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Exploring the Validity of the Affect Balance Scale With a Sample of Family Caregivers

Margaret A. Perkinson, Steven M. Albert, Mark Luborsky, Miriam Moss, and Allen Glicksman

Polisher Research Institute, Philadelphia Geriatric Center

Abstract

Open-ended responses of caregiving daughters and daughters-in-law were generated by a modified random probe technique to investigate the construct validity of the two subscales of the Affect Balance Scale (ABS), i.e., the 5-item Positive Affect Scale (PAS) and the 5-item Negative Affect Scale (NAS). A set of criteria were developed to distinguish between responses that did and did not correspond to Bradburn's assumptions concerning affect. While most responses met at least one of the criteria, very few met all. In exploring the nature of affect, we found that positive affect was based to a large extent on personal accomplishments and the recognition of others. The assessment of negative affect was a more interior, or self-focused process. For a significant subset of the sample, a negative response to a closed-ended PAS or NAS item implied disagreement or discontent with the wording or the implications of the item itself, rather than an absence of affect. Not all of the ABS items were equally valid measures of affect.

ALTHOUGH subjective well-being and its various dimensions represent pivotal concepts in the development of gerontological theory and research, there remain some criticisms regarding the validity of the instruments used to measure them (Beiser, 1974; Diener, 1984; Diener and Emmons, 1984; Gubrium and Lynott, 1983; Lawton et al., 1992). This article will focus on positive and negative affect, and will investigate the construct validity of the instrument that is frequently used as their measure, the Affect Balance Scale (ABS; Bradburn, 1969). Does this scale measure what Bradburn intended?

Background

Although not developed specifically for aged populations, the Bradburn Affect Balance Scale has been used extensively in gerontological research (George, 1981; Harris, 1975; Larson, 1978; Moriwaki, 1974; Nydegger, 1977; Sauer and Warland, 1982). It consists of the 5-item Positive Affect Scale (PAS) and the 5-item Negative Affect Scale (NAS). The PAS items are: "During the past few weeks did you ever feel: (1) ... pleased about having accomplished something? (2) ... on top of the world? (3) ... particularly excited or interested in something? (4) ... proud because someone complimented you on something you had done? and (5) ... that things were going your way?" The NAS items are: "During the past

few weeks did you ever feel: (1) ... so restless that you couldn't sit long in a chair? (2) ... very lonely or remote from other people? (3) ... bored? (4) ... depressed or very unhappy? (5) ... upset because someone criticized you?"

According to Bradburn, overall well-being is expressed as a balance between positive and negative affect and is calculated by subtracting the score for the negative items from the score for the positive. Since he found extremely low correlations between the positive and negative items of his scale, Bradburn claimed that the dimensions of positive and negative affect are independent. [Although some research supports this finding (Andrews and Withey, 1976; Harding, 1982; Moriwaki, 1974), it has been questioned by others (Brenner, 1975; Cherlin and Reeder, 1975; Diener, 1984; Diener and Emmons, 1984; Warr, Barter, and Brown bridge, 1983)).

Affect as defined by Bradburn is a transitory mood, resulting from the effects of current environmental forces. Positive affect is a dimension of emotional experience that reflects a heightened level of energy, excitement, and enthusiasm. Negative affect is a dimension of subjective distress that includes a broad range of aversive states (Watson and Pennebaker, 1989). Affect represents an emotional state or feeling and implies a short-term time referent (Bradburn, 1969; Lawrence and Liang, 1988; Lawton, 1983). It stands in direct contrast to life satisfaction, another major dimension of subjective well-being. Life satisfaction represents a cognitive assessment of life overall, derived from comparisons of desired goals to actual achievements, and implies a long-term time perspective (George, 1981; George and Bearon, 1980).

