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ORIGINAL ARTICLE

Understanding the Relationship between Quality of Life, Adaptive Behavior and Support Needs

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Abstract Psychometric tools providing quantitative measures of the constructs of adaptive behavior, support needs, and quality of life (QOL) have received considerable attention within the field of intellectual disability (ID). The relationship between the three constructs was investigated by examining scores on the Adaptive Behavior Scale (ABS), Supports Intensity Scale (SIS), and Personal Outcomes Scale (POS; a QOL scale). Data from 146 Portuguese adults with ID revealed that: (a) the ABS domains showed a moderate negative relationship with the SIS subscales; (b) the absolute value of correlations between SIS/ABS domains were greater than either the ABS/POS or SIS/POS correlations; and (c) people with relatively stronger adaptive skills and less intense support needs experience a higher QOL. Additionally, adaptive behavior scores were a stronger predictor of personal outcomes than the support needs scores. Personal outcomes associated with QOL were similar when assessed by the POS through self-report and report-of-others measures. Implications for future research and practice are discussed.

This manuscript has not been submitted to any other journal.

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Interest in the constructs of adaptive behavior, support needs, and quality of life (QOL) has been particularly prominent in the field of intellectual disability (ID) during the past 25 years (e.g., see Buntinx and Schalock 2010; Schalock et al. 2010a; Schalock and Verdugo 2009; Thompson et al. 2014b; Wehmeyer et al. 2008) with the introduction of social-ecological models of ID (e.g., Schalock et al. 2010a). Social-ecological models stress that people with ID can be distinguished from the general population by the extent of the mismatch they experience between their personal competence and the demands of community settings and activities. Broadly speaking, the conceptual relevance of adaptive behavior, support needs, and QOL to a social-ecological understanding of people with ID is readily apparent. Deficits in adaptive behavior skills can result in limitations in personal competence (Tassé et al. 2012), which can, in turn, impact the extent of the person-environment mismatch. Support needs are in many ways a mirror reflection of the person-environment mismatch (Thompson et al. 2009), and the QOL of people with disabilities is significantly influenced by availability of supports that address their support needs (van Loon et al. 2010).

Progress in any field is often directly related to progress in understanding critical constructs and their relationship to one another. An improved knowledge of the constructs of adaptive behavior, support needs, QOL, and the relationship between these constructs, has the potential to not only contribute to an enhanced understanding of people with ID and the challenges they face, but also to inform public policies and service systems that are intended to benefit people with ID.

Adaptive behavior is a component of personal competency that Tassé et al. (2012) defined as the conceptual, social, and practical skills that have been learned and are accomplished by individuals in their daily lives. Support needs refers to the pattern and intensity of supports required for a person to participate in activities associated with functioning in contemporary society (Thompson et al. 2009). Although Felce's (1997) observation that QOL resists precise definition remains as true today as it was nearly 20 years ago, there is widespread agreement that the dimensions (i.e., factors and domains) of QOL include: Independence (i.e., Personal Development, Self-Determination), Social Participation (i.e., Interpersonal Relations, Social Inclusion, Rights), and Well-Being (Emotional Well-Being, Physical Well-Being, and Material Well-Being; Schalock et al. 2010b; Simões et al. 2016).

The relationship between support needs and adaptive behavior has been investigated by multiple researchers. There is consensus that although related, the two constructs are distinct (Bossaert et al. 2009; Chou et al. 2013; Lamoureux-Hébert and Morin 2009; Thompson et al. 2004; Verdugo et al. 2010). There is a reciprocal relationship between support needs and adaptive behavior. Generally speaking, people with greater skills will have less intense support needs, and those with lesser skills will have more intense support needs. There are, however, many influences on support needs other than the degree of adaptive skill acquisition (Thompson et al. 2009).

The relationship between adaptive behavior and QOL has also been investigated in the past. Given that independence is a component of QOL, it is not surprising that researchers have consistently reported that people with relatively lower scores on a

variety of personal competence measures (e.g., IQ, adaptive behavior, emotional competence) also have relatively lower scores on QOL measures (Claes et al. 2012; Nota et al. 2007; Rey et al. 2013). It is a dubious conclusion, however, to suggest that lower skills inevitably lead to a lower QOL. A critical element of independence is having choices and decision-making power (Wehmeyer and Schalock 2001). QOL includes self-determination as a critical dimension (Schalock et al. 2010b; Simões et al. 2016), and self-determination is associated with greater choice-making and decision-making (i.e., being the causal agent in one's life; Wehmeyer and Schalock 2001). Therefore, people with more limitations in adaptive behavior (or other aspects of personal competence) may be less independent because they have been offered fewer opportunities to develop self-determination skills and make their own choices. In other words, limited independence (which detracts from QOL) may have less to do a lack of adaptive skills and more to do a lack of opportunities and supports (e.g., adaptations, accommodations, assistance from others) for making choices and decisions. Cases where limited life choices and decision-making were due (at least partially) to a lack of proper supports would corroborate Buntinx and Schalock's (2010) and Thompson et al. (2009) argument that the degree of alignment between supports that a person needs and supports that a person receives can have a significant impact on a person's QOL.

Adaptive behavior, support needs, and QOL are clearly intertwined, and there have been repeated calls for further investigation of the relationships among these constructs (e.g., Buntinx and Schalock 2010; Harries et al. 2005; Riches et al. 2009; Wehmeyer et al. 2008). The current study builds on this line of research through presenting and discussing findings from data collected on 146 people with ID in Portugal. The research questions driving this investigation were: (1) what is the extent of the relationship between measures of adaptive behavior, support needs, and QOL?; (2) to what extent do measures of adaptive behavior and support needs predict personal outcomes associated with QOL?; and (3) are there differences when data on QOL is collected from self-report and report-of-others? Thus, the current investigation sought to contribute to a growing line of research investigating empirical relationships among measures of adaptive behavior, support needs, and QOL (e.g., see Harries et al. 2005; Thompson et al. 2014b; Wehmeyer et al. 2009).

