

Development and Validation of a Short Form of the Valued Life Activities Disability Questionnaire for Rheumatoid Arthritis

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Objective. To develop and validate a shortened version of the Valued Life Activities disability and accommodations scale (VLA) for individuals with rheumatoid arthritis (RA).

Methods. To shorten the existing VLA measure, item response theory analyses were conducted using data from 449 patients with RA. Next, the resulting 14-item shortened version of the VLA scale (S-VLA) was evaluated by structured interviews among 20 RA patients. Lastly, the S-VLA was administered to 150 RA patients along with other measures, including the Health Assessment Questionnaire (HAQ) and Short Form 36 (SF-36). A random sample of 50 patients completed the S-VLA 2 weeks later to assess reliability. Item statistics were calculated to evaluate correlations between individual items and the S-VLA total score. Correlations between the S-VLA and other measures were used to evaluate validity.

Results. Test-retest reliability was 0.91, while Cronbach's alpha for the S-VLA was 0.95. None of the 14 items was associated with improved alpha coefficients when omitted. All of the items were strongly correlated with the S-VLA total score. S-VLA scores were highly positively correlated with the HAQ ($r = 0.81$, $P \leq 0.001$), patient-reported disease activity ($r = 0.71$, $P \leq 0.001$), satisfaction with abilities ($r = 0.82$, $P \leq 0.001$), and number of days with activity limitations ($r = 0.65$, $P \leq 0.001$). In addition, as hypothesized, the S-VLA was inversely correlated with the SF-36 physical component summary score ($r = -0.78$, $P \leq 0.001$) and the physical functioning ($r = -0.80$, $P \leq 0.001$), role physical ($r = -0.67$, $P \leq 0.001$), and social functioning ($r = -0.72$, $P \leq 0.001$) subscales.

Conclusion. The S-VLA is a short, valid, and reliable instrument that may prove useful for monitoring disability among individuals with RA.

INTRODUCTION

Functional impairment and disability are primary manifestations of rheumatoid arthritis (RA). Functioning is most commonly measured among individuals with RA by the Health Assessment Questionnaire (HAQ) (1). Evidence generally indicates a high degree of reliability and validity for the HAQ (2,3), although it has demonstrated questionable response to change in some groups (4,5). Additionally, some have suggested that the HAQ has limited relevance to day-to-day life because difficulty with specific

physical actions is queried rather than difficulty with activities. Finally, the HAQ measures fairly low-level functioning such as toileting and eating, whereas functional goals of most persons with RA are to maintain high-level functioning such as participating in social and recreational activities.

Use of assistive devices or equipment and personal assistance has been shown to reduce disability (6–8), and both assistive devices and personal assistance appear to be widely used by individuals with arthritis. The importance

Supported by an unrestricted grant from Bristol-Myers Squibb and by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (grants R01-AR-050015 and P60-AR-053308).

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Submitted for publication April 26, 2011; accepted in revised form August 26, 2011.

Significance & Innovations

- The Valued Life Activities disability and accommodations scale (VLA) measures a broader range of activities than traditional disability measures, such as the Health Assessment Questionnaire, is more closely related to satisfaction with functioning and psychological well-being than other measures of function, and items can also be included to assess the use of behavioral accommodations in these activities.
- However, to date, the VLA scale has been used predominantly as an academic research instrument mostly because the VLA requires approximately 15 minutes to complete.
- We developed a short version of the VLA, the S-VLA, that is valid, reliable, and conducive to use in clinical settings, as it requires only 2–4 minutes to complete.

of assistive devices and personal assistance to functioning among individuals with RA is reflected by the assessment of accommodations in the HAQ. However, other behavioral accommodations to improve functioning or reduce disability, such as limiting activities or taking more time to perform them, may be more commonly used than assistive devices or personal assistance (6–10). Therefore, there is a need for a measure that can address a wide range of functioning, and also address behavioral accommodations that are frequently adopted by individuals with RA to improve their function.

The Valued Life Activities disability and accommodations scale (VLA) measures a broader range of activities than traditional disability measures, such as the HAQ (11,12). The theoretical basis of the VLA is the disablement model proposed by Verbrugge et al (13–15). Verbrugge et al proposed that life activities be grouped into 3 categories: obligatory activities, required for survival and self-sufficiency, including activities such as hygiene and self-care, walking inside, walking outside, and using transportation or driving; committed activities, associated with one's principal productive social roles, such as paid work, household responsibilities, and child and family care; and discretionary activities, such as socializing, exercising, engaging in leisure time activities and pastimes, pursuing volunteer work or hobbies, or other activities in which individuals engage for relaxation and pleasure. The VLA assesses difficulty in this broad array of activities. Items can also be included in the VLA to assess use of behavioral accommodations in each activity (10).