Various quantitative studies have attempted to document the psychometric properties of the ABS and other measures of well-being, comparing factor structures or variant response patterns in various populations (Bryant and Veroff, 1982; Carp and Carp, 1983; Cherlin and Reeder, 1975; Harding, 1982; Lawrence and Liang, 1988; Lawton et al., 1992; Liang, 1985; Warr, 1978). The goal of the present study is to assess the validity of the ABS and determine whether it represents a "clean measure" of affect by analyzing data of a more qualitative nature. Open-ended responses were elicited from female family caregivers by a modified random probe technique to test the following hypotheses on subjects' frame of reference in responding to ABS items: Responses to ABS items should be based on the emotional experiences or feelings of the respondent as experienced in the present or very recent past. Since affect is transitory or time-limited in nature, valid responses should not be rooted in long-standing reactions to or perceptions of ongoing situations. Bradburn explicitly stated that the ABS represented a measure of individual states rather than personality traits. Therefore, responses to ABS items should not be based on respondents personal attributes or traits. Responses to ABS items also should not be based on respondents' cognitive evaluations of congruence between normative expectations and/or personal goals and actual behavior. Such evaluations would reflect life satisfaction as defined above rather than affect. Disagreement with an ABS item (a "no" response) should reflect a lack of congruence between an individual's emotional state or mood and that referenced by the item. It should not be based on a simple disagreement with either the wording or the underlying assumptions of that item.

In addition to investigating the validity of the ABS, we also will explore the nature of affect as measured by the ABS items by examining the extent to which it is based on personal achievement, the positive and negative evaluations of others, and on the vicarious sharing of others' experiences.

METHODS

The Sample

The sample consisted of two subsets of respondents derived from a longitudinal study of family caregiving and its impact on mental health. The original sample consisted of 688 women with a single (i.e., widowed, separated, or divorced) elderly parent or parent-in-law. A woman qualified for the study if she was the primary person to provide help for her elder when needed. Most respondents helped with at least two IADLs (i.e., Instrumental Activities of Daily Living, such as help with cooking or laundry) at the time of recruitment. The sample was recruited through a wide variety of sources: media announcements; contacts with support groups, churches and synagogues, hospitals, social service agencies, senior centers, community organizations, corporations; and referrals from other caregivers.

The data on the PAS were collected from 306 respondents during the second year of the longitudinal family caregiving study. The data on the NAS were collected in the third year follow-up interviews on 214 respondents. While the two subsamples partially overlapped ($n = 186$), they were treated as separate independent samples, since the analyses focused on the ABS scale characteristics rather than individual respondent attributes.

As indicated in Table 1, the average age of respondents at recruitment was 50 years for the PAS sample and 49 for the NAS sample (range = 26-75). The average level of education was 14 years for both groups. Family median income was approximately \$40,000, and 70 percent of both samples were employed. Respondents in both groups rated themselves as being in good health.

Data Collection

A modified version of the random probe technique (Liang et al., 1992; Schuman, 1966) was employed to elicit and analyze the frames of reference that individuals used in responding to ABS items. Interviewers were trained to ask the 10 items in their traditional closed-ended form, requiring a single yes or no response. Interviewers obtained further information on the respondent's thinking about an item by asking the following probe for one randomly selected PAS item or one randomly selected NAS item: "You said you [did/did not feel on top of the world]. Take a minute to think about that. Can you tell me more about that?" The particular item for probing with each subject was determined prior to data collection using a randomization procedure, and the item selected was marked on the questionnaire. For each of the five positive Bradburn items, roughly 60 open-ended responses were elicited. Approximately 40 open-ended responses were elicited for each of the five negative items. Interviewers were instructed to write the responses verbatim.

Although the items were administered approximately halfway into an interview on family caregiving, it is unclear what impact this context had on ABS responses. Most respondents

did not refer to caregiving in their open-ended responses to the closed-ended ABS items (see the discussion of topic content and Table 4 below).

Our procedure for analysis departed from that originally proposed by Schuman (1966). Schuman's coders first read the open-ended responses, then used them to predict respondents' original responses to the closed-ended item, evaluating the “fit” between the two. Our coders coded the opened responses on 14 variables (see below) developed to test our hypotheses concerning subjects' frame of reference in responding to the Bradburn items. Unlike Schuman's coders, our coders were not blind to subjects' responses to the closed-ended items, because prediction of those responses was not our goal.

Response patterns are generally conceptualized as a function of the response task, characteristics of the subject, and interviewer characteristics (Sudman and Bradburn, 1974). Schuman used the random probe procedure to develop both individual probe scores, which were indicators of subjects' understanding of a question or item, and question probe scores, which were indicators of the ambiguity or unintended meaning of an item over the entire sample. Our focus on the response task and response behavior rather than on subject or interviewer characteristics reflected our interest in investigating the validity of the ABS items.

Data Preparation

Identifying segments for coding—Each response was examined to identify the main topic or content area. We also looked for “topic switches” within a response, where the major subject matter grammatically or semantically changed to a new topic (Button and Casey, 1984; Jefferson, 1984).

