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Factor structure of the "Me as A Parent" scale in a community sample of Portuguese mothers

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Abstract: This study aimed to examine the factor structure of the Portuguese version of a parental self-regulation measure: "Me as a Parent" (MaaP). A confirmatory factor analysis was conducted with an online convenience sample of 370 mothers of children aged between 3 and 15 (M = 9, SD = 3.74). Results showed that in this sample, the original structure of the MaaP was not confirmed. The revised model with three first-order factors showed good fit indices, $\chi 2$ = 202.37, p < .001, $\chi 2/df$ = 101, CFI = .92, TLI = .91; SRMR = .05, RMSEA = .05, 90% CI = [0.046, 0.063]. The factors of MaaP showed good internal consistency, except for Personal Agency. The instrument achieved discriminant validity and showed good test-retest reliability. Although the MaaP seems to be a promising measure, the present results show that more research is needed to validate this new scale.

Keywords: *Parenting; Parental Self-Regulation; Assessment; Confirmatory Factor Analysis.*

Estrutura fatorial da escala "Me as A Parent" numa amostra comunitária de mães Portuguesas: Este estudo teve como objetivo examinar a estrutura fatorial da versão portuguesa de um instrumento de avaliação da autorregulação parental: "Me as A Parent". Uma análise fatorial confirmatória foi realizada com uma amostra de conveniência on-line de 370 mães de crianças com idades entre 3 e 15 anos (M = 9; DP = 3.74). Os resultados não confirmaram a estrutura original da MaaP nesta amostra. O modelo revisto, com três fatores de primeira ordem, mostrou bons índices de ajuste ($\chi 2$ = 202.37, p < .001, $\chi 2/df$ = 101, CFI = .92, TLI = .91; SRMR = .05, RMSEA = .05, 90% CI = [0.046, 0.063]). Os fatores do MaaP mostraram boa consistência interna, à exceção da subescala de Agência Pessoal. O instrumento alcançou validade discriminante e mostrou boa fiabilidade teste-reteste. Embora promissor, os resultados do presente estudo parecem mostrar que serão necessários mais estudos para alcançar a validação da MaaP.

Palavras-chave: *Parentalidade; Autorregulação Parental; Avaliação; Análise fatorial confirmatória.*

Self-regulation is an umbrella term generally referring to "a systematic process of human behavior that involves the setting of personal goals and steering behavior toward the achievement of established goals" (Zeidner et al., 2000, p. 751). For many reasons, self-regulation has been broadly considered one of the most important and ubiquitous psychological phenomena and has been studied in many human life domains (Baumeister & Vohs, 2007; Hoyle, 2010). Though the literature on self-regulation has grown rapidly over the past decades, it has only surfaced intermittently in parenting literature.

The self-regulation approach to parenting differs in important ways from other approaches. In place of the common emphasis on stable traits, attitudes, and behavioral patterns, this approach emphasizes dynamic processes that adjust parenting to the various aspects of children and events (Dix & Branca, 2003). Thus, conceptualizing parenting as goal-directed behavior, applying a self-regulation framework to parenting, and conducting theory-driven studies may potentially advance the current understanding of how cognitive and affective processes guide parenting behavior. Moreover, a self-regulation perspective of parenting can also improve the current understanding of what motivates parents to get involved in directing and changing their behavior to produce changes in their children's behavioral, developmental, and health outcomes (Barros et al., 2015). Yet, as mention before, there is a lack of research in this field that probably stems from the absence of a clear conceptualization of the self-regulation process, the vast array of the components it involves (e.g., goal selection, goal-setting, feedback sensitivity, discrepancy monitoring, self-efficacy beliefs, among others) and the best way to measure it (Maes & Karoly, 2005).

So far, empirical research has mainly focused on specific elements of parenting self-regulation, such as self-efficacy. In many cases, these studies lack conceptual clarity, with dimensions being mislabelled,

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used inconsistently, or used interchangeably (e.g., parental confidence, competence, and self-esteem) (Hamilton et al., 2015, Hess et al. 2004, Wittkowski et al., 2017). Nevertheless, a considerable amount of research has focused on the impact of these dimensions on parent, child, and family outcomes. Studies have shown parenting self-efficacy to be related to positive parent and child psychological functioning, child adjustment, and parenting competence (for a review, see Jones & Prinz's, 2005). For example, Hill and Bush (2001) found that parental self-efficacy was positively related to positive parenting practices and negatively associated with negative parenting. Other studies have found that parents lacking confidence in their abilities may feel more frustration and anxiety (de Haan et al., 2009; Slagt et al., 2012).