Based on prior research findings, we anticipated that support need scores (i.e., higher scores reflect higher intensity of support needed) would be negatively correlated with adaptive behavior scores (i.e., higher scores reflect greater skills; Claes et al. 2009; Harries et al. 2005; Thompson et al. 2004) and QOL (i.e., higher scores reflect more positive life quality; Claes et al. 2012). Moreover, we anticipated that adaptive behavior scores would be positively correlated with QOL (Chou et al. 2013; Claes et al. 2012; Nota et al. 2007). Additionally, there is evidence that combining adaptive behavior and support needs information would provide a robust predictor of QOL (Claes et al. 2012). The opportunity to collect data on all three constructs from the same sample and complete simultaneous analyses offered an opportunity to extend this research line. Additionally, the vast majority of preceding researchers used QOL data collected from proxies (i.e., report-of-others), but in this investigation QOL data were collected from self-report as well as proxy. In prior literature several researchers reported adequate agreement between the QOL perceptions of people with ID and their proxies (e.g., Claes et al. 2010; Simões and Santos 2016), but other researchers observed

disagreement among participants (e.g., Schwartz and Rabinovitz 2003). Therefore, using both proxy and self-report in this investigation allowed access to multiple perspectives.

Materials and Methods

Study Design and Procedures

This investigation utilized a cross-sectional design and data were collected using three measurement tools. The interviewers assessed all participants in accordance with each scale's administration guidelines. All measures were Portuguese versions which had been translated from English versions and validated with Portuguese populations. The administration procedures for the Adaptive Behavior Scale (ABS) and Supports Intensity Scale (SIS) called for eliciting information from respondents who had significant familiarity and knowledge of the person being assessed, while the administration of the Personal Outcomes Scale (POS) called for interviewing both proxies (who knew the person well) and the person with the disability who was being assessed. The interviewers had backgrounds in psychological assessment, several years of professional experience with people with ID, and were specifically trained on how to administer and score each instrument. In additional to completing the three assessments, the same interviewer collected demographic data on each participant (Table 1).

Table 1 Demographic characteristics of the sample

	n (% of valid *n*)
Gender	
Female	67 (45.89)
Male	79 (54.11)
Age (intervals)	
18–20	21 (14.38)
21–29	41 (28.08)
30–39	45 (30.82)
40–49	30 (20.55)
> 49	9 (6.16)
Intellectual disability level	
Mild	77 (52.74)
Moderate	69 (47.26)
Living arrangements	
Own home	8 (5.48)
Family home	95 (65.07)
Care facility	43 (29.45)
Daytime activity	
Vocational training	24 (16.44)
Occupational activities centers	122 (83.56)

Ethics Committee Approval

The ethical principles of the Declaration of Helsinki (World Medical Association 2008) were guaranteed. Ethical approval for the research was provided by the ethics committee of *Centro Hospitalar de São João*. Procedures to assure the informed consent of participants were undertaken, and those agreeing to participate were free to withdraw from the study at any time.

Participants

Respondents for the Portuguese version of the POS self-report section were the consumers themselves (Table 1). Every effort was made to assure that each consumer understood what was being asked of him or her. When there was any indication of confusion, additional information was supplied until the consumer clearly communicated they comprehended what was being asked and supplied responses that were directly relevant to the questions. Although the communication and verbal abilities of consumers varied, each participant had a reliable response, and each consumer respondent was explicitly asked to confirm that each rating on the scale was one which they agreed was the correct rating.

Respondents for the POS report-of-others section, ABS, and SIS were at least two support staff that (a) knew the person with ID well, and (b) had known the person for at least two years. The support staff (n = 87; M_{age} = 39.54, SD = 10.25) had one of the following job titles: psychologist, social worker, psychomotor/occupational therapist, special education teacher, and monitor.

Participants were recruited from seven different service agencies in Portugal using convenience sampling. The inclusion criteria for the sample included having a formal diagnosis of ID and being 18 years or more of age. Initial diagnoses were made by a multidisciplinary team, according to the American Psychiatric Association's's (2000) criteria. The sample included 146 adults with ID aged 18–64 (M = 32.73, SD = 10.37). None of the participants were competitively employed in community jobs. Their daytime activity was classified as either in vocational training (i.e., center-based program where prevocational skills are taught) or occupational activities (i.e., center-based program providing social and leisure activities, with no employment demands).

Measurement Instruments

All of the measures used in this investigation were Portuguese versions. For purposes of clarity, the measures will be introduced by designating they were Portuguese translations, but will be subsequently referred to by their English names.

Portuguese Adaptive Behavior Scale (ABS) The Portuguese ABS is a translated version of the ABS-Residential and Community (Nihira et al. 1993). Like the original English version, the Portuguese ABS is used to assess people's adaptive behavior skills, including skills necessary to navigate environmental conditions. The scale has two parts.

In Part 1, skills associated with ten adaptive domains (i.e., Independent Functioning, Physical Development, Economic Activity, Language Development, Numbers and Time, Domestic Activity, Pre-Vocational Activity, Self-Direction, Responsibility, and

Socialization) are assessed. Responses to items involved one of two procedures: rating the highest level of adaptive behavior or a checklist of yes/no responses. Data from Part 1 were used in this investigation. Santos et al. (2014) reported high internal consistency of Part 1 (all scores ranged from .81 to .98), and construct validity (Pearson coefficients ranged from .53 to .90). Furthermore, statistically significant differences between children and adolescents with and without ID demonstrated the ability of Portuguese ABS to discriminate across groups (Santos 2014).