Most (72%) of the open-ended replies contained only one topic. For these cases the unit for coding was the entire reply. The remaining responses contained multiple topics. For example, in response to the item, “During the past few weeks did you ever feel particularly excited or interested in something?” one respondent answered: “I'm excited about my job, it's always interesting.// My son got into college.// It was exciting to have everyone home for Thanksgiving.” Such responses were divided into topic segments, as indicated by the double-slash, to permit reliable content coding of comparable units of discourse. By segmenting responses we avoided having to make summary judgments on multiple topics that might differ in terms of time reference, affect, or any of the other variables of interest.

In most cases multiple topics were clearly distinct and there was little disagreement concerning the number or placement of segment boundaries. However, the issue was not so clear-cut for the few problematic cases that contained more subtle “topic shifts” (Chafe, 1980) rather than complete “topic switches.” For example, a respondent might continue to elaborate or justify her answer to the probe by giving several examples: “I feel my work situation is better-most of the extra work is finished and I can go back to the work I enjoy”; or a respondent might add a statement concerning her feelings about an event or situation: “I had a great day at work. That made me feel good.” These related statements could conceivably be defined either as separate topics or as subordinate topics to a single main topic. We decided to regard these “topic shifts” as one topic segment because they

represented a continuation or expansion of the initial topic. We based our decision upon customary analytic procedures regarding topic segments and step-wise transitions (Button and Casey, 1984; Jefferson, 1984), evaluative clauses in narratives (Labov, 1972), and background knowledge in stories (Agar, 1980).

Reliability of segmenting—Prior to dividing the total set of responses into segments, we checked the reliability of our technique for segmenting topics. We compared the assessments of three independent raters on the number and boundaries of topic segments for 50 randomly selected responses. The initial agreement among all three raters was over 80 percent and, after discussion of discrepancies, a 96 percent level of agreement was eventually achieved. (Five respondents whose answers had been obviously paraphrased instead of written verbatim were dropped from the original sample to minimize the limitations of working with data that were not transcribed texts.)

Working independently and following the definitions stated above, two coders identified the main topics and their boundaries for all open-ended responses. The coders then compared their results and resolved any disagreements through discussion.

The Variables

Through extensive discussion, the authors developed a list of 14 variables that were most relevant to our investigation of the validity of the ABS. A five-page codebook (available upon request) operationally defined these variables and the coding scheme for five coders who had not been involved in the development of the variables. Each variable was dummy-coded. Coders were instructed to work only from the words on the page and *not* to make judgments based on conjectures or inferences based on their background knowledge of the topic or of the respondent (Agar, 1980). They were also instructed to code each separate segment for all 14 variables.

The variables were:

Variable 1: Topic—This was the general content area referred to by the individual. The list of topics was derived from the respondents' replies and included: paid work, caregiving, finances, family, friends, physical health, positive mental health/personal growth, negative mental health, leisure, education, home, possessions, volunteer work, coping strategy, personal appearance, and other. An additional topic, "ill-fitting item," described replies in which the respondent stated that the circumstances proposed by the item did not fit her situation, e.g., "No one criticized me," or "I have too much to do to be bored. I wish I could be bored."

Variables 2 to 4: Time orientation: Past, present, and future—Bradburn's use of the present time frame for the ABS items stemmed from his theoretical focus on affect as a consequence of "current environmental forces." If the items evoked generalized reports on feelings (e.g., "I always feel x"), they would represent measures of long-term trends. According to Bradburn, this would be undesirable since long-term trends might reflect personality dispositions rather than current feeling states. He believed that 'focusing attention on experiences and feelings in the recent past would enable us to discern better the

relative contribution of environmental factors to psychological well-being” (Bradburn, 1969, p. 55).

To determine whether subjects responded to the ABS items within a present or recent past time frame, we coded each segment for past, present, and future time orientation. We assumed the respondent used the present time frame given to her when the ABS item was asked (i.e., “in the past few weeks did you ever feel ...?”) unless there were explicit references to the contrary. A response would be coded “past” if it referred to feelings that clearly occurred more than 4 weeks prior to the interview. Statements could contain more than one time frame; for example, “We have been working on our house for several years and have been pleased with the progress that we are making” would be coded “past and present.” Generalized statements that lacked a reference to time or were timeless, for example, “If my family is happy, it makes me feel happy,” were coded “no time.” We hypothesized that the probed responses would have a present time orientation, in accord with Bradburn’s assumptions.

