

Quality of Life and Resilience in Adolescents with a Mobility Disability

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Objectives To examine the influences from life stress and the hypothesized protective variables of social competence, family functioning, and peer social engagement on quality of life (QL) in adolescents with mobility disabilities within a stress–resilience model. **Methods** Variables were assessed with questionnaires completed by 159 adolescents with a mobility disability (aged 11–18 years) and their parents. Both more subjective and objective QL measures were completed using both adolescent and parent reports. **Results** Increased life stress was associated with worse QL. Hypothesized protective variables were used to explain significant variance in more subjective, but not objective, measures of QL beyond covariates and life stress. The hypothesized protective variables, however, did not moderate the effects of life stress on QL. There was a cumulative effect from the hypothesized protective variables such that adolescents with more of these factors had more subjective QL than those with just one factor, regardless of the specific factor. **Conclusions** Consistent with the tested model, interventions to improve QL in adolescents with a mobility disability may focus on reducing life stress and developing resilience by enhancing a variety of personal and social resources.

Key words adolescence; disability; quality of life; resilience.

Quality of life (QL) has become a commonly used concept as well as an increasingly active research field, yet no consensus exists on what QL is (Koot, 2001). Although definitions have sprouted to become almost “researcher-specific” (Borthwick-Duffy, 1989), most commonly QL is construed as a multidimensional latent construct traceable to the World Health Organization’s (WHO’s) definition of health including physical, mental, and social components (Spieth & Harris, 1996). Nonetheless, several issues must be dealt with in measuring QL.

Two approaches of studying QL have emerged. Disease-specific QL is applicable only to individuals with a given disease and typically addresses symptoms, functional status, and psychological and social functioning (Spieth & Harris, 1996). It is often used in medical/health care to measure burden from specific diseases in patients; however, it prevents QL comparisons among different diseases and with healthy individuals (Koot, 2001). Generic QL takes a broader view of life, including,

for example, considerations for relations with family and friends, job or school situations, and goals in life (Koot, 2001). Generic QL can and should be applied to both healthy and ill individuals to express the notion that ill individuals are more than their illness (Wallander, 2001). For these reasons, this study included generic measures of QL. In addition, QL measures can consist of both subjective and objective components. This distinction addresses the content of the measure, not the source of the information per se (Cummins, 2001). Subjective measures typically tap into one’s satisfaction with life, whereas objective measures request factual information about one’s life. Measures of QL therefore can vary on a dimension from subjective to objective. This study employs measures of QL that are both more subjective and more objective in nature.

Although QL has become of increased interest for individuals with disabilities, few studies have focused on adolescence or on disabilities *other than* intellectual

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(Wallander, 2001). Hughes and Hwang (1996) identified 87 studies on QL of individuals with disabilities, but only 5% targeted those with a disability *other than* intellectual. One under-researched category of disabilities is mobility disabilities, which stem from impairments in the muscular or skeletal system such that locomotion, body disposition, or dexterity is hindered (WHO, 1980). Common medical diagnoses that include mobility disabilities are spina bifida, cerebral palsy, juvenile rheumatoid arthritis, and spinal cord injury. Albeit mobility-disabling conditions have different etiologies, they have numerous commonalities, especially in their psychosocial implications, such as experienced pain, missed days of schools, frequent health care visits, and social isolation. People with mobility disabilities therefore are at increased risk of reduced QL.

Whereas QL has rarely been addressed directly in research on mobility disabilities as a group, some studies of specific diseases provide indirect information. For example, compared with preadolescent children without spina bifida, same-aged children with spina bifida were reported to be more socially immature and dependent on adults, less physically active, less likely to make independent decisions, and less engaged during observed family interactions (Holmbeck et al., 2003). Moreover, a recent study in Hong Kong that assessed QL in adolescents with physical disabilities, many of which involved mobility, reported they scored significantly lower on objective QL but not on subjective QL compared with a group without disabilities (Chow, Lo, & Cummins, 2005).

Another neglected issue in research on QL and disability is adolescence. The average age of the individuals targeted in the review of Hughes and Hwang (1996) was 33 years, underscoring the dearth of information about youth. Adolescence is marked by biological, social role, and psychological changes (Holmbeck, 2002), and how adolescents adapt to these changes may set the stage for the transition into adulthood. If the additional stress of a disability negatively impacts adolescence, it is important to learn if this can be altered or buffered.

