensional or Bidimensional? the Portuguese Revised Life Orientation Test

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The aim of the study is to adapt and then discuss the appropriateness of the Life Orientation Test as a one or two dimension scale. The research includes two studies; one is composed of a sequential sample of 280 people with multiple sclerosis, 71 % female, and another includes a convenience sample of 615 individuals from the community, 51.1% female. Because the construct is built upon a theoretical assumption that has one dimension, we examine the hypothesis of one or two factor solutions through confirmatory factor analysis, and the two-dimension solution premise demonstrates better adjustment for both samples. The other psychometric properties explored show appropriate results for the Portuguese sample, and similar to the original ones; the Test therefore seems appropriate for use in cross cultural studies. Based on our results, we discuss whether the questionnaire is a one or two dimension instrument, concluding that it appears appropriate to accept the recommendations of the original authors to use it as a one-dimensional tool and, when necessary, to use both dimensions.
Keywords: optimism, validation study, LOT-R dimensionality.

El objetivo del estudio es adaptar y discutir la adecuación de la prueba de Orientación de la Vida en una o dos escalas de dimensión. La investigación engloba dos estudios, uno constituido por una muestra secuencial de 280 personas con esclerosis múltiple, 71% mujeres y otro con una muestra de conveniencia de la comunidad de 615 individuos, 51,1% del sexo femenino. Como el constructo se asienta sobre la presunción teórica de que tiene una dimensión, inspeccionamos la hipótesis de una o dos soluciones de factor a través del análisis factorial confirmatorio y la hipótesis de dos dimensiones manifiesta un mejor ajuste para ambas muestras. Las otras propiedades psicométricas exploradas muestran los resultados apropiados para la muestra portuguesa, y semejantes a los originales. Parece apropiado para los estudios culturales transversales. Basándonos en nuestros resultados, discutimos si el cuestionario es un instrumento de una o dos dimensiones, concluyéndose que parece conveniente seguir las recomendaciones de los autores originales, para utilizarlo como un instrumento unidimensional y, si fuera necesario necesario, utilizar cada una de las dimensiones.
Palabras clave: optimismo, estudio de validación, dimensionalidad LOT-R.

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Based on the theory of behavioural self-regulation, Scheier and Carver (1985) developed the Life Orientation Test (LOT) with the aim to measure dispositional optimism as a personal construct. The authors consider it a global generalized tendency to believe that one will usually experience good versus bad outcomes in life (Scheier & Carver, 1985, 1992).

Scheier and Carver, (1985), develop the construct, and the test to measure it, assuming that Optimism is a onedimensional construct: However, some research found support for the bidimensionality of optimism and pessimism (Chang, Maydeu-Olivares, & D'Zurilla, 1997). In the original study, authors chose items and developed a scale to measure a onedimensional construct. Can we be loyal to the original assumption and still change it for a bidimensional concept and construct? Correlations between pessimism and optimism dimensions are, generally, around .50. For a onedimensional construct this correlation is low, for a bidimensional construct it is high.

Since the publication of the LOT in 1985, it has been used in several studies in health and personality psychology and has been linked to both psychological and physical well-being (Aspinwall, Richter, & Hoffman III, 2001; Ebert, Tucker, & Roth, 2002; Scheier & Carver, 1992). Chang and Sanna, (2001) in a study with middle-aged adults, found significant direct and indirect links between optimism and pessimism with depressive symptoms and life satisfaction; Segerstrom and Nes (2006) found better indices of psychological health accompanying better dispositional optimism; Chang, (1998) found that dispositional optimism is a significant moderator of the relation between stress and psychological well-being. Moreover, it was believed that optimism would serve as a protective factor when facing difficulties in life such as illness (Fournier, de Ridder, & Bensing, 2002; Giltay, Geleijnse, Zitman, Hoekstra, & Schouten, 2004; Giltay, Kamphuis, Kalmijn, Zitman, & Kromhout, 2006). Vickers and Vogeltanz, (2000) found that a lack of optimism is a predictor of depression. Schou, Ekeberg, and Ruland, (2005) found that optimistic women diagnosed and treated for breast cancer, appear to be associated with better global health, quality of life and functioning. Schou, Ekeberg, Ruland, Sandvik, and Karesen, (2004) found that pessimism was the strongest predictor of emotional morbidity one year after surgery for breast cancer. David, Montgomery, and Bovbjerg, (2006) found that optimism and pessimism were directly related to distress levels prior to surgery among patients scheduled for surgery related to breast cancer. De Moor et al. (2006) reported that dispositional optimism is associated with better results from chemotherapy in cancer patients. Giltay et al.(2004) found that dispositional optimism protected people from all-cause mortality in old age, mainly cardiovascular mortality. Scheier et al. (1999) found that optimism predicts a lower rate of rehospitalisation after coronary artery bypass graft surgery. Pais-Ribeiro, Martins da Silva, Meneses, and Falco, (2007) found that optimism is the variable that best contributes to mental health status perception and QOL in persons with epilepsy. Chang, Chang, and Sanna, (2009) assert that there is no doubt that optimism and pessimism strongly influence physical health. A meta-analytic review concludes that optimism is a significant predictor of positive physical health outcomes (Rasmussen, Scheier, & Greenhouse, 2009). Raikkonen and Matthews, (2008) use the questionnaire to study the relationship of optimism and pessimism on the blood pressure of adolescents.