Moreover, several studies have shown the relevance of parental self-efficacy for parenting interventions. Some studies have demonstrated that interventions aimed at improving parenting and child behavior can increase parental self-efficacy (e.g., Sanders et al., 2000). Higher parental self-confidence at the start of a program appears to improve program outcomes (e.g., Hoza et al. 2000).

The differences in concepts may be subtle, but the term parenting self-regulation offers a broader and more dynamic process (Hamilton et al., 2015). Trying to bring some theoretical order to this field, Sanders and Mazzucchelli (2013) operationalized parental self-regulation as a multi-component process involving five key elements: (a) *self-management skills*, the tools, and skills that parents use to change their parenting practices; (b) *self-efficacy*, beliefs about the capacity to execute daily parenting tasks or to solve specific parenting problems; (c) *personal agency*, parents' locus of control in attributing their child's behavior and outcomes to their efforts; (d) *self-sufficiency,* independent problem-solving and self-reliance; and (e) *problem solving,* parents' capacity to define problems, formulate options, develop a plan, execute the plan, evaluate the outcomes achieved, and to revise the plan as required. Furthermore, they argued that the parental self-regulation perspective has a range of implications for practice and leads to several predictions that are yet to be empirically tested (Sanders & Mazzucchelli, 2013).

In response to this issue, Hamilton and colleagues (2015) developed the "Me as a Parent" (MaaP) scale, which is designed to assess the self-regulatory components outlined by Sanders and Mazzucchelli (2013). The MaaP is a 16-item self-report questionnaire intended to measure parents' global beliefs about self-efficacy, personal agency, self-management, and self-sufficiency. Validation of the original English version of the instrument with an Australian sample of parents was carried out by Hamilton et al. (2015). In this study, the confirmatory factor analysis showed that the MaaP comprises the hypothesized four unique factors (self-efficacy, personal agency, self-management, self-sufficiency) plus a higher-order factor (self-regulation). Furthermore, results showed that the scale has adequate internal consistency (.62–.84), satisfactory convergent validity, and reasonable test-retest reliability.

The present study aims to adapt and analyze the psychometric properties of the MaaP with a community sample of Portuguese mothers. To this end, confirmatory factor analysis (CFA) was used to examine the measure's structure. Also, the discriminant validity and test-retest reliability of the MaaP were explored. We hypothesized that the adapted scale would present the same factor structure as the original, with four unique but related factors predicted to reflect the underlying construct of parenting self-regulation.

METHOD

Participants

Three hundred and seventy mothers (N = 370) of children aged 3 to 15 completed the MaaP scale. Twenty-two (n = 22) of these mothers completed the measures at time 1 (T1) and four weeks later (T2) to determine test-retest reliability. The mothers' average age was 40 years (SD = 5.66), while the average age of the children was nine years (SD = 3.74). Other demographic characteristics of the sample are presented in Table 1.

Table 1. Sample demographics

	n	%
Mothers		
Educational level		
Elementary school	2	.54
Middle school	17	4.59
High school	80	21.62
Higher education	271	73.24
Number of children		
1 child	97	26.22
2 children	192	51.89
3 or more children	54	14.59
Children		
Age (range)		
Pre-school 3–5 years	120	32.43
Pre-teens 6–10 years	123	33.24
Young adolescents 11–15 years	127	34.32
Gender		
Male	192	51.89
Female	178	48.11
Family		
Family Structure		
Two Parents	287	77.57
Single Parent	78	21.08
Unknown	5	1.35
SES		
Low	54	14.59
Middle	174	47.03
High	142	38.38

Measures

A *Demographic Questionnaire* was used to collect general information about mother's demographic characteristics (age, highest educational level, occupation, and marital status), their children (age, sex, sibling order), and their family (number of children, household composition, and area of residence).