The basic premise of a stress–resilience framework is that not all individuals exposed to stressors experience negative psychological effects. Rutter (1987) proposed that “resilience is concerned with individual variations in response to risk. Some people succumb to stress and adversity whereas others overcome life hazards” (p. 317), thereby showing resilience. Different positive outcomes in the face of adversity can indicate resilience, such as lack of psychopathology, life satisfaction, and QL. A mobility disability produces intermittent,

frequent stressors. If characteristics of resilient individuals with a mobility disability can be identified, it may be possible to improve the QL of those who experience stress by bolstering their resilience.

Characteristics fostering resilience are often referred to as protective (Masten & Reed, 2002). Although it is generally accepted that risk factors have an exponential relationship with detrimental outcomes, little is known about how protective factors contribute to resilience. For example, Rutter (1979) found that having any one of six risk factors for childhood psychiatric disorder did not pose an increased risk compared with having none of these; however, having any two risk factors created a four-fold increase and any four risk factors increased the chances of psychiatric disorder ten-fold. It is possible that there is a threshold for how many protective factors need to be present in order for an individual to show resilience, but this has yet to be investigated.

It is important to identify protective variables that can be modified, and the current research focuses on one each within three levels of protection: self, family, and the broader social environment (cf. Wallander & Varni, 1998). Derived from ecological models (Bronfenbrenner, 1992; McLeroy, Bibeau, Steckler, & Glanz, 1988), these levels can be construed as expanding circles of protection around the individual. First, we consider *social competence* as a personal protective factor, including, for example, cooperation, assertion, responsibility, and self-control. These competencies enable one to access social resources. Secondly, we consider *family functioning*, which incorporates supportive relationships, cohesion, and adaptability with parents and siblings (Hanson, 2001). A family that continues to function well under stress can protect against adverse effects on its members and maintain their QL. Finally, we consider, *peer social engagement* (Schaffer, 1996). Relationships with peers are significant in adolescence (Holmbeck, 2002) but may be challenging to achieve for those with a disability.

This study examines QL in adolescents with a mobility disability within a stress–resilience framework. The following hypotheses were tested: (a) Exposure to life stressors will be negatively associated with QL; (b) the relationship of life stressors with QL will be moderated by the following factors, indicating protective effects: social competence, family functioning, and peer social engagement; and (c) there will be a cumulative effect from the protective factors such that in each case those with one more protective factor will experience better QL than those with one less protective factor.

Methods
Participants

About 2,000 potentially eligible adolescents, aged 11–18 years, were identified by agency staff from the service records of the Departments of Rehabilitation Services as well as Education in a southern state and mailed information about this study. Because of confidentiality regulations, these records were not available to the investigators and no information could be discerned on nonparticipants. Parents/guardians of 500 agreed to be contacted, and 341 were screened to meet inclusion criteria. A functional definition of mobility disability was used such that to be included, the adolescent had to have a disability in locomotion, body disposition, or dexterity due to a skeletal or muscular impairment rated at or above the “difficulty in performance level” (severity category ≥ 1) based on the International Classification of Impairments, Disabilities, and Handicaps (ICIDH; WHO, 1980) that was diagnosed in the first decade of life. ICIDH was in place when this research was conducted but has since been replaced by the International Classification of Functioning (ICF; Lollar & Simeonsson, 2005). Because this was a statewide community rather than clinic-based sample, formal charted medical diagnoses of the participants could not be obtained. On the basis of parental report (PR), the three most common conditions were in order cerebral palsy, spina bifida, and scoliosis. Adolescents with a mobility disability with comorbid cognitive and/or communication disabilities were enrolled in this overall sample. Because self-report measures needed to be used in this study, 182 participants with significant enough cognitive and/or communication impairment such that they could not complete self-report measures were excluded from the analysis. This left 159 providing data for this study. The mean adolescent age was 14.71 years ($SD = 2.14$); 48% of the sample were females; 61% were Caucasians and 38% were African Americans; and 40% had a family income $< \$20,000$, 32% had in the range of $\$20,000$ – $\$49,999$, and 18% had $\geq \$50,000$. Information on adolescents’ disability is in Table I.