Heinonen et al. (2006) suggest that the foundation of dispositional optimism and pessimism is related to early socio economic status of the family, and Korkeila et al. (2004) explore the effects of childhood adversities and parent-child relationship on adulthood dispositional optimism, concluding that those reporting childhood adversities and poor parent-child relationships had less optimistic expectations.

Optimism is supposed to be a stable characteristic - a disposition. Schou et al, (2005) with a sample of cancer patients, found stability optimism–pessimism as measured by the LOT–R, and Giltay et al. (2006) found that dispositional optimism is a relatively stable trait over 15 years. However, van der Velden et al. (2007) question the relative stability of dispositional optimism, suggesting that the stability is not equal among different samples and that the stability declines after one year.

Disposition is not a trait. Carver, Scheier, and Weintraub, (1989) explain that "styles" or "dispositions" are relatively stable, and people do not approach each context anew, but rather bring to bear a preferred set of behaviours, expectancies or cognitions that remain relatively fixed across time and circumstances (a tendency to use a particular behaviour). A trait is a basic constituent of personality: it constitutes a very basic structure that tends to remain stable across time and situations. Dispositions are stable preferences that may derive from personality or may develop for other reasons. Personality characteristics dispose the person to behave in certain ways that impair or facilitate the various components of adaptational status, explain Folkman, Lazarus, Gruen, and DeLongis, (1986). Some authors use the terms trait and disposition alternatively (Epstein, 1983; Watson & Hubbard, 1996); others use the term dispositional traits (McAdams & Adler, 2006).

In a meta-analytic study, Andersson (1996) found the clearest association between the LOT and measures of negative affect, suggesting that the LOT could therefore be just another measure of negative affect. However, Andersson says that does not mean that optimism is uninteresting or very similar to neuroticism. It may well be that it is the LOT that needs to be reconstructed, and an effort to do so has already been made by the original authors (Scheier, Carver, & Bridges, 1994).

Research with LOT found systematically two dimensions (Bailey, Eng, Frisch, & Snyder, 2007; Brenes, Rapp, Rejeski,

& Miller, 2002; Chang, D'Zurilla, & Maydeu-Olivares, 1994; Chang & Mcbride-Chang, 1996; Fournier, de Ridder, & Bensing, 1999; Herzberg, Glaesmer, & Hoyer, 2006; Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992; Mroczek, Spiro III, Aldwin, Ozer, & Bossy, 1993; Raikkonen, & Matthews, 2008; Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser,1997; Smith, Pope, Rhodewalt, & Poulton, 1989). Even the creators of the LOT found that it consisted of two factors, namely optimism and pessimism, with factor loadings corresponding to the negatively and the positively worded items (Scheier & Carver, 1985), but they did, however, consider the LOT to be onedimensional for pragmatic reasons, even though they acknowledged the possibility of examining optimism and pessimism scores separately.

In a couple of these studies, an optimism and a pessimism subscale of the LOT have been separated and found to correlate differently with criterion variables. For example, Marshall et al**.** (1992) found LOT pessimism to be associated with neuroticism and negative affect, whereas LOT optimism was associated with extraversion and positive affect. In the same way Chang et al. (1997) defends the bidimensionality of optimism and pessimism, defined as positive and negative outcome expectancies. In this view people can be, simultaneous, high or low on optimism, and high or low on pessimism.

In response to the criticism, the constructors of the scale have suggested a modification of the LOT, but they concluded that the original LOT still is a viable instrument for assessing people's generalized sense of optimism (Scheier et al., 1994; Terrill, Friedman, Gottschalk, & Haaga, 2002). The original authors developed a new version, the revised LOT (LOR-R): they argue that optimism and pessimism are polar opposites on an onedimensional continuum. This view assumes that a person is either optimistic or pessimistic; one cannot be both optimistic and pessimistic. Scheier et al. (1994) score the optimist scale as bipolar "for primary analyses, but to follow these primary analyses with subsidiary analyses in which the positively and negatively worded items are examined separately" (p.1076). Gillham, Shatte, Reivich, and Seligman, (2001) say that this perspective is confusing.