The MaaP scale (Hamilton et al., 2015) is a brief and easy-to-administer measure that aims to assess parents' perceptions of their self-regulation related to parenting. The 16 items of the MaaP are divided into four subscales reflecting: (1) self-efficacy (four items; e.g., "I have confidence in myself as a parent"; α = .75), (2) personal agency (four items; e.g., "When something goes wrong between my child and me, there is little I can do to fix it"; α = .63), (3) self-sufficiency (four items; e.g., "I know how to solve most problems that arise with parenting"; α = .65), and (4) self-management (four items; e.g., "When changes are needed in my family I am good at setting goals to achieve those changes"; α = .72). Parents were asked to rate the degree to which they agree or disagree with the statements, using a 5-points scale (from 1 = *strongly disagree* to 5 = *strongly agree*).

Procedure

In a first stage, the MaaP scale was translated to Portuguese. Firstly, two independent forward translations were done. A third person then compared the two translated versions to identify discrepancies indicative of ambiguous wording within the original scale. Discrepancies were reconciled through discussion among the translators and this third person. Finally, another person blind to the original scale back-translated the updated scale into English. This translation was compared to the original document to check the validity of the translation. Finally, a pre-test study was carried out with a small number of mothers to verify item comprehensibility and cultural adaptation. No changes were introduced, and the final version of the measure was used in the present study.

Ethics approval was obtained from the Research Ethics Committee of the Faculty of Psychology of the University of Lisbon. Following institutional approval, data were collected online through Qualtrics survey software. An internet page of the study was created, and the study was publicized through diverse channels (schools, social networks, institutional internet pages). Mothers of children aged between 3 and 15 years were invited to participate. After receiving a description of the study's objectives and a guarantee of the data's anonymity, the mothers who gave their consent completed the MaaP online.

To establish test-retest reliability, a group of 22 mothers completed the MaaP for a second time, four weeks after initial completion. This was accomplished with the help of students from the Faculty of Psychology who were involved in disseminating the study. They were given a code and were asked to encourage people they knew to participate in the test-retest, entering the code in the first assessment (T1) and in the second assessment four weeks later (T2).

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics software (v.23, SPSS Inc., Chicago, IL) and the R software packages (R Core Team, 2008): lavaan (Rosseel, 2012) and semTools (semTools Contributors, 2015).

We began by examining the univariate statistics for each item, such as the mean, standard deviation, skewness, and kurtosis. To determine which solution best fitted the data, three confirmatory factor analysis models were tested using the 16 items of the MaaP scale. First, a unidimensional model with a single factor and a 4-factor model, to serve as a comparison for the hypothesized second-order model with four first-order factors, were examined. However, in our sample, the 4-factor model resulted in an inadmissible parameter estimate. As two factors were highly overlapping, we decided to re-specify the model by collapsing these dimensions into a single factor. Finally, we compared a unidimensional model with a single factor representing self-regulation (Model A) and a three first-order factor oblique model (Model A1). Because the original structure was not replicated, model comparisons could not be made between a first-order factorial model and a second-order one. This comparison requires at least four first-order factors to generate overidentification of the second-order factor (Chen, Sousa, & West, 2005).

The Robust maximum likelihood (MLR) estimator was used to correct for non-normality. In addition to the Satorra-Bentler (S-B) χ^2 tests, several fit indices were used to evaluate the models' suitability, namely the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA) with a 90% confidence interval and the Bayesian information criteria (BIC; Raftery, 1995; Schwarz, 1978). The CFI and TLI values close to .90 or greater (Bentler, 1990; Bentler & Dudgeon, 1996) and the SRMR and RMSEA values below .08 (Arbuckle, 2009; Browne & Cudeck, 1992; Hu & Bentler, 1999) indicate an acceptable model fit. As for the BIC, the model with a smaller BIC value is preferred because it is more parsimonious (Byrne, 2010).

Furthermore, discriminant validity was assessed by the heterotrait-monotrait ratio (HTMT) of the correlations proposed by Henseler and colleagues (2015). In this study, we used the HTMT method as a criterion. This involves comparing HTMT results to a predefined threshold where values below .90 are indicative of discriminant validity (Kline, 2011). Internal consistency was evaluated through Composite Reliability (CR), and Cronbach's alpha coefficients above .70 indicated good internal consistency (Hair et al., 2010).