Procedure and Measures

Assessments were performed at home in more than 90% of the cases. Parents signed the consent form while adolescents provided assent. Adolescents and parents were interviewed separately and responses were not shared. The following measures were administered as part of a larger 2.5-hr assessment protocol. Items were read to participants by a trained interviewer to provide a consistent administration regardless of reading ability. Flash

Table I. Disability Status

	%	n
Dependence on another person at least some of the time		
Mobility in home	45	72
Mobility in community	63	100
Mobility-fine motor	32	51
Self-care hygiene	45	72
Self-care dress	46	73
Communication expressive	12	19
Communication receptive	13	21
Any area	64	102
Locomotion aid used ^a		
None	29	46
Wheelchair or scooter	58	93
Walker, crutches, or cane	35	55
Brace	23	37
Other equipment	17	27
Distance able to move without equipment		
Unable to move any distance	38	60
Length of a room	6	10
Length of the house	8	13
Length of a Block	22	35
1 mile	8	13
>1 mile	18	29
Special education enrollment		
None	28	44
Orthopedic Handicap	19	30
Multi-Handicap	12	19
Other Health Impaired	11	18
Mental Retardation or Learning Disability	19	31
Other	11	17

n = 159.
^aBecause more than one device may be used, these categories are not mutually exclusive.

cards were shown with response choices, and indicated responses were marked by the interviewer.

Demographic Information

Demographic information was obtained with a standard form completed by the parent, requesting information on child age and race/ethnicity, parent age and marital status, and family income and members living in the household. Family income was coded into five categories ($< \$10,000$; $\$10,000$ – $19,999$; $\$20,000$ – $29,999$; $\$30,000$ – $49,999$; or $\geq \$50,000$).

Disability Status Information

Disability status information was obtained for descriptive purposes and for use as a covariate in the planned hypothesis tests based on PR using the following factors. An information form requested the following indications: (a) which, if any, of several possible devices was used by the adolescent to aid locomotion; (b) what

distance the adolescent could move without any aid; (c) which, if any, special education programs enrolled the adolescent; and (d) when the impairment causing the mobility disability was first present. Severity of disability was assessed with a rating form developed herein based on the WHO (1980) classification system. In each of the domains of (a) mobility in home, (b) mobility in community, (c) mobility-fine motor, (d) self-care hygiene, (e) self-care dressing, (f) communication-expressive, and (g) communication-receptive, the parent indicated the adolescent's level of independence-dependence using a 7-point scale (0 = complete independence, 6 = complete inability to perform regardless of help and equipment), where each scale point had behavioral anchors. A total score summed across the seven domains defined overall disability status (range 0–42). In addition, a dichotomous classification was made for each domain in terms of dependence on others. A classification "Yes (1)" was made if the adolescent received a rating of ≥ 3 (3 = dependence on a person some of the time); a lower rating yielded a classification "No (0)."

QL

QL was measured in two ways, representing a more subjective and a more objective approach. First, the Quality of Student Life Questionnaire (QSLQ; Keith & Schalock, 1995), which exists in both self-report and PR versions, was administered as a more subjective QL measure. Suitable for students from junior high school through college age, it is designed to measure QL in adolescents with or without disabilities. Consisting of 40 items, which are rated on a 3-point Likert scale, it produces four subscales (Satisfaction, Well-being and Competence, Social Belonging, and Control and Empowerment), which are combined for a total score. Test-retest coefficients for 2 weeks range from $r = .72$ to $.92$ for the total score and the individual scales and Cronbach alpha coefficients range from $.76$ to $.91$ (Watson & Keith, 2002). Both the adolescent report (AR) and PR report versions were used herein, and Cronbach alpha coefficients for the study sample were $.81$ and $.83$, respectively. They were designated as subjective QL herein. Second, QL was also measured in a more objective manner with two items from the QL Module of the Behavioral Risk Factor Surveillance System (BRFSS; Centers for Disease Control and Prevention, 1994), administered to both adolescents (AR) and parents (PR). These ask how many days during the past 30 days was physical or mental health, respectively, not good for the adolescent. Employed in on-going population surveillance systems by the Centers for Disease Control and Prevention (CDC), analyses have supported the reliability and construct