To date, more than 1,200 persons with rheumatic diseases have completed the VLA, but its length (15–20 minutes to complete) may inhibit application in large clinical trials and routine practice. A brief version of the VLA might be more feasible to use in both clinical settings and as an outcome measure for intervention studies. Therefore, the primary objective of this study was to develop and validate a shortened version of the VLA (S-VLA) for RA,

while maintaining the coverage of the broad spectrum of activities included in the VLA.

MATERIALS AND METHODS

This was a 3-phase project. Phase 1 focused on item reduction to shorten the existing VLA. Phase 2 consisted of a pilot test to ensure readability, relevance, and comprehension of items and instructions of the new shortened measure. In Phase 3, a formal test of the new measure was conducted to estimate reliability and validity in a clinical setting.

Development and validation of the original VLA scale.

Development of the VLA has been described in detail previously (11). Briefly, the VLA scale was developed based on time/budget studies to determine the impact of arthritis (16), and has been modified and refined over the past decade. Respondents have been asked over multiple waves to identify activities or activity domains in addition to those queried that have been affected by their condition. Revisions have been made to the VLA scale based on those accumulated responses as well as analysis of previous versions of the scale. The version of the VLA scale used in the current analyses includes 34 activity domains. Respondents rate the difficulty of performing each activity, using a 4-point scale corresponding to the response scale of the HAQ (0 [no difficulty] to 3 [unable to perform]). Activities that participants deem unimportant to them or activities that they do not perform for reasons unrelated to RA are not rated and are not included in scoring.

In addition to rating the difficulty in performing each activity, the participants are also asked whether they make 4 types of behavioral accommodations for the activity: limitations in the amount or kind of activity within the domain, taking more time to perform activities, needing help from another person, and using special devices or aids. A scoring method for the VLA incorporating the use of accommodations has been developed and reported (10).

In the present study, scoring on both long and short versions took into account use of behavioral accommodations, as previously reported (10). Items with no difficulty and no accommodations received scores of 0, items with no difficulty but with use of any accommodation received scores of 1, and items with a little difficulty, with a lot of difficulty, or that participants were unable to perform received scores of 2, 3, and 4, respectively, regardless of use of accommodations. The total S-VLA score is calculated as the mean difficulty of all activities rated.

Phase 1: item reduction. *Subjects.* Phase 1 entailed analysis of existing data from 2 waves of the University of California, San Francisco RA Panel. RA Panel members were originally recruited in 1982–1983 from a random sample of rheumatologists practicing in Northern California ($n = 822$). There were subsequently 4 additional enrollment periods in 1989–1990, 1995, 1999, and 2003, during which 203, 131, 122, and 169 individuals were enrolled, respectively. Retention from year to year has averaged 93%; the 7% attrition includes deaths. The

Table 1. Characteristics of samples*

	Phase 1: UCSF RA Panel (n = 449)	Phase 3: validation sample (n = 150)
Women, % (no.)	85.1 (382)	74.0 (111)
Age, mean \pm SD years	59.2 \pm 12.9	55.7 \pm 14.6
White non-Hispanic race/ethnicity, % (no.)	74.8 (336)	62.0 (93)
Duration of RA, mean \pm SD years	18.3 \pm 11.7	12.7 \pm 11.5
HAQ score, mean \pm SD	1.09 \pm 0.74	1.09 \pm 0.77
* UCSF = University of California, San Francisco; RA = rheumatoid arthritis; HAQ = Health Assessment Questionnaire.		

principal data source for the RA Panel is an annual telephone interview. In years 1 and 2 of the current analyses there were 449 and 421 participants, respectively. Characteristics of the RA Panel during year 1 are shown in Table 1. Analyses were first conducted with year 1 data and then validated with year 2 data.

Procedures and analyses. Item response theory (IRT) analyses using ConQuest were conducted to reduce the number of items while still covering the range of activity “difficulty” (e.g., from low-level activities such as self-care to high-level activities such as physical recreation). Items were deleted based on misfit (weighted mean square statistic <0.75 or >1.34 and t -statistics less than -2 or greater than $+2$), logit values that duplicated information provided by other items at similar logit values, and substantive considerations.