However, in the study where they developed the LOT-R, Scheier et al. (1994) found a one-factor solution trough exploratory factor analysis. Testing for fit of the models using confirmatory factor analysis for one and two factor solutions, found that both the one and two factors solution fit appropriately. Authors using the LOT-R in different idioms, with exploratory factor analysis found two factors, as in Spanish (Ferrando, Chico, & Tous, 2002), and Portuguese from Brazil (Bandeira, Bekou, Lott, Teixeira, & Rocha, 2002). Lai, Cheung, Lee, and Yu, (1998) conducted confirmatory factor analyses to compare the goodness of fit of the single and the two-factor solutions for modelling data from Hong Kong Chinese students, and argued that the LOT-R better supports a one-factor than a two-factor model. However, both solutions do not fit properly. Rauch, Schweizer, and Moosbrugger, (2007), with one German sample, defend also a one factor solution: Trottier, Mageau, Trudel, and Halliwell (2008), through confirmatory factor analysis with a French-Canadian translation conclude that one solution fit well, in a similar way as with the original version. Vautier, Raufaste, and Cariou, (2003) with a French sample using confirmatory factor analysis, discussed Lai et al (1998) results and concluded that there is no empirical necessity for hypothesizing that the dispositional optimism construct must be split into optimism and pessimism, but that the question of the definition of the basic psychological dimensions underlying the data is still wide open. With a large German sample, Herzberg et al. (2006) compared the one and two factor hypothesis and found a good fit for the two factors solution and a non fit of the data for the one factor solution, and "recommend that future research use separate measures of optimism and pessimism with all age groups, and we advise researchers to use caution when interpreting results of empirical studies that treat the LOT–R as a unidimensional measure" (p.437).

Many authors use the LOT-R as bidimensional (Affleck, Tennen, & Apter, 2001; Chang, & Farrehi, 2001; Chang, & Sanna, 2003, Fontaine, & Cheskin, 1999) and others use it as unidimensional (Ebert et al., 2002; Harju & Bolen, 1998; Korkeila et al., 2004; Lai et al., 1998; Nelson, McMahon, Joffe, & Brensinger, 2003; Schou et al., 2005; Schou et al., 2004; van der Velden et al., 2007). Benyamini, (2005) focuses on the interaction of optimism and pessimism. She suggests that dispositional optimism and pessimism interacted in their associations, meaning that they are different measures. Others classify the dimension in a different way, namely by subtracting their ratings of negatively worded items from positively worded items (Ji, Zhang, Usborne, & Guan, 2004).

Fischer and Chalmers, (2008) in a meta-analysis study across different countries, reported small effects of cultural variability on levels of optimism: the same conclusion was reached by Ji et al. (2004).

The objective of the present research is to contribute to the adaptation and the usefulness of one dimension versus a two dimensions solution, and the fit of a Portuguese version of LOT-R with two different solutions used in the literature: a one-factor solution such as that proposed in the study of Scheier et al. (1994) and a two-factor solution. We used two different samples: one of participants from the community and another of participants with a chronic disease.

Method

Participants

The study of the adaptation process includes two studies; one with 280 patients with a diagnosis of multiple sclerosis (MS), and another with 615 people from the community. We will present the results in two consecutive presentations

we name study 1 and study 2. The sample of people with MS is included because two main reasons: the disease is physiologically uniform and the treatment also, reducing the variables associated with the disease; the second and most important reason is that MS manifests in young adults, between 20 and 40 years of age. This sample is similar to the community sample for age.

Material

The LOT-R includes 10 items; four of them are filler items and are not used in scoring. Of the six items that are scored, three are keyed in a positive direction and three in a negative direction. Respondents indicate the extent of their agreement with each of the items, using the following response format of 0="strongly disagree", 1="disagree", 2="neutral", 3="agree", and 4="strongly agree" (Scheier et al. 1994). Compared with the previous version (LOT), the revised version contains two items fewer (10 vs. 12). One new positively worded item was added and one negatively worded item was eliminated so that equal numbers of positive and negative worded items were used in the calculation of scores. Total score of LOT-R range from zero to 24; higher scores meaning optimism and lower scores meaning pessimism. The present version was previously studied (Pais-Ribeiro & Pedro, 2006).

For validation purposes, we used three more measures with both samples, and more specific measures for each sample. The three common measures used are Health Status Perception, Global Quality of Life, and Hope.