validity of each item with adults (Hennessy, Moriarty, Zack, Scherr, & Brackbill, 1994). For example, a reasonable association with the SF-36 has been reported and 2-week test-retest reliability has been $r = .75$ or higher with adult samples (Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2003; Andresen, Fouts, Romeis, & Brownson, 1999). Although it seems reasonable to apply these relatively concrete items also to adolescents, the BRFSS has not been used previously with this age group. A preliminary evaluation with this adolescent sample could be conducted using other measures administered in the project protocol. Correlations between the number of physical symptoms out of 148 endorsed as present in the past week (Wahler, 1983) and the BRFSS physical health item were significant but modest ($r = .27$ for AR and $.36$ for PR; $p < .001$ for both). Similar correlations were obtained between the Child Behavior Checklist (CBCL) Internalizing score (Achenbach, 1991) and the BRFSS mental health item ($r = .26$ for AR and $.35$ for PR; $p < .001$ for both). These findings provide some validity support for the use of these items with this sample. The sum of the two BRFSS items was designated as objective QL herein.

Life Stressors

Life stressors were measured by combining standardized scores from two instruments. First, Adolescent Disability-Related Life Events Survey (Wallander, 1997) asks which of 66 different disability-related stressors occurred in the past 3 months and how each event made him/her feel, using a 4-point response scale (0 = not applicable/good/neither good nor bad, 3 = very bad). A total negative impact score was calculated as the sum of these item ratings. Four-week test-retest reliability has been reported at $r = .74$ (Wallander, 1997). Second, the Adolescent Life Events Survey-Revised (ALES; Cole-Beamon & Wallander, 1992) asks which of 69 stressful life events have occurred in the past 3 months. The ALES was created to be applicable to a broader range of adolescents and especially including lower socio economic status (SES) youth. The adolescent indicates how each event made him/her feel, using a 4-point scale (1 = not applicable/good/neither good nor bad, 4 = very bad). A total negative impact score was calculated. The 8-week test-retest reliability coefficient is $r = .95$ for the total score, and construct validity is supported by significant correlations between ALES and scores on a standard physical symptom checklist and the depression, anxiety, and global psychiatric symptom scores on the Symptom Check List 90-R (Cole-Beamon & Wallander, 1992). Cronbach alpha was $.93$ for the study sample across all 135 items of the combined score.

Social Competence

Social competence was measured with the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) completed using PR. It has 40 items, with three behavioral frequency responses (never, sometimes, and very often) addressing cooperation, assertion, responsibility, and self-control. Internal consistency for the social skills total score has ranged from .83 to .94 and 4-week test-retest reliability was $r = .87$. Expected relationships with other measures of similar constructs support the validity of the SSRS (Gresham & Elliott, 1990). Cronbach alpha coefficient was .89 for the study sample.

The remaining two hypothesized protective factors were measured with two subscales of the Offer Self-Image Questionnaire Revised (OSIQ-R; Offer, Ostrov, Howard, & Dolan, 1992) completed by the adolescent. The OSIQ is a commonly used questionnaire for adolescents aged 13–18 years, which uses a 6-point response scale across all items (1 = “describes me very well,” 6 = “does not describe me at all”). (1) *Family functioning* was measured with the Family Functioning subscale, which consists of 19 items that assess feelings about the parents, relationship with parents, and emotional atmosphere in the home. Lower scores indicate tension and an unsupportive atmosphere and higher scores positive feelings and supportive atmosphere. Coefficient alpha was .83–.90 for different normative samples of adolescents, whereas it was .77 for the study sample. (2) *Peer social engagement* was measured with the Social Functioning subscale, which consists of nine items that evaluate friendships and interpersonal relationships. A low score is an indication of loneliness, isolation, and an uneasiness socializing with peers, whereas a high score indicates the presence of meaningful relationships with peers. Coefficient alpha has been reported to be .68–.76 for different samples of adolescents, whereas it was .51 for the study sample. Extensive research provides support for the validity of the different OSIQ-R subscales (Offer et al., 1992).