Psychometric properties of the S-VLA were compared to those of the original longer version. Internal consistency of each version was assessed with Cronbach’s alpha. Analyses were conducted to establish construct validity by examining correlations of VLA and S-VLA with the following 3 measures, each of which is theoretically related to the construct of valued life activity disability.

The HAQ was developed specifically for and validated in patients with arthritis (1). Respondents rate the difficulty posed by specific actions on a 0–3 scale (where 0 = no difficulty, 1 = some difficulty, 2 = much difficulty, and 3 = unable to perform). Items also assess the need for assistance from others and use of assistive devices. A score ranging from 0 to 3 can be calculated.

The overall impact of RA was measured with a single item (“Considering all the ways your arthritis affects you, rate how well you are doing”), rated from 0 (very poorly) to 100 (very well).

Each of the questions for the extent to which RA affects “things you NEED to do” and the extent to which RA affects “things you LIKE to do” was rated on a 0–3 scale (where 0 = not at all, 1 = a little, 2 = a moderate amount, and 3 = a great deal).

Phase 2: pilot test of S-VLA. *Subjects.* Twenty RA patients from the University of Medicine and Dentistry of New Jersey Robert Wood Johnson Medical School (UMDNJ-RWJMS) rheumatology clinic completed the S-VLA questionnaire. All of the participants met the American

College of Rheumatology (ACR) criteria for RA (17), had a diagnosis of RA for at least 6 months, had no alternate diagnosis that contributed significantly to disability (e.g., Parkinson’s disease, multiple sclerosis, metastatic cancer), were fluent in English, and were present at the clinic for a routine visit to their rheumatologist. Study-related procedures were carried out by trained research assistants.

Procedures. Subjects were asked to read the directions associated with the S-VLA and complete the questionnaire. No other explanations about completing the questionnaire were offered, although subjects could ask questions if the instructions were unclear. Inquiries related to the S-VLA were recorded and considered before the larger validation study (phase 3) was initiated. Once the questionnaire was completed, the subject participated in a structured cognitive debriefing interview, which queried instruction clarity, item clarity, adequacy of response options, opinion regarding how well each item addressed the activity in question, and whether the S-VLA, as a whole, adequately measured activity limitations. Patients were paid for participation in the phase 2 interview. Procedures were approved by the UMDNJ-RWJMS Institutional Review Board, and all of the participants provided written informed consent.

Analyses. Phase 2 analyses focused on the clarity of the S-VLA instructions and items, adequacy of response options, relevance and comprehensiveness of the items, and appearance and format of the questionnaire.

Phase 3: validation study. *Subjects.* For phase 3, 150 patients with RA were recruited from the UMDNJ-RWJMS rheumatology clinic and several other clinics in the community; characteristics are shown in Table 1. All of the patients met ACR criteria for RA (17), had a diagnosis of RA for at least 6 months, had no alternate diagnosis that contributed significantly to disability, were fluent in English, and were at the clinic for a routine visit to their rheumatologist. No patients who participated in phase 2 participated in phase 3. All study-related procedures were carried out by trained research assistants. Patients were paid for participation in phase 3. Procedures were approved by the UMDNJ-RWJMS Institutional Review Board, and all of the participants provided written informed consent.

Table 2. Phase 1: item response theory analysis of S-VLA*

	EAP reliability†	Cronbach's α	HAQ‡	Correlation with		
				Overall rating of RA impact§	RA affects things you NEED to do¶	RA affects things you LIKE to do¶
VLA	0.949	0.97	0.79	-0.54	0.74	0.65
S-VLA	0.932	0.94	0.83	-0.56	0.74	0.66

* VLA and S-VLA scores range from 0–4, with higher scores reflecting greater disability. S-VLA = shortened version of the VLA; EAP = expected a posteriori prediction; HAQ = Health Assessment Questionnaire; RA = rheumatoid arthritis; VLA = Valued Life Activities disability and accommodations scale.
† EAP reliability explains the degree to which predictions of an individual's ability have improved, and range from 0–1, with higher estimates reflecting greater reliability.
‡ HAQ scores range from 0–3, with higher scores reflecting greater functional limitations.
§ Ratings of the overall impact of RA ranged from 0–100, with lower scores reflecting greater impact.
¶ Ratings ranged from 0–3, with higher scores reflecting greater effect.