Health Status Perception: Self-ratings of health, between "very poor" and "excellent" have been usual measures for the last 40 years. We find them in the Alameda County Study (Kaplan & Camacho, 1983), in the Idler, Hudson, and Leventhal (1999) study, in The Medical Outcomes Study (Stewart & Ware,Jr, 1992), and in the resulting short-form health assessment questionnaire, the classic measure SF-36 Health Survey (Ware Jr., Snow, Kosinski, & Gandek, 1993). They are also used in more disease related quality of life measures, such as the Quality of Life Questionnaire of The European Organization for Research and Treatment of Cancer (EORTC), the QLQ-C30, which assesses the health status perception with the same question, answered between "very poor" and "excellent" (Fayers, Aaronson, Bjordal, & Sullivan, 1995). Research shows that self assessed health with one item is a good predictor of mortality (Benyamini, Leventhal, & Leventhal, 1999; Idler & Benyamini, 1997). It is composed by one item, asking, "in general how do you classify your health' with answers in a 5 point scale between "excellent" and "poor."

Global Quality of Life was assessed with one item, asking, "How do you classify your quality of life?" with answers in a likert type scale, with five positions between "very poor" and "excellent." Higher scores mean better quality of life perception. This one-item assessment is used also in diverse questionnaires like, for example, the EORTC, QLQ-C30, and the Multiple Sclerosis Quality of Life-54 questionnaire (Vickrey, Hays, Harooni, & Meyers, 1995). Correlations between self-ratings of health and quality of life assessment are in general moderate (around .50).

Hope Assessment: we used the Snyder (1995) adult Trait Hope Scale. The scale includes 12 items and consists of four Agency, four Pathways, and four distracter items. In its 2002 version, Snyder proposes a response in an ordinal scale from 1 (definitely false) to 8 (definitely true). We use this last response format. Hope Theory is similar to optimism explains Snyder (1995; 2002), Snyder, Sympson, Michael, and Cheavens (2001) and Bryant and Cvengros,(2004). The Portuguese version of the Hope Scale shows similar internal reliability with the original version. Optimism and hope are related but not identical constructs. They are related by the central core of expectancies and are conceptualized as cognitive sets that (a) pertain to the individual's outcomes or goals; (b) pertain to the future; and (c) are powerful, if not the strongest, determinants of behaviour. Both theories are cognitive and cross situational in their emphasis, and are based on a reciprocally derived sense of successful goal-directed determination and planning of ways to meet goals (Snyder, 1995). Hope theory has two separate yet related agency and pathway factors as well as an overarching hope factor (Snyder, 2002).

Translation procedure

To translate the LOT-R we used: a) bilingual translation English - Portuguese and reverse translation Portuguese-English (with two different translators); b) discussion about lexical and grammatical equivalence; c) discussion about cultural appropriateness; d) discussion of discrepancies between initial and final English versions; e) discussion with experts in the construct to inspect content validity of the Portuguese version of the items; f) cognitive debriefing with six individuals from the community; g) final utilization. The version used is shown in table 1 with both the Portuguese and the Original versions.

STUDY 1

Participants

A sequential sample of 280 individuals with a diagnosis of MS, 71.4% females (approximately the ratio for this disease), with a mean age of 39.23 years, *SD* = 11,21 (between 16 and 70), and a mean school level of 11.8 years (between 3 and 25 years), 60.7% married, 64.6% active workers, a mean number years of diagnosis of 7.21, and The Kurtzke Expanded Disability Status Scale mean score of 2.55 (between 0 and 6).

MS is a serious autoimmune disease characterized by its unpredictable and variable course: it produces varying

Table 1
Portuguese and original version of the LOT-R items

Item
1- Em momentos difíceis espero sempre o melhor (In uncertain times, I usually expect the best)
2- Para mim é fácil relaxar (It's easy for me to relax) (filler item)
3- Se houver a mínima hipótese de alguma coisa me correr mal, tenho a certeza que correrá [a] (If something can go wrong for me, it will)
4- Sou sempre optimista acerca do meu futuro (I'm always optimistic about my future)
5- Gosto muito de estar com os meus amigos (I enjoy my friends a lot) (filler item)
6- É importante para mim estar ocupado (It's important for me to keep busy) (filler item)
7-Quase nunca espero que as coisas vão correr como eu quero. [a] (I hardly ever expect things to go my way)
8- Não me chateio facilmente (I don't get upset easily) (filler item)
9- Raramente espero que me aconteçam coisas boas [a] (I rarely count on good things happening to me)
10-Em geral espero que me aconteçam mais coisas boas do que más (Overall, I expect more good things to happen to me than bad)

[a]- inverted items

degrees of neurological symptoms, cognitive problems, fatigue, and pain. Possibilities for influencing the course and symptoms of MS are limited, and the patients must learn to live with the uncertainty of the disease's progression, their symptoms, and the psychosocial consequences, from activities of daily living to interpersonal, vocational, sexual, and family functioning, explains Fournier et al. (1999).