Data Analysis

Hypothesis 1

Hierarchical regressions were performed with each of the four QL variables serving as the dependent variable in separate analyses. Covariates were entered first, followed by life stress. To determine which variables would be entered as covariates in this and subsequent hypothesis tests, we performed two regressions for each QL dependent variable. Demographic covariates were considered in the first regression, which include race, age, gender, and family income. Disability-related covariates were considered in the second set of regressions, which

include overall disability, communication others needed, and age when disability was noticed. Family income, overall disability, and communication others needed were significantly related to at least one of the dependent variables. Although age was not a significant covariate, it was also included in subsequent hypothesis tests because of the broad, age range in the sample. Thus, four variables were entered as covariates in the analyses.

Hypothesis 2

Hierarchical regressions were completed for each of the four dependent QL variables to test for moderation effects by social competence, family functioning, and peer social engagement in the relationship between life stress and objective and subjective QL. Following Baron & Kenny (1986), covariates were entered first, then the life stress variable, followed by social competence, family functioning, and peer social engagement as the hypothesized protective variables. Interaction terms between life stress and each of the hypothesized protective variables were entered on the last step.

Hypothesis 3

Different cut points were explored to establish what constituted the presence of a protective variable, but the results for using the upper quartile as an indication of the “presence” of protective variables are presented here (using a median split produced highly similar findings). Participants were assigned a value of 1 (present) if the score on the variable was above the 75th percentile and 0 (not present) if not. A score was then calculated indicating how many of the three protective variables were present, thus creating groups with zero ($n = 81$), one (51), two (22), and three (5) variables present. Because the group sizes were highly unequal, two one-way ANOVA sets were performed for each dependent variable (nonparametric Kruskal–Wallis tests yielded the same conclusions as reported herein). The first ANOVA set combined the groups with two and three variables present. The second ANOVA set excluded the group with three variables present to remove outliers. Because negligible differences were found, the post-hoc analyses were only performed for the first ANOVA set. Post-hoc testing used the Hochberg’s GT2 adjustments because this does not assume equal group sizes. Homogeneity of variance was confirmed in all cases with the Levene test.

Results

Correlations and Descriptive Statistics

As can be seen in Table II, significant positive Pearson correlations were found among objective QL-AR, objective

Table II. Pearson Correlations among and Descriptive Statistics for Study Variables

	1	2	3	4	5	6	7	8	9	<i>M</i>	<i>SD</i>	Sample range
1. Objective QL-AR	–									52.72	10.74	0–60
2. Objective QL-PR	.42**	–								51.35	12.31	0–60
3. Subjective QL-AR	.21**	.20*	–							90.69	10.08	63–113
4. Subjective QL-PR	.12	.21**	.57**	–						90.60	10.37	62–119
5. Life stress	–.49**	–.29**	–.35**	–.25**	–					–.07 ^a	1.55	–1.98–4.90 ^b
6. Social competence	–.04	.02	.33**	.48**	–.07	–				57.97	10.35	28–80
7. Family functioning	.22**	.11	.60**	.35**	–.38**	.22**	–			94.24	12.56	51–114
8. Peer social engagement	.24**	.18*	.55**	.31**	–.40**	.21**	.47**	–		40.72	7.17	13–54
9. Overall disability	.03	.00	–.22**	–.19*	.04	–.13	.01	–.06	–	1.44	1.17	0–4.71
10. Age	–.05	–.08	.04	.06	.20*	.02	–.13	–.09	–.01	14.71	2.14	11–18

QL, quality of life; AR, adolescent report; PR, parent report.

^aCombined z-score mean.

^bz-score.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

QL-PR, and subjective QL-AR. Thus, all but one of the correlations among the QL variables were significant, but of small to moderate size. Table II also presents the bivariate correlations between the continuous variables measured in this study in addition to the *M* and *SD* of all the variables.

Relationship Between Life Stress and QL (Hypothesis 1)

Results pertaining to Hypothesis 1 are summarized in Table III, up through Step 4. More reported life stress was consistently significantly associated with worse subjective QL-AR, subjective QL-PR, objective QL-AR, and objective QL-PR after controlling for the covariates. Life stress explained an additional 5–18% of the variance in the QL variables.