RESULTS

Factor Structure

Data were first screened to ensure that the MaaP item distributions were not highly skewed or kurtotic (i.e., absolute values of skewness > 3 and kurtosis > 10; Kline, 2005), which would pose problems in the CFA. All items had acceptable skewness (range = -0.54 to - 1.34) and kurtosis (range = - 0.36 to 3.18). Descriptive statistics for each item, such as the mean, standard deviation, skewness, and kurtosis, are presented in Table 2.

Table 2. Descriptive Statistics, Skewness, and Kurtosis of the 16 items of the MaaP

	M	*SD*	Skewness	Kurtosis
MaaP1	4.68	0.51	-1.33	1.52
MaaP2	3.58	0.92	-0.64	-0.36
MaaP3	4.10	0.75	-1.25	3.18
MaaP4	4.53	0.56	-0.72	0.04
MaaP5	3.81	0.75	-0.76	0.86
MaaP6	3.84	0.69	-0.99	2.11
MaaP7	3.70	0.74	-0.76	0.66
MaaP8	3.91	0.79	-0.93	1.25
MaaP9	3.67	1.03	-0.67	-0.27
MaaP10	3.82	0.77	-0.88	1.29
MaaP11	3.96	0.76	-0.86	1.37
MaaP12	4.01	0.63	-0.52	1.75
MaaP13	4.41	0.56	-0.72	2.79
MaaP14	3.92	0.75	-0.75	0.78
MaaP15	3.88	0.64	-0.69	2.12
MaaP16	4.31	0.78	-1.34	2.70

The confirmatory factor analysis started with a single model factor (Model A) and a 4-factor model to compare the hypothesized second-order model with four first-order factors. In our sample, the 4-factor model resulted in an inadmissible parameter estimate as the latent variables' covariance matrix was not positive definite. The inspection of this model structure indicated that correlations between Self-Sufficiency and Self-Management approached 1.0. In these cases, there is strong evidence to question the notion that the latent factors represent distinct constructs (Brown & Moore, 2012). As these two factors are highly overlapping, we decided to re-specify the model by collapsing the dimensions into a single factor. The revised, 3-factor model showed good fit indices (see Table 3, Model A1).

Table 3. Summary of CFA model fit indices

Models	S-B χ^2	*df*	BIC	CFI	TLI	RMSEA	SRMR	ΔS-Bχ^2 (Δdf)	Model comparison
Model A	252.82	104	11463.80	.88	.86	.06	.05		
Model A1	202.37	101	11410.14	.92	.91	.05	.05	38.38 (3)***	Model A

BIC Bayesian information criteria; CFI Comparative Fit Index; TLI Tucker-Lewis Index. Model A (unidimensional structure), Model A1 (three first-order oblique factors). *** $p < .001$.

The first-order model, $\chi^2 = 202.37$, $p < .001$, $\chi^2/df = 101$, CFI = .92, TLI = .91; SRMR = .05, RMSEA = .05, 90% CI [0.046, 0.063], was retained for the validity and reliability analysis and its graphic illustration is presented in Figure 1. As it is required at least four first order factors to generate overidentification of the second-order factor, a second order model could not be tested (Chen et al., 2005).

Correlations between subscales were $r = .40$, $p < .001$ for Personal Agency and Self-Efficacy, $r = .41$, $p < .001$ for Personal Agency and Self-Management, and $r = .71$, $p < .001$ for Self-Efficacy and Self-Management.