Part 2 of the ABS is concerned with personality and behavior disorders. It is organized under eight domains, in which behaviors are evaluated by frequency (i.e., never, occasionally, and frequently). Part 2 was not used in the present research due to the poor psychometric indices found in an initial study (Santos and Morato 2012a). Additionally, the conceptual legitimacy of including items associated with maladaptive/problem behavior as a measure of the construct of adaptive behavior has been questioned by some prior researchers (e.g., see Thompson et al. 1999).

Portuguese Support Intensity Scale (SIS) The Portuguese SIS was translated from the original, English version (Thompson et al. 2004). The scale is used to assess the support needs of persons with ID who are 16 years or older (Lopes-dos-Santos et al. in press). The standardized portion (i.e., Part 1) of the scale focuses on support needed (i.e., type, frequency, and daily support time) to participate in a variety of life activities associated with six domains/subscales: Home Living Activities, Community Living Activities, Lifelong Learning Activities, Employment Activities, Health and Safety Activities, and Social Activities. Ratings on the scale are reported on a 4-point scale, from lowest support needs (i.e., 0) to highest support needs (i.e., 4). Like other translated versions of the SIS (e.g., Claes et al. 2009; Lamoureux-Hébert and Morin 2009; Verdugo et al. 2010), the internal consistency (i.e., α's ranged from .92 to .96) and construct validity (i.e., r's ranged from .72 to .87) suggest that the Portuguese SIS is a reliable and valid tool to measure the relative intensity of support needed by people with ID (Lopes-dos-Santos et al. in press). Only data from Part 1 were used in this investigation. Data from the other two sections, which do not generate standard scores, were not used. The other sections focus on supports related to eight activities associated with advocacy and self-determination (i.e., Protection and Advocacy Activities, Part 2), and supports needed to manage a medical condition or a behavioral problem (i.e., Exceptional Medical and Behavioral Support Needs, Part 3).

Portuguese Personal Outcomes Scale (POS) Consistent with the original tool (Claes et al. 2010; van Loon et al. 2009), there are two sections of the Portuguese POS: a set of questions to be answered by the person who is being evaluated (i.e., self-report); and the same set of questions answered by proxies (i.e., report-of-others) who know the person well. Despite the original version of the scale including 48 items, based on the confirmatory factorial analysis (CFA) eight questions were removed from the Portuguese version (Simões et al. 2016). Consequently, the Portuguese POS has the same forty items in each part, with five questions per domain. Answers are reported on a 3-point scale (i.e., 3 = frequent; 2 = sometimes; 1 = never).

Simões and Santos (2014) used content validity procedures to adapt the items to the Portuguese language and culture. The eight domains emerging from the CFA comprise the POS and were used in this study: Personal Development, Self-Determination,

Interpersonal Relations, Social Inclusion, Rights, Emotional Well-Being, Physical Well-Being, and Material Well-Being (Schalock and Verdugo 2002; Simões et al. 2016). According to Simões et al. (2015) results, the POS demonstrated adequate test-retest (i.e., *r*'s ranged from .67 to .92), internal consistency (i.e., α = .87 for self-report and α = .90 for report-of-others), and inter-rater reliability (i.e., *r*'s ranged from .40 to .88). Furthermore, the scale revealed suitable factorial, discriminant, and convergent properties (Simões et al. 2016).

Data Analyses

Statistical analyses were undertaken using the Statistical Package for Social Sciences (SPSS; IBM Corp. Released 2012), version 21.0. Pearson correlation analyses were performed to examine the relationships between the constructs of three scales. Regression analyses were conducted to investigate how adaptive behavior and support needs predicted QOL. First, with eight core QOL domains and POS Index Score (i.e., self-report and report-of-others sections) serving as the dependent variables, and ABS Total Score of the Part 1 serving as the independent variable, nine regression analyses were performed. Second, with the same set of dependent variables and SIS Total Score of the Part 1 serving as the independent variable, nine regression models were conducted. The resulting solutions were verified through examining standardized residual and Durbin-Watson statistics. Thus, scores near 2 were considered a null self-correlation (Marôco 2007). Multi-collinearity between the independent variables was determined through the ratio of variance inflation (VIF < 5.00) and tolerance (Tol > .10; Fox 1991). These statistical procedures inform us about whether the assumption of independent variables is acceptable and the precision with that the parameters can be estimated (Marôco 2007). The standardized mean difference effect sizes (Cohen's *d*) were calculated to interpret the results (Lipsey and Wilson 2001; Wilson 2001).

Results

Relationship between ABS, SIS, and POS

Data were analyzed with both POS subjective (i.e., Part 1) and objective (i.e., Part 2) sections. Before comparing the patterns of parameter estimates between the two POS measures, correlation coefficients of QOL were calculated. Pearson correlations of the QOL scores between people with ID and proxies ranged from Emotional Well-Being domain (*r* = .43) to Personal Development domain (*r* = .80). The agreement was evaluated based on conventional guidelines: poor < .40, fair ≥ .40 < .60, good ≥ .60 < .75, and excellent ≥ .75 (Cicchetti 1994). According to Cicchetti's (1994) criteria, the consistency between those respondents ranged from fair to excellent.

The correlations between the ABS and the SIS domain scores are summarized in Table 2. Correlation coefficients were in the negative direction, indicating that people with more intense support needs had lower adaptive behavior scores, and conversely, those with less intense support needs had higher adaptive behavior scores. The ABS

domains of Independent Functioning, Physical Development, Economic Activity, Domestic Activity, and Self-Direction had relatively robust correlations with the SIS domains of Home Living Activities, Community Living Activities, Health and Safety Activities, and Social Activities. Numbers and Time was the only ABS domain that did not show a significant correlation with the SIS Employment Activities subscale. The SIS composite score (i.e., total score from Part 1) had correlation coefficients that approached Pestana and Gageiro's (2005) moderate range (i.e., .40 to .69) for five ABS subscales (i.e., Independent Functioning, Physical Development, Economic Activity, Domestic Activity, and Self-Direction).