Moderators of the Life Stress–QL Relationship (Hypothesis 2)

As can be seen in Table III, Step 5, social competence, family functioning, and peer social engagement as a set did not significantly predict variation in either objective QL variables. Likewise, there were no significant interactions (see Step 6), indicating these variables did not moderate the relationship between life stress and either objective QL variables. However, the protective variables explained a significant additional 24% of the variation in subjective QL-PR, over and beyond the covariates and life stress ($F[17, 141] = 4.99, p < .001$). The regression coefficients at Step 6 indicated that having higher social competence and family functioning uniquely predicted better subjective QL-PR. However, because the interaction terms did not add significant explained variation (see Step 6), none of the variables were found to moderate

the relationship between life stress and subjective QL-PR. The protective variables also explained a significant additional 34% of the variation in subjective QL-AR beyond covariates and life stress ($F[17, 141] = 11.41, p < .001$). The regression coefficients (see Step 6) indicated that overall disability, social competence, family functioning, and peer social engagement were unique predictors of better subjective QL-AR. Because the R^2 -change attributed to the interaction terms (see Step 6) was not significant for subjective QL-AR, there was no moderation indicated.

Cumulative Protective Factors and QL (Hypothesis 3)

There were no differences among groups in objective QL based on the number of protective variables present. However, differences among groups were found for both subjective QL variables (PR: $F[2, 156] = 16.31, p < .001$; AR: $F[2, 156] = 28.20, p < .001$). The means for the different groups are plotted in Fig. 1. Post-hoc tests indicated that significant differences existed among all groups for both subjective QL-PR and subjective QL-AR. In all cases, having more of the protective variables present was associated with better QL.

Discussion

The major aim of this study was to examine stress and resilience influences on QL in adolescents with mobility disabilities. Both AR and PR were used to assess aspects of QL that were more subjective as well as objective. Even though pros and cons exist for different approaches to assessing QL, including both subjective and objective perspectives and two reporting sources offer a more complete perspective on QL. In addition,

Table III. Hierarchical Regression Models Predicting Quality of Life while Controlling for Income, Disability, and Age

Step, variables entered (number of variables)	Objective QL-PR		Objective QL-AR		Subjective QL-PR		Subjective QL-AR	
	ΔR^2	$F\Delta$	ΔR^2	$F\Delta$	ΔR^2	$F\Delta$	ΔR^2	$F\Delta$
1. Income variables ^a (5)	.08*	2.63*	.10**	3.31**	.01	.28	.03	.93
2. Disability variables (2)	.00	.29	.00	.30	.00	3.04	.07**	5.93**
3. Age (1)	.00	.42	.00	.00	.00	.63	.00	.57
4. Life stress (1)	.05**	8.13**	.18***	37.09***	.06**	10.24**	.10***	18.99***
Significant predictors at step 4 (β)	Life stress = $-.23^{**}$		Life stress = $-.46^{***}$		Life stress = $-.27^{**}$		Life stress = $-.34^{***}$	
Overall Model R^2 from Steps 1–4	$R^2 = .13^*$ $F = 2.53^*$		$R^2 = .28^{***}$ $F = 6.45^{***}$		$R^2 = .11^*$ $F = 2.10^*$		$R^2 = .21^{***}$ $F = 4.26^{***}$	
5. Potential moderator variables ^b (3)	.01	.37	.01	.59	.24***	18.04***	.34***	35.64***
6. Interaction terms ^c (3)	.02	.87	.01	.75	.00	.21	.01	1.55
Significant predictors at Step 6 (β)	Life stress = $-.20^*$		Life stress = $-.44^{***}$		Social competence = $.39^{***}$		Overall disability = $-.16^*$	
					Family functioning = $.19^*$		Social competence = $.13^*$	
							Family functioning = $.41^{***}$	
							Peer social engagement = $.28^{***}$	
							Life stress \times social competence = $-.12^*$	
Overall Model R^2 from Steps 1–6	$R^2 = .16$ $F = 1.74$		$R^2 = .30^{***}$ $F = 4.09^{***}$		$R^2 = .36$ $F = 5.26^{***}$		$R^2 = .56^{***}$ $F = 11.91^{***}$	

^aIncome effect was coded into five categorical variables, Income1 < \$10,000; Income2 = \$10,000–19,999; Income3 = \$20,000–29,999; Income4 = \$30,000–39,999; Income5 = \$40,000–49,999; Income6 > \$50,000. Income6 is reference group.
^bSocial competence, family functioning, and peer social engagement.
^cThe four interaction terms include life stress \times social competence, family functioning, and peer social engagement, respectively.
* $p < .05$. ** $p < .01$. *** $p < .001$.

this study indicates that more subjective and objective aspects of QL are moderately and positively related. This suggests that they measure related, yet different, aspects of QL, and both should be considered when assessing QL.