Material

Patients were assessed with the measures described above applied to both samples, as well as the Kurtzke Expanded Disability Status Scale (EDSS) (Kurtzke, 1983), which is a neurological test that is a standard method of quantifying disability in MS, and which replaced the previous Disability Status Scales. The EDSS quantifies disability in eight Functional Systems (FS) and allows neurologists to assign a Functional System Score (FSS) in each of these. The FS are: pyramidal, cerebellar, brainstem, sensory, bowel and bladder, visual, cerebral, and other. The FSS varies between "0" (Normal neurological examination) and "10" (Death due to MS). Selected patients in our sample have an EDSS with less than 7 (the more functional group): The classification under 7 means that the patients are between "0" (Normal neurological examination) and "6.5" (constant bilateral assistance - canes, crutches, braces-required to walk about 20 meters without resting).

Disease perception: one question asking to classify the severity of the disease in a scale with eleven positions, anchored in two extreme positions "non severe" and "extremely severe".

Functional assessment: one question asking to classify the perception of functionality in a scale with eleven positions, anchored in two extreme positions, "excellent" and "very bad".

Life as Whole: based on Andrews and Robinson's (1991) study, the item ''Taken all together, how would you say things are these days'', was followed by a Likert type scale ranging from 1 (horrible) to 7 (very happy).

Impact on Participation and Autonomy Questionnaire (IPA): this is a generic functional outcome measure, and can be used in populations or with individuals with a large range of diagnoses. The IPA addresses autonomy and participation in five domains: autonomy indoors, family role, autonomy outdoors, social relations, and work and educational opportunities. It includes 31 questions with a Likert type answer in response options per item: very good, good, fair, poor, and very poor (Cardol, de Haan, de Jong, van den Bos, & de Groot, 2001).

Each patient completed the questionnaire by himself (self-completion), with the support of a researcher if necessary. Ethics committee approval was obtained before inclusion, and patients signed an informed consent agreement, as required by the Helsinki Declaration, Portuguese law, and hospital rules.

Results

No statistically significant differences were found, based on gender, for LOT-R score. No statistically significant correlation was found between age and school level and LOT-R score.

Using the same procedures as the original study (Scheier et al., 1994), we conducted an exploratory factor analysis using principal component analysis Kaiser rule, varimax rotation: we identified one factor that explains 49.8% of the

Table 2
Factorial loading of LOT-R items on the factors

	One component	Forced two components solution	
	factor	*F1*	*F2*
In uncertain times	.69		.83
if something can go wrong	.67	.68	
I'm always optimistic	.69		.81
I hardly ever expect things to go my way	.71	.84	
I rarely count on good things happening to me	.76	.80	
Overall, I expect more good things to happen to me than bad	.69	(.36)	.63

(Exhibit loadings above .25)

variance (the original study explains 48.1% of the variance), with factor loadings above .65. A forced solution for two factor components explains 65.5% of the variance, and shows the three pessimistic orientation items on the first factor and the optimistic orientation items on the second factor. The magnitude of the difference between item loadings (more than .20) on the two components allows us to say that the item belongs to one component and not to another. Inspection of table 2 shows the solution for one or two components.

Internal consistency

Considering the one factor solution, the internal consistency is .79, with the correlation item total score of LOT-R, corrected for overlap, between .52 and .61. The original work of Scheier et al (1994) found a Cronbach's alpha of .78, and a correlation item total score, corrected for overlap, between .43 and .63.

If we consider the two factors solution, the internal consistency for the pessimistic domain is .74 with correlation item total of the pessimistic domain, corrected for overlap, between .50 and .61: the internal consistency for the optimistic domain is .72 with the correlation item total of the optimistic domain, corrected for overlap, between .48 and .58.

Test retest

A test retest for the one solution factor shows a correlation for three months interval of $r(30)= .80$. The original version shows correlations between .68 for four months intervals and .79 for 28 months interval. In our study, correlation for the two dimensions is, for a three-month interval, .50 for optimism and .36 for pessimism. Higher correlation for onedimension is natural because the number of items is higher (double). However the magnitude of our results is similar to the original version - large correlation (Cohen, 1988) -, and they suggests stability over time, as it is supposed as optimism is a disposition.

Table 3
Correlations between bidimensional optimism and pessimism and optimism as one dimension not corrected for overlap

	pessimism	optimism	LOT-R
optimism	.53(**)		
LOT-R	.87(**)	.87(**)	

** Correlation is significant at the .01 level (2-tailed).
Pessimism- Dimension of pessimism; optimism-dimension of optimism; LOT-R - unidimensionsl optimism scale

Confirmatory factor analysis

Using the EQS 6.1 version for the inspection of confirmatory factor analysis for the two factor solution, we found a $\chi^2(df\ 8)= 17.70$, $p = .02$, CFI = .97, RMSEA = .06, (90% confidence interval of RMSEA, .02, .10): for one factor solution $\chi^2(df\ 9) = 59.83$, $p = .0001$, CFI = .88, RMSEA = .14, (90% confidence interval of RMSEA .11, .17). The two factor solution shows a good fit and the one factor solution is under the acceptable level if we consider Bentler and Bonett's (1980) recommendations.