As shown in Table 3, the correlation coefficients associated with the POS domains and the ABS domains varied considerably. The pattern of variation, however, was similar for POS domain scores obtained from self-report and report-of-others. That is, ABS domain scores showing relatively robust correlations with POS domain scores from interviews with the people with ID also showed relatively robust correlations with POS domain scores from interviews completed by others who knew the person with ID. Likewise, the same ABS domain scores with low correlations with POS domains in the self-report condition yielded low correlations with POS domains in the report-of-others condition. Additionally, the coefficients were in the positive direction, indicating that people with relatively higher adaptive behavior scores (and thus more advanced skills) tended to have relatively higher QOL scores.

Six ABS domains (i.e., Independent Functioning, Physical Development, Economic Activity, Language Development, Numbers and Time, and Domestic Activity) had relatively robust correlations with three POS domains (i.e., Personal Development, Self-Determination, and Rights). With a few exceptions, three ABS domains (Pre-Vocational Activity, Self-Direction, Responsibility, and Socialization) showed only marginal associations with the POS domains. The overall, composite POS score (i.e., QOL Index Score) had correlation coefficients that approached Pestana and Gageiro's (2005) moderate range (i.e., .40 to .69) for all ABS subscales, except Pre-Vocational Activity, Self-Direction, and Responsibility.

The correlations between the POS and the SIS domain scores are presented in Table 4. As with the correlations between the POS and the ABS, the pattern of correlations between SIS scores and POS scores in the self-report and report-of-others conditions were practically mirror images. Correlation coefficients were in the negative direction, indicating that people with more intense support needs had a lower QOL compared to those with less intense support needs.

The SIS domains of Home Living Activities, Community Living Activities, and Social Activities had relatively stronger correlations with POS domains compared to SIS domains of Lifelong Learning Activities, Employment Activities, and Health and Safety Activities. In terms of the POS domains, clearly the domains of Personal Development and Rights showed the strongest association with SIS subscales while Social Inclusion and Self-Determination showed relatively robust correlations with only a few subscales. The POS domain scores of Interpersonal Relations, Emotional Well-Being, Physical Well-Being, and Material Well-Being showed correlation coefficients with SIS subscale scores that were so low as to render them meaningless. Home Living Activities and Community Living Activities were the only SIS subscales with correlation coefficients with the QOL Index Score that were either in, or near, the lower border of Pestana and Gageiro's (2005) moderate range (i.e., .40 to .69). The remaining

Table 2 Correlations between adaptive behavior scale and supports intensity scale domains

	Adaptive Behavior Scale									
Supports Intensity Scale	Independent Functioning	Physical Development	Economic Activity	Language Development	Numbers and Time	Domestic Activity	Pre-Vocational Activity	Self-Direction	Responsibility	Socialization
Home Living Activities	–.61**	–.53**	–.38**	–.31**	–.25*	–.62**	–.29**	–.41**	–.33**	–.26*
Community Living Activities	–.51**	–.43**	–.51**	–.29**	–.31**	–.45**	–.23*	–.28**	–.20*	–.21*
Lifelong Learning Activities	–.29**	–.18*	–.38**	–.18*	–.27**	–.30**	–.31**	–.27**	–.19*	–.22*
Employment Activities	–.34**	–.28**	–.26**	–.19*	–.14	–.31**	–.28**	–.36**	–.27**	–.21*
Health and Safety Activities	–.50**	–.33**	–.37**	–.24*	–.25*	–.39**	–.32**	–.35**	–.30**	–.34**
Social Activities	–.45**	–.40**	–.37**	–.29**	–.23*	–.36**	–.37**	–.36**	–.35**	–.34**
Total	–.56**	–.44**	–.47**	–.31**	–.30**	–.50**	–.37**	–.41**	–.33**	–.32**

** $p \leq .001$; * $p < .05$

Table 3 Correlations between Escala Pessoal de Resultados (self-report and report-of-others sections) and Adaptive Behavior Scale domains

Adaptive behavior scale	Self-report section								
	Personal development	Self-determination	Interpersonal relations	Social inclusion	Rights	Emotional well-being	Physical well-being	Material well-being	QOL index score
Independent functioning	.57**	.31**	.18*	.25*	.36**	.09	.19*	.23*	.53**
Physical development	.46**	.17*	.17*	.25*	.23*	.13	.23*	.16*	.40**
Economic activity	.58**	.31**	.19*	.32**	.47**	–.07	–.01	.35**	.56**
Language development	.55**	.24*	.21*	.25*	.36**	.04	.14	.31**	.54**
Numbers and time	.58**	.21*	.21*	.26*	.34**	–.06	.02	.34**	.49**
Domestic activity	.48**	.21*	.14	.27**	.30**	–.01	.16	.15	.42**
Pre-vocational activity	.08	.03	.03	.05	.17*	.05	–.12	.10	.10
Self-direction	.34**	.18*	.15	.18*	.23*	.05	.06	.13	.28**
Responsibility	.21*	.09	.17*	.12	.22*	.11	.11	.23*	.26**
Socialization	.31**	.12	.19*	.19*	.22*	.00	.04	.21*	.28**
Adaptive behavior scale	Report-of-others section								
	Personal development	Self-determination	Interpersonal relations	Social inclusion	Rights	Emotional well-being	Physical well-being	Material well-being	QOL index score
Independent functioning	.58**	.41**	.11	.30**	.34**	.12	.20*	.17*	.54**
Physical development	.49**	.25*	.07	.23*	.22*	.12	.27**	.09	.41**
Economic activity	.59**	.38**	.10	.29**	.53**	–.05	.01	.33**	.54**
Language development	.55**	.31**	.05	.11	.33**	.03	.17*	.24*	.48**
Numbers and time	.56**	.29**	.11	.21*	.40**	–.06	.05	.33**	.44**
Domestic activity	.45**	.31**	.08	.26*	.24*	.16	.18*	.10	.42**
Pre-vocational activity	.13	.06	.07	.07	.17*	.08	–.07	.05	.13
Self-direction	.37**	.24*	.06	.16	.17*	.19*	.09	.09	.29**
Responsibility	.24*	.17*	.13	.21*	.22*	.25*	.17*	15	.31**
Socialization	.32**	.24*	.31**	.25*	.24*	.23*	.19*	.18*	.40**