It was not an explicit purpose of this study to describe the QL of adolescents with mobility disability. However, it can be noted that adolescents with a mobility disability had a self-reported subjective QL comparable with that reported by Keith & Schalock (1995) for adolescents with varied disabilities (specific learning disabilities, mental retardation, and behavioral disorders) making up one of the norm samples for the Quality of Student Life Questionnaire (normative disability sample $M = 91.2$, current mobility disability sample $M = 90.7$). As expected, both disability samples had lower mean scores than Keith & Schalock’s (1995) general adolescent norm sample ($M = 99.8$, $SD = 11.2$).

Results indicate that life stress significantly predicted QL, even after controlling for covariates. The relationship between life stress and QL was stronger when adolescents reported for themselves, compared with their parents’ reports. This may be due to shared

method variance, as life stress was also measured by self-report or may indicate that individuals have better knowledge about their own experiences than someone else does. Life stress has been associated with numerous negative outcomes such as poorer mental health (Bovier, Chamot, & Perneger, 2004) and chronic disease (Hanson, 2001). For example, life stress in adolescents with spina bifida was positively related to anxiety and depression, and negatively related to self-esteem (Murch & Cohen, 1989). This study further extends findings on the impact of life stress on adolescents with a mobility disability more generally, and on different aspects of QL.

In light of the strong relationship between increased life stress and reduced QL, identifying factors that support resilience is a logical step for improving QL. However, no moderating effects were found for the three hypothesized protective variables examined in this study. Whereas this may be because these variables do not function as moderators, it must be noted that interactions are difficult to find in nonexperimental research (McClelland & Judd, 1993). Reasons include more measurement error and restricted ranges and reduced variances in nonexperimental compared with experimental studies.