Procedures. Subjects completed the S-VLA, in addition to several other questionnaires, described below, and a demographics form. The S-VLA was administered first with the additional questionnaires in random order. Subjects were asked to read the directions associated with the questionnaires and complete them. No other explanations about completing the questionnaires were offered, although the subjects were allowed to ask questions if the instructions were unclear. A random sample of 50 respondents was asked to complete the questionnaires 2 weeks later, to assess test–retest reliability. Questionnaires were mailed to these individuals.

Measures. Formatting of the S-VLA was modified prior to phase 3 based on subject feedback during phase 2. The S-VLA is shown in Supplementary Appendix A (available in the online version of this article at [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2151-4658](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2151-4658)).

To assess the construct validity of the S-VLA, the HAQ (described above) and several additional questionnaires were administered.

The Short Form 36 health survey (SF-36) is a self-report questionnaire consisting of 36 items aggregated to score 8 subscales related to physical and mental health (18,19). The subscales can be combined to yield a physical component summary (PCS) score and a mental component summary score. The PCS and 3 subscales, i.e., role emotional, social functioning, and role physical, were used in this study because they were judged by the investigators to possess properties associated with VLA disability and general role functioning. The SF-36 summary scales and subscales have demonstrated excellent reliability and validity (18,19).

The Rheumatoid Arthritis Disease Activity Index (RADAI) is a patient-assessed measure of RA disease activity (20,21). It queries global disease activity in the past 6 months, current disease activity in terms of swollen and tender joints, arthritis pain, duration of morning stiffness, and painful joints rated on a joint list. Scores range from 0–10, with higher scores reflecting greater disease activity. Ample evidence exists supporting the reliability and validity of the RADAI (22).

The Satisfaction with Abilities and Well-Being Scale (SAWS) is a 13-item self-report questionnaire developed to assess satisfaction with abilities and well-being in pa-

tients with RA (23). It assesses 13 domains (e.g., work, home maintenance, social participation) and has a total score plus subscales scores for satisfaction with activities and satisfaction with well-being. The overall SAWS has demonstrated good validity and internal consistency (Cronbach's $\alpha = 0.93$), as have the 2 subscales (activities: $\alpha = 0.91$ and well-being: $\alpha = 0.82$).

Two questions are included in the Activity Participation Questionnaire (APaQ): "During the past 30 days, on about how many days did your rheumatoid arthritis keep you from doing your usual activities?" and "During the past 30 days, how often were you able to perform your usual activities completely, in spite of your rheumatoid arthritis?" (24). We included only the number of days with activity limitations in our analyses. The APaQ has been found to have good internal consistency (Cronbach's $\alpha = 0.70$) and acceptable test–retest reliability (intraclass correlation coefficient 0.60). Construct validity and sensitivity to changes in patient activity levels have also been demonstrated.

Analyses. Internal consistency was determined with Cronbach's alpha. Unidimensionality was assessed using an exploratory bifactor model, which features a comparison of a single-factor model to a model with a general factor and group factors (25). Test–retest reliability was evaluated in the subgroup of participants that completed the 2-week followup questionnaires by correlating S-VLA scores from the 2 administrations and by calculating Krippendorff's alpha coefficients of reliability for individual item responses (ordinal scale) (26). Item statistics were then calculated to examine the correlations between individual items and the total S-VLA score, while also correcting for overlap and scale reliability. Construct validity of the S-VLA was assessed via correlations with the other measures. *T*-tests compared responses of men and women and of individuals with early (<25 months) and later (≥ 25 months) RA.

RESULTS

Phase 1. IRT analyses. Partial credit and rating scale models were both tested; the partial credit model had fewer item and step misfits (G^2 likelihood ratio = 623.881,

Table 3. S-VLA scale characteristics*

	Total (n = 150)	Sex		P†	Duration of RA		P†
		Women (n = 111)	Men (n = 39)		<25 months (n = 18)	≥25 months (n = 132)	
S-VLA score, mean ± SD	1.42 ± 0.92	1.52 ± 0.92	1.16 ± 0.88	0.03	1.21 ± 0.92	1.45 ± 0.92	0.30
No. of S-VLA activities rated, mean ± SD	12.9 ± 1.4	12.8 ± 1.3	13.0 ± 1.5	0.57	13.0 ± 1.3	12.8 ± 1.4	0.65
Cronbach's α	0.95	0.95	0.94		0.96	0.95	

* S-VLA = shortened version of the Valued Life Activities disability and accommodations scale; RA = rheumatoid arthritis.
† P from t-test comparing women vs. men or <25 months vs. ≥25 months.