** $p \leq .001$; * $p < .05$

Table 4 Correlations between Escala Pessoal de Resultados (self-report and report-of-others sections) and supports intensity scale domains

Supports Intensity Scale	Self-report section								
	Personal development	Self-determination	Interpersonal relations	Social inclusion	Rights	Emotional well-being	Physical well-being	Material well-being	QOL index SCORE
Home living activities	–.48**	–.26*	–.23*	–.30**	–.31**	–.06	–.19*	–.08	–.42**
Community living activities	–.49**	–.18*	–.14	–.26*	–.36**	.04	–.09	–.16	–.40**
Lifelong learning activities	–.32**	–.19*	–.13	–.16*	–.24*	.09	–.08	–.11	–.26*
Employment activities	–.27**	–.11	–.10	–.06	–.11	.07	–.04	.03	–.13
Health and safety activities	–.36**	–.21*	–.11	–.13	–.22*	.03	–.10	–.10	–.26*
Social activities	–.35**	–.21*	–.17*	–.21*	–.25*	.03	–.10	–.07	–.29**
Supports intensity Scale	Report-of-others section								
	Personal Development	Self-Determination	Interpersonal Relations	Social Inclusion	Rights	Emotional Well-Being	Physical Well-Being	Material Well-Being	QOL Index Score
Home living activities	–.49**	–.27**	–.13	–.32**	–.19*	–.09	–.05	.01	–.40**
Community living activities	–.51**	–.21*	.04	–.26*	–.31**	.06	–.05	–.07	–.38**
Lifelong learning activities	–.30**	–.12	–.11	–.23*	–.20*	.02	.08	–.07	–.20*
Employment activities	–.26*	–.11	–.10	–.14	–.03	.02	.06	.01	–.12
Health and safety activities	–.36**	–.15	–.12	–.26*	–.17*	.00	–.02	–.13	–.26*
Social activities	–.36**	–.25*	–.12	–.22*	–.18*	–.10	–.11	–.10	–.30**

** $p \leq .001$; * $p < .05$

subscales were well below the moderate range, with the Employment Activities subscale (r = −.13 for self-report and r = −.12 for report-of-others) showing an exceptionally low correlation with the QOL Index Score.

ABS and SIS as Predictors of QOL

Regression analyses were used to further determine the extent to which the adaptive behavior predicted QOL outcomes as measured in both POS self-report and report-of-others conditions. Table 5 shows that adaptive behavior proved to be relatively robust predictor of QOL scores under both conditions of data collection. The effect sizes were evaluated based on Lipsey and Wilson's (2001) guidelines: insignificant (d = .00–.19), small (d = .20–.49), medium (d = .50–.79), and large (d > .80). In regard to self-reported scores, adaptive behavior was a robust predictor of (1) Personal Development domain (β = .61, $t(144)$ = 9.32, d = 1.54), (2) Self-Determination domain (β = .29, $t(144)$ = 3.64, d = .61), (3) Social Inclusion domain (β = .30, $t(144)$ = 3.79, d = .63), (4) Rights domain (β = .41, $t(144)$ = 5.33, d = .90), (5) Material Well-Being domain (β = .30, $t(144)$ = 3.74, d = .63), and (6) QOL Index Score (β = .50, $t(144)$ = 6.97, d = 1.16).

The pattern of coefficients across the QOL domains was similar for data collected through self-report and report-of-others. Nevertheless, adaptive behavior was a small predictor of the Material Well-Being domain in regard to scores based on report-of-others (β = .23, $t(144)$ = 2.89, d = .47). Data analyses further revealed that adaptive behavior had little to no predictive power in respect to Interpersonal Relations, Emotional Well-Being, and Physical Well-Being domains (d's with self-report and report-of-others ranged from .10 to .45).

Table 5 further reveals that adaptive behavior was best at predicting scores in the Personal Development domain on both parts (R^2 = .37, $F(1, 144)$ = 86.86 and R^2 = .38, $F(1, 144)$ = 91.24). The coefficients of determination were evaluated based on conventional guidelines: small ≥ .02, medium ≥ .13, and large ≥ .26 (Cohen 1988). Findings also showed a medium explanation in regard to the Rights domain (R^2 = .16, $F(1, 144)$ = 28.41 and R^2 = .15, $F(1, 144)$ = 26.87). The coefficient obtained for the composite score (i.e., QOL Index Score) was near the lower border of Cohen's (1988) large range. Adaptive behavior seems to explain 24.70 % [R^2 = .25, $F(1, 144)$ = 48.63 (self-report)] or 23.50 % [R^2 = .24, $F(1, 144)$ = 45.56 (report-of-others)] of the QOL total score.