Convergent discriminant validity

We inspected the correlations of each dimension of LOT-R with the one-dimension hypothesis. Table 3 show the results.

Correlation between the two dimensions- pessimism and optimism – is moderate and inside the range reported by Gillam et al. (2001), Bailey et al. (2007) and Benyamini, (2005). The contribution of pessimism and optimism for the total LOT-R score is the same, each one explaining three

Table 4
Correlations of onedimensional and bidimensional LOR-R with demographic and disease variables

	pessimism	optimism	LOT-R
age	–.02	–.15(**)	–.09
School level	–.04	.24(**)	.11
Years of diag.	.02	–.03	.004
N attacks	–.06	–.13(*)	–.08
EDSS	–.05	–.14(*)	–.10
SDperception	–.29(**)	–.19(**)	–.26(**)
IPA	–.29(**)	–.32(**)	–.34(**)

** Correlation is significant at the .01 level (2-tailed).
Pessimism- Dimension of pessimism; optimism - dimension of optimism; LOT-R - onedimensional optimism scale. Age-years of age; School level- School level; Years of diag - Years of diagnosis; N attacks – number of attacks; EDSS- The Kurtzke Expanded Disability Status Scale; SDperception- Severity of Disease perception; IPA-impact on participation and autonomy

Table 5
Correlations between two dimension optimism-pessimism, one dimensional optimism, and psychological and functional variables

	pessimism	optimism	LOT-R
F. perception	–.19(**)	–.21(**)	–.23(**)
H.Perception	–.28(**)	–.26(**)	–.30(**)
QOLPerception	–.40(**)	–.36(**)	–.42(**)
LAW	.42(**)	.38(**)	.44(**)
HOPE	,60(**)	,46(**)	.59(**)

** Correlation is significant at the .01 level (2-tailed).
Pessimism- Dimension of pessimism; optimism - dimension of optimism; LOT-R - unidimensional optimism scale. F perception -Functional assessment; H. Perception- health status perception; QOL Perception-quality of life perception; LAW- Life as Whole; HOPE-Hope scale

quarters of the variance of the total scale, with a large portion of variance overlap. A strong and identical correlation between each one of the two factors (pessimism and optimism) and the total score, explaining 75% of the total variance of LOT-R, and a more moderate correlation between the two dimensions, suggests that the onedimension solution proposed by Scheier et al. (1994) could be appropriate.

Instead of a high correlation between optimistic and pessimistic dimensions of LOT-R bidimensional (meaning that they measure the same construct), or near zero correlation (suggesting that they measure different constructs), we found a moderate correlation.

Correlations between bidimensional and onedimensional LOT-R and demographic variables are shown in table 4.

In general, correlations are low. However, they show different patterns for bidimensional and onedimensional assessment, with different results for "optimism" and "pessimism", and with optimism as one dimension for the demographic variables "age" and "years of school," as well as for disease variables. Differences are higher for demographic variables age and school level, and tend to be of the same magnitude for disease variables.

Table 5 inspects the correlations between psychological variables and optimism

Results from bidimensional and onedimensional LOT-R show similar magnitude for functional and psychological variables. Convergent tests between LOT-R and Hope scale, severity of disease perception, health perception, and quality of life perception, and Satisfaction with Life as a Whole, show moderate correlations, suggesting that LOT-R shares important variances with chosen criteria variables. Shared variance tends to be higher with hope construct, a dimension built under the same model.

Conclusion of the study 1

Confirmatory factor analysis shows that the two factor solution for LOR-R is the most appropriate for the group of people with MS, but with the one factor solution near the border of acceptability. Looking for the internal consistency of the two dimensions or one dimension, we find that both solutions are acceptable.

The use of onedimensional or bidimensional measures shows identical results for the majority of the criterion variables, and because it does not give additional information, it seems unnecessary to use the two dimensions alternative.

STUDY 2

Participants

A convenience sample of people from the community, includes 615 individuals, 51.1% females, mean age 39.18, *SD* = 10.64 (between 17 and 80 years with the mode between 38 -43 years of age -23.1%-), 9.1 years of school (between 0 and 23), 19.3% single, 68.8% married, 9.6% divorced and 2.1% widowed. Participants were approached in public areas and asked if they were willing to complete a short questionnaire.