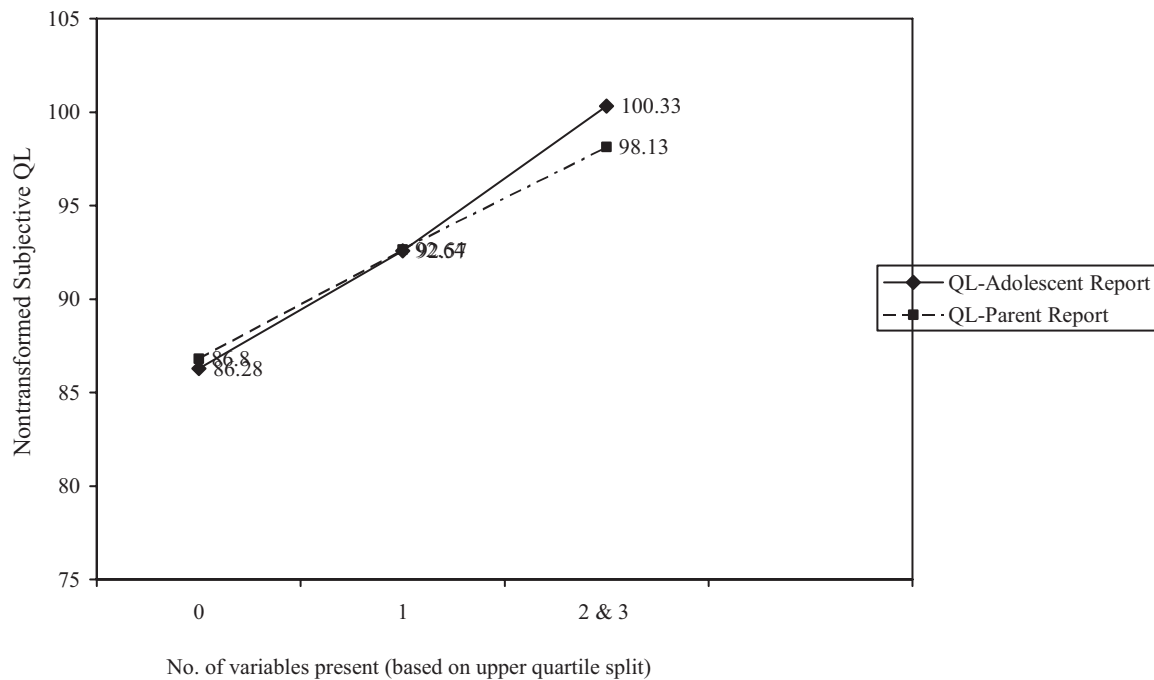


Figure 1. Subjective QL as a function of number of potential protective variables present (Groups 2 and 3 combined). Variables are social competence, family functioning, and peer social engagement. All groups were significantly different. All pairwise follow-up post-hoc tests were performed with Hochberg's GT2.

Although not functioning as moderators of life stress, some variables were found to be positive correlates of QL independent of the level of stress exposure. Social competence and family functioning were positively associated with subjective QL as reported by parents, and family functioning, social competence, and peer social engagement likewise with subjective QL as reported by adolescents. Having supportive relationships has been reported to be associated with positive psychological adjustment in children with chronic health conditions (Drotar, 1997), and the current results support these findings specifically regarding mobility disability.

Moreover, having a high level of personal and social resources, from among social competence, family functioning, and peer social engagement, was generally associated with better QL, both as reported by parents and adolescents, regardless of which specific resource. Adolescents with quantitatively more desirable qualities had better QL, both as reported by parents and the adolescents. This was especially the case for self-reported, more subjective QL. Individuals exposed to stress, yet, apparently still doing well, often have “something” present that others do not. This “something” may take different forms. In this case, a linearly ordered trend appeared to exist between QL and the number of positive characteristics.

Indeed, Rutter (1987) has proposed that resilience research needs to focus on processes and mechanisms, as opposed to identifying discrete desirable qualities.

Consistent with this, rather than looking at this finding as an indication that the three specific variables tested herein are crucial for better QL per se, it may be useful to consider a “more versus fewer” interpretation. Consequently, instead of focusing on one particular characteristic, it may be beneficial to develop a broad range of strengths with adolescents with a mobility disability, because having more of these resources is generally associated with more positive outcomes. In this way, protective factors appear to behave similarly to risk factors (but in the opposite direction) (Rutter, 1979).

Our results are in contrast to one of the few studies on QL in adolescents with physical disabilities. Chow et al. (2005) reported that the participants with physical disabilities scored statistically significantly lower than the control group on objective QL, but not on subjective QL. In addition, no statistically significant correlation was found between objective and subjective QL in the physical disability group. Cultural differences may account for some of these differences as the adolescents in this study resided in the United States and the participants in Chow et al.'s (2005) study were Chinese adolescents enrolled in special schools because of their disabilities. Also, differences in measures and definitions of QL may account for differences in results.

Among the limitations of this study is the absence of a control group. A matched control group of adolescents without mobility disabilities would have provided

important information about the relative standing of the QL of those with mobility disabilities. Access to the participants' medical records was not possible. Therefore, reliable medical diagnoses were not available. However, this is a study using a paradigm other than the medical-categorical paradigm. It is a study of disability as defined by mobility limitations, whatever the reason for these limitations in mobility may be. Clearly, this study takes a continuous perspective on disability, including participants with minor limitations, to inform about the whole range of children with mobility limitations. Information on the eligible adolescents who declined to partake could not be obtained and could not be compared with the participants. The current sample size may not have had enough power to detect the statistical interactions that would have indicated moderating effects. Numerous other potential moderators of life stress (e.g., temperament, coping strategies, and spirituality) should be tested in future research. Finally, this is a correlational study; thus causation cannot be inferred.

QL is a useful construct when considering how to improve the lives of young people with disabilities (Koot & Wallander, 2001). The current findings suggest that because life stress is associated with worse QL, it is important to try to reduce it, whether the stress is disability related or of a more general form. This may require modifications at multiple levels, ranging from family to school, community, culture, and policy. Enhancing personal competence and providing social support may also improve QL. Of interest is the finding that it appears beneficial to have more rather than fewer resources regardless of the particular constellation of those resources. This suggests that interventions could benefit from a focus on strengthening a broad range of qualities rather than just one or two specific ones, but this idea requires further evaluation in intervention outcome studies.

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