Table 6 reveals that support needs were less powerful than the adaptive behavior in terms of predicting QOL outcomes based on data from POS self-report as well as report-of-others. In regard to self-report measure, support needs predicted scores in the (1) Personal Development domain (β = −.47, $t(144)$ = −6.39, d = −1.07), (2) Self-Determination domain (β = −.24, $t(144)$ = −2.93, d = −.50), (3) Rights domain (β = −.31, $t(144)$ = −3.89, d = −.65), and (4) QOL Index Score (β = −.35, $t(144)$ = −4.47, d = −.75). In regard to self-report measure, the support needs predicted scores in the (1) Personal Development domain (β = −.47, $t(144)$ = −6.39, d = −1.07), (2) Self-Determination domain (β = −.24, $t(144)$ = −2.93, d = −.50), (3) Rights domain (β = −.31, $t(144)$ = −3.89, d = −.65), and (4) QOL Index Score (β = −.35, $t(144)$ = −4.47, d = −.75). In regard to report-of-others measure, support needs predicted scores in the (1) Personal Development domain (β = −.47, $t(144)$ = −6.39,

Table 5 Regression analyses between quality of life scores (self-report and report-of-others sections) and adaptive behavior score (part 1)

	Self-report section																	
	Personal Development		Self-Determination		Interpersonal Relations		Social Inclusion		Rights		Emotional Well-Being		Physical Well-Being		Material Well-Being		QOL Index Score	
	β	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*
Adaptive behavior	.61**	1.54	.29**	.61	.22*	.45	.30**	.63	.41**	.90	.05	.10	.15	.30	.30**	.63	.50**	1.16
R^2	.37		.08		.04		.08		.16		–.01		.01		.08		.25	
F	86.86**		13.22**		7.29*		14.34**		28.41**		.29		3.12		14.00**		48.63**	
Df	(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)	
	Report-of-others section																	
	Personal Development		Self-Determination		Interpersonal Relations		Social Inclusion		Rights		Emotional Well-Being		Physical Well-Being		Material Well-Being		QOL Index Score	
	β	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*
Adaptive behavior	.62**	1.58	.40**	.87	.13	.26	.29**	.61	.40**	.87	.12	.24	.18*	.37	.23*	.47	.49**	1.13
R^2	.38		.15		.01		.08		.15		.01		.03		.05		.24	
F	91.24**		27.32**		2.42		13.00**		26.87**		2.02		5.07*		8.36*		45.56**	
Df	(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)	

β Standardized coefficients Beta, *d* Cohen's *d* R^2 Adjusted R square, *F* *F*-test, *Df* Degrees of freedom

** $p \leq .001$; * $p < .05$

Table 6 Regression analyses between quality of life scores (self-report and report-of-others sections) and support needs score (part 1)

	Self-report section																	
	Personal Development		Self-Determination		Interpersonal Relations		Social Inclusion		Rights		Emotional Well-Being		Physical Well-Being		Material Well-Being		QOL Index Score	
	β	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*
Support needs	–.47**	–1.07	–.24*	–.50	–.18*	–.37	–.23*	–.47	–.31**	–.65	.04	.08	–.12	–.24	–.10	–.20	–.35**	–.75
R^2	.22		.05		.02		.05		.09		–.01		.01		.00		.12	
F	40.88**		8.56*		4.63*		8.06*		15.10**		.25		2.17		1.50		19.96**	
Df	(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)	
	Report-of-others section																	
	Personal Development		Self-Determination		Interpersonal Relations		Social Inclusion		Rights		Emotional Well-Being		Physical Well-Being		Material Well-Being		QOL Index Score	
	β	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*	*β*	*d*
Support needs	–.47**	–1.07	–.23*	–.47	–.11	–.22	–.29**	–.61	–.22*	–.45	–.01	–.02	–.02	–.04	–.07	–.14	–.31**	–.65
R^2	.22		.05		.01		.08		.04		–.01		–.01		.00		.09	
F	40.84**		7.90*		1.67		13.39**		7.59*		.03		.06		.77		14.74**	
Df	(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)		(1, 144)	

β Standardized coefficients Beta, *d* Cohen's *d*, R^2 Adjusted R square, *F* *F*-test, *Df* Degrees of freedom

** $p \leq .001$; * $p < .05$

$d = -1.07$), (2) Social Inclusion domain ($\beta = -.29$, $t(144) = -3.67$, $d = -.61$), and (3) QOL Index Score ($\beta = -.31$, $t(144) = -3.84$, $d = -.65$).

As with the adaptive behavior, prediction was best with the Personal Development domain (see Table 6). In this QOL dimension, the coefficient of determination was the same under both data collection conditions (i.e., $R^2 = .22$). An R^2 value of .09 or less was generated in all other QOL domains, suggesting that the support needs had little to no explaining power. Likewise, the coefficient of determination obtained for the composite score, the QOL Index, was similar under both data collection conditions [$R^2 = .12$, $F(1, 144) = 19.96$ (self-report) and $R^2 = .09$, $F(1, 144) = 14.74$ (report-of-others)].

Discussion

The purpose of this investigation was to shed light on relationships among measures of adaptive behavior, support needs, and QOL. This research was undertaken to extend both conceptual and practical knowledge, as has been called for by prior researchers (Harries et al. 2005; Schalock and Verdugo 2009; Thompson et al. 2014a; Wehmeyer et al. 2009). Findings from this investigation uniquely contribute to the body of existing literature by analyzing data from three assessment measures (i.e., the ABS, SIS, and POS) collected simultaneously on a sample of Portuguese adults with ID, and by incorporating both self-report and report-of-others QOL measures.

The unique contributions of the current study are related to the scope and context of data collected. First, although many researchers have examined data related to two of the three constructs, a search of PsycINFO (using the keywords support needs, adaptive behavior, and QOL) revealed only one article (i.e., Riches et al. 2009) published in a peer-reviewed journal where measures of all three constructs were collected on the same population. Riches et al. (2009) data were presented in the context of providing evidence to support the construct validity of a support needs assessment scale, the I-CAN. Their discussion of the relationships between the three measures was limited.