No statistically significant correlations were found between optimism, age and school level. Statistically significant differences were found between gender $t(613) = 2.69$, $p = .007$, with males showing higher optimism ($M = 15.70$) than females ($M = 14.91$): considering the two factor model, males are more optimistic than females $t(613) = 4.23$, $p < .0001$; for the pessimist dimension there are no statistically significant differences.

Table 6
Exploratory factor analysis with Kaiser rule (two factors) and forced one factor solution

	Two component solution		One component solution
	F1	*F2*	
In uncertain times		.84	.48
f something can go wrong	.76		.58
I'm always optimistic		.77	.52
I hardly ever expect things to go my way	.77		.63
I rarely count on good things happening to me	.77		.73
Overall, I expect more good things to happen to me than bad	(.29)	.60	.60

-maintains loadings above .25

Procedure

Exploratory factor analysis using principal component analysis Kaiser rule, varimax rotation, identify two factors with the positive worded items on one factor and the negative worded items on another factor. The two-factor solution explains 59.81% of the variance, with the negative worded items on the first factor. Because the original study considers that optimism is onedimensional, we repeated the procedure forced to one factor. The solution found explains 36.01% of the variance. The Component Matrix extracted shows factorial loadings between .48 and .73, with the majority of values in the 50s and 60s (see table 6). The loadings are appropriate, if we consider as appropriate loadings values over .40, but the variance explained by the solution is low.

Inspection of table 6 shows that a two-factor solution is clear, with high item loadings on the factor to which it belongs, and good discrimination between the two factors. However, the one factor solution also shows adequate loading values –above .40- for all the items.

Internal consistency

If we consider the two-factor solution, the internal consistency for the pessimistic domain is .61, with correlation item total score domain, corrected for overlap, between .34 and .51: the internal consistency for the optimistic domain is .67, with the correlation item total of the optimistic domain, corrected for overlap, between .45 and .53. For the one-factor solution the internal consistency shows a value of .64, with correlation item total score corrected for overlap between .29 and .50, with the majority of the values in the 30s.

Correlation shows that the pessimism dimension of the two-factor model explains better the total dimensional LOT-R, but at the same magnitude level. Considering demographic variables, age shows no differences for an onedimensional model or for each of the dimensions of the bidimensional model. For school level, correlation between dimensions –optimism and pessimism- of the bidimensional model shows a substantial difference compared with the one-dimensional solution, and similar to the disease group. The correlation between pessimism and optimism of the bidimensional model is under the reference values reported by Gillam et al (2001), suggesting an orthogonal relation between the two dimensions.

Table 7
Correlations between a one-factor optimism score, the two-factor pessimism and optimism, and demographic variable school level and age

	LOT-R	pessimism	optimism
LOT-R			
optimism	.73(**)		
pessimism	.82(**)	.21(**)	
age	.03	.04	.01
School	–.07	.19(**)	–.27(**)

** Correlation is significant at the .01 level (2-tailed).
Pessimism- Dimension of pessimism; optimism-dimension of optimism; LOT-R - unidimensional optimism scale; age- age; School- school level

Correlations between the two factors model and one factor model, and psychological and functional measures are presented in table 8.

Correlations between onedimensional optimism, bidimensional, and the hope score are substantially different, with similar results for the optimism dimension of the bidimensional model and the onedimensional score. For QOL and health perception, score values are similar between the pessimistic dimension of the bidimensional model and onedimensional LOT-R.

Confirmatory factor analysis

Using the EQS 6.1 (Bentler & Wu, 1995) version for the Confirmatory factor analysis for the two factor solution, we found a $\chi^2(df\ 8) = 51.89$, $p = .0001$, CFI = .92, RMSEA

Table 8
Correlations between optimism and psychological variables

	pessimism	optimism	LOT-R
hope	.19(**)	.43(**)	.38(**)
QOL Perception	–.31(**)	–.20(**)	–.33(**)
H. Perception	–.20(**)	–.17(**)	–.24(**)

** Correlation is significant at the .01 level (2-tailed).
Pessimism- Dimension of pessimism; optimism-dimension of optimism; LOT-R - unidimensional optimism scale; age- age; H. Perception- health status perception; QOL Perception-quality of life perception; HOPE-Hope scale

Table 9
Mean and standard deviation of patient and community sample (in brackets the original study values for patients and students)

	N	*M*	*SD*
MSclerosis	271	15.11 (15.16)	4.38 (4.05)
female	192	15.16 (14.92)	4.38 (3.97)
male	79	15.01 (15.24)	4.40 (4.09)
Community sample	615	15.30 (14.33)	3.64 (4.28)
female	314	14.91 (14.42)	3.83 (4.12)
male	301	15.70 (14.28)	3.40 (4.33)

= .09, (90% confidence interval of RMSEA, .07, .12): for one factor solution $\chi^2(df\ 9) = 207.16$, $p = .0001$, CFI = .65, RMSEA = .18, (90% confidence interval of RMSEA, .16, .21). The fit of the two-factor solution is acceptable and for the one factor it is under the appropriate value.