$P < 0.0001$). Item deletions were made progressively, resulting in a 21-item version, a 14-item version, and 4 12-item versions. For both analytic and conceptual reasons, the 14-activity version of the VLA questionnaire was selected as the final S-VLA version. The 14-item S-VLA had 0 misfitting steps; 2 items had potential misfit but were retained to provide logit spread and for substantive reasons, specifically, to ensure that a balance of items measuring obligatory, committed, and discretionary activities and that items representing the full range of activity difficulty were included. Expected a posteriori prediction reliability was excellent for both versions (0.949 for the VLA, 0.932 for the S-VLA) (Table 2).

Other analyses. Correlation between the VLA and S-VLA scores was 0.97. Internal consistency was excellent for both measures (VLA: 0.97, S-VLA: 0.94) (Table 2). Correlations of the S-VLA with other measures of functioning and RA impact were similar in magnitude to correlations of the VLA with the same measures; all of the correlations were in the expected directions. All analyses were repeated with year 2 data, and all results were confirmed.

Phase 2. Twenty patients with RA completed the cognitive interviewing process. Participants were largely women (80%) and married (55%), with a mean ± SD age of 52 ± 13 years. Twenty percent of the participants were Hispanic, 15% were African American, 5% were Asian, and 55% were white. Just over one-half (55%) were employed full time and 70% reported a household income of more than \$50,000 a year. The mean ± SD duration of illness was 9 ± 8 years.

Overall reaction to the S-VLA was positive; only 1 patient indicated that he/she did not like the instrument. Because 2 of the first 5 patients reported that the instructions were not clear and another found the response options confusing, the instructions and formatting were slightly modified for interviews with the remaining 15 patients. After modification, 14 of 15 patients interviewed reported the instructions to be clear and the response options to be clear and adequate; all 15 reported that the items were easy to understand. Respondents were also asked to rate whether each item assessed the ability to

Table 4. Phase 3: response patterns for S-VLA items*

	No. rating item	Difficulty rating response frequency, %				% reporting an accommodation		Mean score (adjusted for accommodations)†
		0 (no difficulty)	1 (some difficulty)	2 (a lot of difficulty)	3 (unable to perform)	Total	Of those reporting no difficulty	
1. Basic needs	150	47	46	6	1	44	6	1.18
2. Meal preparation	140	47	41	9	2	41	5	1.21
3. Light housework	141	52	38	6	4	37	6	1.13
4. Heavier housework	144	22	42	26	10	52	6	2.06
5. Gardening or yard work	121	23	36	20	21	44	7	2.18
6. Caring for family members	124	49	39	7	5	39	10	1.23
7. Attending social events	146	54	38	5	3	34	8	1.06
8. Getting around in home	150	58	37	3	1	29	0	0.90
9. Walking around outside	150	44	42	11	3	37	2	1.30
10. Leisure outside of home	142	57	35	5	4	31	3	0.99
11. Hobbies	129	47	43	10	9	41	4	1.56
12. Physical recreation	143	20	45	24	11	49	7	2.07
13. Traveling out of town	142	39	47	8	6	49	5	1.42
14. Working at a job	108	32	39	12	17	39	6	1.82

* The complete text of S-VLA items is shown in Supplementary Appendix A (available in the online version of this article at [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2151-4658](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2151-4658)). S-VLA = shortened version of the Valued Life Activities disability and accommodations scale.

† Scoring: difficulty = 0 and no accommodations: score = 0; difficulty = 0 and any accommodations: score = 1; difficulty = 1 (some difficulty), regardless of accommodations: score = 2; difficulty = 2 (a lot of difficulty), regardless of accommodations: score = 3; difficulty = 3 (unable to perform), regardless of accommodations: score = 4.