The second unique contribution of this investigation is related to the context of Portuguese society. The vast majority of prior researchers using measures of adaptive behavior, support needs, and QOL has collected data in countries with well-established community-based service systems (i.e., systems are widespread and have been developed over multiple decades) compared to Portugal (e.g., see Bossaert et al. 2009; Riches et al. 2009; Wehmeyer et al. 2009). Examining relationships between assessments of adaptive behavior, support needs, and QOL in the Portuguese context provides insight regard the extent to which prior research findings and conclusions may be generalizable to countries that are in earlier stages of community-based services and inclusive practices.

The first phase of our research involved examining the direction and extent of correlation among the three measures. Based on prior conceptual and empirical literature (Chou et al. 2013; Claes et al. 2009, 2012; Harries et al. 2005; Nota et al. 2007; Thompson et al. 2004), we hypothesized that there would be moderate correlations between QOL, adaptive behavior, and support needs. Moreover, we anticipated that the intensity of support needs would be

negatively correlated with the adaptive behavior proficiency and QOL, and that the adaptive behavior would be positively correlated with QOL. Results of correlation analyses supported the hypothesized relationship between the three constructs.

The ABS domains showed a moderate relationship with the SIS subscales. Previous researchers have reported similar levels of correlation between measures of adaptive behavior and support needs (e.g., Claes et al. 2009; Harries et al. 2005; Thompson et al. 2004). Results of our research highlighted that greater adaptive behavior skills correlate with lower levels of support needs. This finding is not surprising given how adaptive behavior and the support needs are conceptualized. In this regard, while the ABS provides a measure of achievement related to skills needed to successfully function in daily life activities (Nihira 2012; Santos and Morato 2012b), the SIS evaluates how much assistance or support a person needs to participate as a member of an interdependent, contemporary society (Thompson et al. 2004, 2009). It is noteworthy that the correlations between SIS/ABS domains were higher than either the SIS/POS or ABS/POS correlations. Nevertheless, prior researchers have found that level of personal competence as well as intensity of support needs are associated with QOL (e.g., Chou et al. 2013; Claes et al. 2012; Nota et al. 2007), and this finding held true in our investigation as well.

The QOL Index Score of the POS showed a moderate correlation with six (i.e., self-report) and seven (i.e., report-of-others) of the 10 adaptive behavior domains on the ABS. The domains of Self-Direction and Responsibility showed a weak, although significant, correlation with the QOL construct. These findings support that there is a positive relationship between QOL and adaptive behavior. The results are consistent with prior investigations showing that people with higher levels of personal competence enjoy a higher QOL (Kraemer et al. 2003; Schalock et al. 1994).

The SIS subscales also showed a relationship with the QOL Index Score. The higher correlations were observed among Home Living Activities (i.e., self-report and report-of-others) and Community Living Activities (i.e., self-report). The finding that Employment Activities showed practically no correlation with the QOL Index Score was not surprising given that people with ID involved in this study were all unemployed. Moreover, very few people with ID have a paid job in Portugal (Sousa et al. 2007). Although the finding that level of support needed is not associated with employment outcomes provides evidence of an equitable service system, in this case it is equitable only because the needs of all of the people are being so poorly addressed. In the Portuguese context, much effort needs to be invested in changing the general population's perceptions regarding the capacity of people with ID to meaningfully contribute their talents to the larger society. Employment has not traditionally been perceived as important for this population in Portugal; therefore, many respondents (both people with ID and the people who knew them) may have had difficulty envisioning support needed by people with ID to obtain and maintain employment. It would appear that getting paid jobs for people with ID may be a less immediate goal than providing them with increased opportunities to make contributions that the general population recognizes and values. As perceptions in Portugal change regarding the usefulness of people with ID to society, it is

likely that the importance of supports that empower people to make positive contributions to their world will be more fully recognized, and the relationships between employment supports and QOL outcomes will become clearer.

Findings also showed that the QOL domains associated with Emotional Well-Being, Physical Well-Being, and Material Well-Being were not correlated or had a weak correlation (self-report) with SIS scores. This is not surprising given that well-being is an internal disposition related to satisfaction with one's life conditions and status (Schalock and Verdugo 2002; Schwartz and Rabinovitz 2003). Logically, perceptions of well-being should be related to the alignment of supports received with support needed, but not related to the intensity of support needed. The SIS measures intensity of support needed, but it does not provide an indication of whether the supports than one receives are well aligned with the supports that one needs.

Findings from this investigation highlighted that Personal Development domain of the POS was best predicted by both adaptive behavior and support needs scores. This result was expected given that Personal Development domain is related to indicators and descriptors that also assess daily life activities. According to Schalock and Verdugo (2002), the domain includes: education (i.e., achievements, status), personal competence (i.e., cognitive, social, practical), and performance (i.e., success, achievement, productivity).

The most prominent finding from this investigation is that people with greater adaptive skills and less intense support needs experience a higher QOL. This finding highlights the presence of inequities in the service system in Portugal. It is clear that those with higher SIS scores (more intense support needs) and lower ABS scores (fewer adaptive skills) are experiencing a relatively lower QOL compared to other adults with ID that are receiving services from Portugal's human service system. Although the service system undoubtedly has room for improvement in terms of meeting the needs of all adults with ID, the findings from this investigation strongly suggest that people with the most intense support needs and the fewest skills are the most vulnerable in terms of experience a poor QOL.