Conclusion of the study 2

It seems clear that the two factor solution for LOR-R is the most appropriate for the community sample, with acceptable fit values, concurrent with Bentler and Bonett, (1980).

Looking for the internal consistency of the bidimensional or onedimensional LOT-R, we see that the values are under the traditional reference values for both solutions.

Normative values for the LOT-R

The original authors propose normative data for patients and for college people that vary between 14.28 and 15.24, with standard deviations between 3.97 and 4.33. Compared with the Portuguese samples the magnitude of the values is similar. We can then set these values to identify as pessimist the ones under the mean, and as optimist the ones above the mean. Table 9 compares the different values for the unidimensional LOT-R

The higher score means an optimistic disposition, and the lower scores mean a pessimistic disposition. The highest possible score is 24, the lowest 0, and the mean for different groups is around 15, meaning that our samples have a more optimistic orientation; otherwise, the mean would have been around the mathematical mean of 12. However, the same tendency can be seen in the original version.

A one-sample *t* test procedure to test whether the mean of a patient variable differs from the original patient mean shows no statistically significant difference between the two groups. The comparison of the original college sample and our community sample shows a statistically significant difference $t(614) = 6.20$, $p = .0001$. However, our community sample has a mean age of 39.23, and the college sample of undergraduate students of the original Scheier et al. (1994) study should be younger. The comparison between the patient and community samples did not find statistically significant differences.

Results are similar to the original study, with is in agreement with Fischer and Chalmers's (2008) meta-analysis of dispositional optimism levels across 22 countries, which found that overall culture differences were small.

General discussion

In conclusion, the results of the Portuguese study with LOT-R suggest that it measures the same construct in the same way, and can be used in cross-cultural studies in western countries, considering that Western and Eastern cultures show an optimistic and pessimistic bias as Chang et al. (2009) explains.

Inspection trough confirmatory factor analysis with our samples shows that, contrary to the original study (Scheier et al.,1994), where "both the one-factor and the two-factor model provided an acceptable fit to the observed data" (p.1076), our studies show an adequate fit for the two-factor model and a non fit for the one-factor model. The original authors also state that "evaluation of the difference in fit between the two models (…) suggested that the two-factor solution was superior" (Scheier et al., 1994, p.1074). Our results match other studies in different languages and cultures.

Internal consistency for patient and community samples is adequate for the two samples, but the patient sample show higher values. The time lag comparison through test retest show high values for the one dimension score suggesting good stability, and confirming the results of Schou et al. (2005), and Giltay et al. (2006).

Our results slightly suggest that pessimism may weight more than optimism on the total score of the LOT-R, supporting the comment from Andersson (1996), and Vickers and Vogeltanz, (2000) which found that the clearest association was between the LOT and measures of negative affect.

Magnitude of correlations with demographic, disease, and psychological variables, shows that sometimes they are

similar and, different at other times, for the two dimensions as well as for the onedimension LOT-R, suggesting that it can depend on the characteristics of the sample. Affleck et al. (2001) agree that the two dimensions model measures different aspects. Depending on the variables used, and the population, using the LOR-R as onedimensional or bidimensional produces different results.

Then is it more appropriate to use LOT-R as one dimension, or as a two dimension questionnaire? If we consider statistics as the primary criteria to use the LOT-R, then we must use the bidimensional form. However the LOT-R was developed based on a theoretical perspective, and we defend that we must follow the authors' conceptual perspective. We can go back to the original authors when they suggests that in primary analyses we must rely on an overall score, followed by subsidiary analysis in which the positively and negatively worded items can be examined independently. In a recent review, original authors, reaffirm that "It is common to refer to optimists and pessimists as though they were distinct categories of people, but this is a verbal convenience (…).People range from very optimistic to very pessimistic, with most being somewhere between" (Carver, Scheier, & Segerstrom, 2010, p.880).

We are discussing about construct validity. Messick (1995), in a seminal article, says that construct validation is a complex task, integrating six distinguishable aspects, namely, substantive, structural, generalizability, external, and consequential. He call it an unified concept of validity integrating content, criteria, and consequences into a construct framework for the empirical testing of rational hypotheses about score meaning and theoretically relevant relationships, including those of an applied and a scientific nature.

However, it seems appropriate to return to the Vautier et al. (2003), recommendation, that the question of the definition of the basic psychological dimensions underlying the data is still wide open.

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