Table 5. Phase 3: assessment of construct validity and correlations between S-VLA scores and other measures*

	HAQ	RADAI	SAWS total	SAWS abilities	APaQ	SF-36 PCS	SF-36 physical functioning	SF-36 role physical	SF-36 social functioning
Total sample	0.81	0.71	0.81	0.82	0.65	-0.78	-0.80	-0.67	-0.72
By sex									
Women (n = 111)	0.81	0.67	0.89	0.82	0.65	-0.77	-0.79	-0.68	-0.74
Men (n = 39)	0.78	0.82	0.83	0.82	0.65	-0.78	-0.82	-0.60	-0.71
By RA duration									
<25 months (n = 18)	0.81	0.69	0.82	0.84	0.84	-0.89	-0.94	-0.67	-0.81
≥25 months (n = 132)	0.81	0.72	0.81	0.82	0.65	-0.76	-0.78	-0.68	-0.75

* For the S-VLA, HAQ, RADAI, SAWS, and APaQ, higher scores reflect worse functioning. For the SF-36 scales, higher scores reflect better functioning. S-VLA = shortened version of the Valued Life Activities disability and accommodations scale; HAQ = Health Assessment Questionnaire; RADAI = Rheumatoid Arthritis Disease Activity Index; SAWS = Satisfaction with Abilities and Well-being Scale; APaQ = Activity Participation Questionnaire; SF-36 = Short-Form-36 health survey; PCS = physical component summary; RA = rheumatoid arthritis.

engage in the activity in question. All items were rated as addressing the activity domain well or extremely well.

Phase 3. Internal consistency of the S-VLA was excellent (Cronbach's $\alpha = 0.95$) (Table 3), item-total correlations ranged from 0.64–0.83, and alpha coefficients did not improve after omitting any of the 14 items. Time needed to complete the S-VLA ranged from 2–4 minutes, with older patients and those with impaired ability to write taking longer than younger and/or less impaired patients. Forty-two (84%) of 50 subjects asked to complete the S-VLA for test–retest analysis returned their questionnaires. Krippendorff's alpha for individual items ranged from 0.58–0.85. Correlation between initial and 2-week responses was 0.92; the corresponding Krippendorff's alpha was 0.91.

Results from bifactor assessment of unidimensionality showed that, in comparison to the single-factor model, loadings for the general factor in the bifactor model shrank somewhat (a phenomenon also observed by Reise et al [25]), but no loading of a variable differed by more than 12%. The ratio of the eigenvalue of the general factor to the largest eigenvalue of the group factors was 7.2. The only group factor loadings above 0.4 were on items 8 and 9, the 2 walking items. Together, these results support the use of the mean item score as the S-VLA score.

Ratings for all items spanned the response scale, indicating adequate variability in responses (Table 4). Respondents reported accommodations on 29–52% of activities. Reported use of accommodations for specific activities ranged from 0–10% among individuals reporting no difficulty.

The S-VLA demonstrated excellent construct validity. Significant correlations with all other measures in hypothesized directions were found (Table 5). While these correlations were strong, ranging from 0.65–0.82, they indicated that, at best, the correlated measures accounted for approximately 66% of the variation in S-VLA scores.

A significant difference in S-VLA scores was noted between men and women (Table 3). This difference paralleled a significant difference between men and women on other measures of functioning, such as the HAQ and the physical function subscale of the SF-36. Overall, there was no significant difference in the number of items rated “I don't do this for reasons unrelated to my RA” by sex. For

specific items, bias by sex did not appear to be present, with one exception: a larger proportion of women did not rate the item querying difficulty with work (women: 32%, men: 15%; $P = 0.06$). There were no substantive differences in the construct validity analyses between men and women (Table 5).

S-VLA scores of individuals with early and longer duration RA were also compared; no significant differences were noted (Table 3), nor were differences noted in scores on other measures of functioning between these 2 groups. Only 1 item appeared to be rated differently by the 2 groups: “taking care of family members” was rated not applicable by a larger portion of those with longer disease duration (early RA: 0%, longer duration: 19.7%; $P = 0.04$). Construct validity analyses yielded correlations with other measures in the expected directions, although for 2 measures (APaQ and SF-36 physical functioning), the correlation coefficients were quite different for individuals with early compared with longer duration RA. The reason for this difference is unknown, but may be at least partially due to the small number of individuals with early disease.

DISCUSSION

A short version of the VLA has been developed, which can provide a brief assessment of disability in a broad range of life activities in individuals with RA. Based on phase 1 analyses, the S-VLA accurately represents results obtained with the longer version of the VLA scale. Phase 2 analyses indicate that S-VLA items were comprehensible to individuals with RA and accurately represented the impact of RA on their functioning in a number of key areas ranging from work and self-care to travel and hobbies. Phase 3 analyses support the reliability and validity of the S-VLA. Both internal consistency and 2-week test–retest reliability were high. Correlations with other measures support the construct validity of the S-VLA.