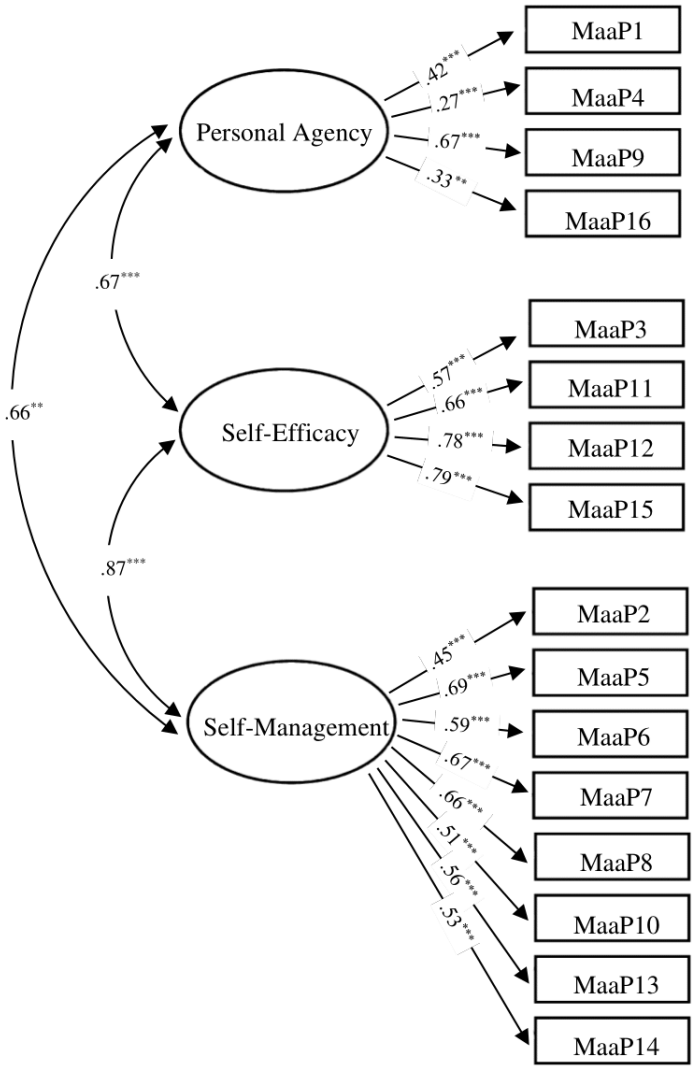

Figure 1. Results of the confirmatory factor analysis showing standardized estimates of the first-order model of the MaaP scale.

Reliability and validity

Table 4 presents the mean, standard deviations, reliability, and validity results for the total scale and subscales of the MaaP. The result of the internal consistency, as estimated by Cronbach's alpha coefficient, is .46 for the Personal Agency (with corrected item-total correlations ranging from .24 to .34, and an average inter-item correlation of .20), .78 for Self-Efficacy (with corrected item-total correlations ranging from .49 to .68, and an average inter-item correlation of .48) and .79 for Self-Management (with corrected item-total correlations ranging from .37 to .63, and an average inter-item correlation of .33). The composite reliability estimates (CR) were good (Self-Efficacy =. 80 and Self-Management = .81), except for the Personal Agency scale that presented a value below .60. The instrument also showed good test-retest reliability (ICC values above .70). In terms of discriminant validity, the results from the HTMT[90] indicated discriminant validity.

Table 4. Means, standard deviations, reliability, and validity of the MaaP scale

	M (SD)	Alpha coefficient	CR	ICC	95% CI of ICC	HTMH.90	
						MaaP *Personal agency*	MaaP *Self-Efficacy*
MaaP							
Personal agency	17.19 (1.85)	.46	.47	.85	[.64, .94]		
Self-Efficacy	15.95 (2.17)	.78	.80	.70	[.29, .88]	.57	
Self-Management	30.99 (3.85)	.79	.81	.70	[.30, .87]	.63	.89

CR Composite reliability, CI confidence interval, ICC Intraclass correlation coefficient, HTMT heterotrait-monotrait ratio

DISCUSSION

Despite the hypothesized importance of self-regulation to parenting and parenting interventions, it has received little attention in the literature. One possible explanation for this could be the absence of reliable measures of parental self-regulation processes (Sanders & Mazzucchelli, 2013). Hence, the present study aimed to explore the factor structure and the psychometric properties of the MaaP in a Portuguese context, expecting it could be used in research and clinic work and especially as an outcome measure for the evaluation of parenting interventions. For that purpose, we conducted a confirmatory factor analysis with a community sample of Portuguese mothers.

The original factor structure of the MaaP (Hamilton et al., 2015) was not replicated in our sample. The inspection of the measurement model indicated that the factors of self-sufficiency and self-management were highly overlapping, and to address this, we re-specified the model by collapsing these dimensions into a single factor. The revised, 3-factor model showed good fit indices. A second-order model was expected since the scale was originally developed with the conceptualization that the four factors would be unified by a common underlying construct posited to be parenting self-regulation, verified in the original CFA study. Unfortunately, the present investigation model comparisons could not be made between the first-order factorial model and a second-order one because this comparison requires at least four first-order factors (Chen et al., 2005).