Future investigators should directly focus on the relationship between QOL and the extent to which people's support needs are properly addressed. We predict that people - regardless of their skill levels and the intensity of support they require - with relatively few unmet supports needs will experience a higher QOL that those whose support needs are largely unaddressed. According to the social-ecological understanding on disability, the critical difference between people with ID and the general population is that people with ID need extra supports to successfully participate in daily life activities in community settings (Schalock et al. 2010a; Thompson et al. 2009). Public policies, services, and professional practices that are directed towards addressing the support needs of people with ID do so by (a) modifying environments and activities so that people with ID can fully participate, and (b) arranging and providing individualize supports that enable people to successfully participate in community-based settings and activities. In an ideal service system, the intensity of support needed would be largely irrelevant to QOL. A service system that was truly responsive to people's support needs would strive to assure that all people's

needs are met. Therefore, a critical indicator of a service system where the support needs of all people were successfully addressed would be negligible differences in QOL among people with differing intensities of support needs.

Regarding the third purpose of the research, there was a high degree of consistency between the QOL measures based on self-report and report-of-others. This is encouraging because it shows that staff members who provided the proxy reports were sensitive to and aware of the life experiences and perspectives of the people with ID whom they support. Given that QOL is such a personal and subjective construct, it is important to get more than one perspective. This is especially true when measures of QOL have the potential to influence public policy and decision-making (Bonham et al. 2004; Claes et al. 2009; van Loon et al. 2010).

The importance of getting the perspectives of people with ID, whose interests the service system is supposed to serve, is self-evident. Who is in better position to evaluate one's QOL than oneself? In our view, however, no single perspective on QOL is totally sufficient because so many extraneous factors can influence QOL ratings. For instance, some people may have a natural proclivity to be extremely positive or extremely negative about their life circumstances. This could apply to all people, both with and without disabilities. Of course, there is a risk that key stakeholders may respond in way they believe will please the interviewer, just as there is a risk that stakeholders might respond differently depending on whether they are having a good or bad day. The critical point for those collecting QOL data to remember is that both people with ID and their proxies have valuable perspectives to share. Richer insights into a person's QOL are most likely achieved when there has been thoughtful consideration of different viewpoints and interpretations.

Differences in perspectives between people with ID and support staff confirm the importance of the active participation of those adults in the assessment process, and can be useful in terms of enhancing communication and problem solving. For instance, Claes et al. (2009) reported people with disabilities indicated they needed less intense supports compared to their staff members. In this regard, two reasons can be given, namely (a) people with disabilities were unaware of their vulnerabilities and needs for assistance or (b) staff members were over-protective and perceived people as less competent than they actually were. Individual cases differ, and in some instances it may be that with certain activities in life a person needs less intrusive supports, and in other activities the same person needs more intense supports. The critical point is that multiple perspectives are essential to getting the most accurate understanding of people's needs and outcomes, and multiple perspectives provide the best basis for discussion and problem-solving among planning team members.

The findings of this investigation have practical implications for services, practices, and policies in the field of ID. The three assessment measures that were the focus of this investigation can be useful to monitoring individual progress and establishing personalized support plans. Using multiple assessment tools results in a multidimensional evaluation that provides guidance on how to address the person-environment mismatch that sets people with ID apart from the general population (Bonham et al. 2004; Claes et al. 2009; van Loon et al. 2010). In the field of ID, there is a need to gather information relative to people's strengths and weaknesses

(ABS), types and intensity of support needed (SIS), and personal outcomes associated with QOL (POS). Data from assessments should provide information that leads to thoughtful support planning, efficient use of resources, and ultimately an enhanced QOL for people with disabilities.

Moving the service system from a defect/disability/pathology orientation to a social-ecological orientation will undoubtedly take time. It is unquestionable, however, that the overarching goal must be "nothing short of widespread opportunities for people to engage in dignified and meaningful life activities that are based on their personal priorities and individual support needs" (Thompson et al. 2014a, p. 96). Findings from this investigation confirm that adaptive behavior, support needs, and QOL are related constructs, and multiple measures are needed in order to understand people holistically. If comprehensive information were collected on a widespread basis, the service system could move toward an intervention model similar to the one advocated by van Loon et al. (2010). Namely, information regarding inputs (goals, choices, perspectives, adaptive behavior skills, support needs), throughputs (personalized supports planning and implementation based on consideration and valid measures of QOL outcomes, support needs, and personal competency), and outputs (enhanced personal outcomes) could be used to inform professional practice as well as public policy.

Public policy and disability service reform should be focused on improving the QOL of citizens with ID. Data relevant to evaluating and monitoring social policies and societal practices (Brown et al. 2009) should drive changes in policy and service provision. In Portugal and elsewhere, it is urgent to inform practitioners (i.e., education and rehabilitation) about the application of the QOL model (Brown et al. 2009) and ethical principles in the field of ID (van Loon et al. 2010). It's also vital to build an equitable system of resource allocation based on differences in individual support needs and environmental circumstances. Finite public resources must be used efficiently and directed in ways that promote full participation in all dimensions of community life (Thompson et al. 2014a). Such practical approaches would assure that Portuguese education and rehabilitation services evolve in ways that encourage a more inclusive society, where people with ID are engaged as full citizens and valued members of their communities.

Limitations

Our investigation had several limitations and the results should be interpreted with these in mind. First, we note the size of our sample and the fact that it was a convenience sample. Data from a truly representative sample of people with ID in Portugal might provide different results. Also, the sample was skewed because people with ID involved in this study were all unemployed. Although this is typical of people in Portugal, it is not typical in other countries with more developed community-based service systems. Additionally, all of the people with ID in this study were able to communicate their preferences and opinions, and future investigations into differences in

QOL reports from consumers and proxies are needed which individuals with ID with more limited communication skills.

Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research has been approved by the ethics committee of the Centro Hospitalar de São João-Porto.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare that they have no conflict of interest.

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