One primary goal in constructing the S-VLA was to maintain coverage of the spectrum of obligatory, committed, and discretionary activities. The final version of the S-VLA taps functioning in 3 obligatory activities (taking care of basic needs, getting around inside home, walking just to get around outside the home), 5 com-

mitted activities (meal preparation, light housework, heavier housework, caring for family members, working at a job), and 6 discretionary activities (gardening or yard work, attending social events, leisure outside the home, hobbies, physical recreation, and traveling out of town). The inclusion of discretionary activities is particularly important, as these are typically not measured in other disability instruments, but appear to be the areas of functioning that are affected earliest in the disablement process (11).

An important innovation of the VLA, and by extension the S-VLA, is incorporation of the use of accommodations. The HAQ measures 2 forms of accommodation: use of assistive devices and personal assistance. Use of other behavioral accommodations, such as limiting activities or taking more time to perform them, to improve functioning or reduce disability appears to be even more common than use of devices or assistance (10), yet no other disability measures include assessment of such behavioral accommodations. The importance of including accommodation use is underscored by the finding that individuals who report the use of accommodations without reporting difficulty in an activity, and that such "subclinical disability" identifies individuals who are at high risk for functional decline (27–29).

One limitation to the current analysis is that no estimates of responsiveness or sensitivity to change can be made. The long form of the VLA questionnaire demonstrated a high degree of sensitivity to change in a lupus sample (12), and other studies have found that VLA disability is more strongly linked to quality of life, satisfaction with functioning, perceived health status, and changes in psychological status than basic levels of functioning, such as that measured by the HAQ (30–34). While the S-VLA has yet to be tested in this fashion, its extremely high correlation with VLA scores suggests that similar performance and relationships may be found. As the S-VLA queries difficulty in a broad range of activities, particularly discretionary activities that may be affected earliest in the disablement process, in addition to the use of behavioral accommodations that may signal preclinical disability (35), it may be especially sensitive to early changes in functioning. We could not examine this question directly in the current study, however, because of the relatively small number of individuals in phase 3 who had earlier disease. It may also be useful in the future to examine the performance of the S-VLA in relation to other measures of functioning, such as the Rheumatoid Arthritis Outcomes Score (36), and other measures of RA disease activity, such as the Disease Activity Score (22).

The items measured by the S-VLA may be closer to the functional expectations of individuals with RA, especially those with early disease, than measures such as the HAQ. For example, when persons with RA were asked what activities were affected by RA that most bothered them or what activities they most wanted to improve, only approximately one-half of the functions or activities mentioned were covered by the HAQ (37). In addition, disability in discretionary activities, specifically social and recreational activities, appears to be strongly linked to the onset of depressive symptoms (31). Advances in pharmacologic

treatment have led to higher expectations regarding functioning and overall quality of life. Patients want to move beyond moderate symptom relief and regain independence and valued activities such as physically demanding hobbies and recreation. This very point was made in our phase 2 interviews in which the item pertaining to participating in physical recreation activities received a higher rating of relevance than any other activities queried, including basic activities of daily living.

In summary, the S-VLA is a short, valid, and reliable instrument assessing a broad range of life activities and use of behavioral accommodations that may prove useful for monitoring disability among individuals with RA. The brevity of the S-VLA makes it "user friendly" for both clinical and research settings, and the current analyses support its use in early and later disease. While additional studies are needed to assess its validity and responsiveness to change, it appears to be a promising new, brief measure of disability among individuals with RA that addresses important aspects of functioning not currently measured by other instruments.

AUTHOR CONTRIBUTIONS

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be published. Dr. Katz had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study conception and design. Katz, Allen, Maclean, Hassett.

Acquisition of data. Katz, Radvanski, Schiff, Hassett.

Analysis and interpretation of data. Katz, Allen, Buyske, Nadkarni, Rosenblatt, Hassett.

ROLE OF THE STUDY SPONSOR

Bristol-Myers Squibb personnel were involved in initial discussions regarding the conception and potential design of this project, but were not actively involved in data collection or data analysis. Authors from Bristol-Myers Squibb offered comments on manuscript drafts and approved the final version, but publication was not contingent on the approval of Bristol-Myers Squibb.

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