Regarding internal consistency, as estimated by Composite Reliability (CR) and Cronbach's alpha coefficients, the factors of MaaP showed good internal consistency, except for Personal Agency that presented the lowest internal reliability. However, the mean inter-item correlation for this dimension is within the .15 - .50 recommended range (Briggs & Cheek, 1986; Clark & Watson, 1995). The Cronbach's alpha for the Personal Agency dimension was low in the original study, showing that this result may not be due to our sample's specificity but to a problem in the items' content. As a matter of fact, there is a body of research that shows that negatively phrased items can affect reliability and validity by introducing measurement artifacts into the scores (Stewart & Frye, 2004). This can pose as a preliminary hypothesis to explain the poor internal reliability found on the personal agency scale, as all its items are negatively phrased. Further studies should pay particular attention to these items to see if they need to be reworded. In our sample, discriminant validity was achieved, and the instrument also showed good test-retest reliability.

To the best of our knowledge, this is the second study that examines the MaaP structure and psychometric properties. For this reason, it is fair to say that future research on more diverse samples, in terms of sociodemographic variables such as educational level and income, is needed to reach a better understanding of the MaaP factorial structure. Furthermore, measurement invariance of the instrument across age and gender (mothers/fathers) should be tested, and, given that the measure is expected to be used in parenting interventions, it is important to determine whether the measure can differentiate between clinical and non-clinical populations.

Nevertheless, it is important to understand the differences encountered in this study compared to the original study. For that purpose, we looked at the relations between factors and the content of each factor. As in the original study, in our sample, the correlations between the four hypothesized factors showed that self-sufficiency, self-efficacy, and self-management are strongly related, and the relationship between personal agency and the other factors is weaker. It was expected that all the scales showed strong correlations between them as they should reflect the underlying construct of parenting self-regulation. The authors of the original study (Hamilton et al., 2015) claimed that there is a statistical explanation for the

weaker relationships observed with personal agency, arguing that, as previously mentioned, it may be a statistical artifact of the negatively phrased items within the personal agency factor.

As mentioned before, it was hypothesized that the scale would be multidimensional with four related but unique factors. However, in our study, self-sufficiency and self-management were so highly correlated that a re-specified model where these two dimensions were collapsed showed better parsimony. A closer look at the content of each factor's items showed some similarities between these two scales. The personal agency scale comprises items related to an external locus of control and helplessness, and the self-efficacy scale has items related to a global sense of efficacy. The self-management and self-sufficiency scales present items related to the perception of efficacy in new or difficult situations. An example of similar items in these two scales could be: "When changes are needed in my family, I am good at setting goals to achieve those changes" (self-management scale), and "I have the skills to deal with new situations with my child as they arise" (self-sufficiency scale).

It should be noted that our study has several limitations. First, our sample size was moderate and was composed of an online sample with high academic qualifications. Therefore, future studies will be important to examine the factorial structure and psychometric characteristics among diverse populations. Larger samples are also needed to provide normative data for the Portuguese MaaP. Also, the convergent validity of the Portuguese version has not been verified. To this end, it will be necessary to use the MaaP along with scales postulated to measure elements of parenting self-regulation, such as the Parenting Sense of Competence scale (PSOC; Guidubaldi & Cleminshaw, 1985), The Parental Locus of Control Scale (PLOC; Campis et al., 1986), and the Self-Efficacy in Parenting Tasks Index (SEPTI; Coleman & Karraker, 2000). Additional validation through field-testing should also be conducted to assess the scale's therapeutic applicability, allowing the scale to be tested for its sensitivity to detect changes resulting from interventions.

In summary, a self-regulation perspective to parenting has a range of implications for theory and practice that are yet to be empirically tested (Sanders & Mazzucchelli, 2013). The MaaP is a promising measure developed with this goal in mind. It has several advantages, such as being brief and easy-to-administer and allowing researchers and clinicians to analyze parenting self-regulation beliefs and its different dimensions. However, the present results show that more research is needed to validate this new measure.

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