Variables 5 and 6: Positive and negative affect—Since responses to the ABS items should be based on the emotional experiences or feelings of the respondent, we hypothesized that such emotions would be expressed in the open-ended response. Presence of either a positive or a negative affect term in the probed response was used as an operationalization of respondents’ feelings. Examples of positive affect terms included: enthusiastic, interested, excited, inspired, alert, active, and *proud*. Examples of negative affect terms included: afraid, upset, distressed, nervous, ashamed, guilty, irritable, hostile, and *depressed* (Watson and Pennebaker, 1989). The statement “I’m just happy to be alive” contains the positive affect term, “happy.” However, the statement “I won one million dollars in the lottery” contains no affect terms and would be coded “no term present” for both positive and negative affect. Although one might be tempted to infer affect in this particular example, there were many responses that were open to multiple interpretations in which such references would be risky, e.g., “I visited my mother-in-law yesterday.” Although coding for the presence of affect terms in the probed response represented a more conservative way of operationalizing affect, we felt it was a more reliable procedure than simply asking coders to infer affect.

Variable 7: Discrete event/time-limited affect—As was discussed above, the ABS was not intended to tap long-term trends or ongoing dispositions. The variable “discrete event” provided an additional way to test this. Responses coded “yes” for this variable contained references to emotions or feelings that were limited in time, that represented an “event” of affect rather than a general attitude or tendency, e.g., “I had a wonderful time at the party yesterday.” A statement referring to a long-standing condition or disposition, e.g., “I am a happy person,” would be coded “no” for this variable. The time of occurrence of the feeling was irrelevant in coding this variable, making it distinct from the time orientation variable described above.

Variable 8: Accomplishment—The variable “accomplishment” referred to an achievement, something that resulted from the respondent’s effort or skill, e.g., “I got my

grades from school and I got all A's" This variable allowed us to explore the extent to which individuals' responses to ABS items were based on personal achievement.

Variable 9: Self as focus—This variable referred to something that the respondent had done herself, e.g., "I planned a trip to Greece," rather than a vicarious reaction to another person's actions, e.g., "My son got into the college that he wanted." This variable allowed us to investigate whether respondents' well-being was based on others' achievements or situations as well as on their own.

Variable 10: Trait attribution—This variable referred to any mention of a personality trait, self-labeling, or description of self, e.g., "I'm the type of person who is never depressed." Since Bradburn explicitly stated that he did not intend to tap long-standing characteristics or personality dispositions with his scale, we hypothesized that responses to the ABS item probes would not contain references to personal traits.

Variable 11: Use of moral Language—This variable referred to the presence of a normative statement within the response. Coders were instructed that such statements often contained terms such as "ought," "should," "should not," and "must"; e.g., "I should be doing more for my mother." We hypothesized that responses to the ABS item probes would not contain normative statements since such statements would imply a cognitive evaluation of the congruence between normative expectations and real life circumstances and thus represent life satisfaction as defined earlier rather than affect state.

Variables 12 and 13: Positive and negative social evaluation—Responses were coded for any references to outside affirmation, recognition, or evaluation of the respondent by others. The evaluation could be positive, e.g., "Friends have complimented me on how well I'm dealing with things," or negative, "I'm usually told that what I do is wrong." These variables provided insight into positive and negative affect by allowing us to explore the extent to which individuals' responses were influenced by other people's opinions or evaluations.

Variable 14: Metacommentary—If the respondent challenged the wording or assumptions of an ABS item, e.g., "That is too strong a statement," the response was coded "yes" for metacommentary. We hypothesized that such responses were not tapping the affect construct since they represented disagreement with the item itself rather than a reflection of the respondent's affect state.

Reliability of Coding

We assessed the reliability of the codes by comparing the ratings of six coders who independently coded 36 randomly selected PAS and 36 NAS probed responses for all the variables described above. Table 2 illustrates the range of interrater reliability for each variable, as assessed by the proportion of exact agreement between pairs of raters. Overall reliability for both the PAS and NAS coding was high.

In interpreting these measures of agreement, it should be noted that the high agreement among raters for negative social evaluation and moral language may be partly artifactual due to the low frequency and variability for each variable (see Table 3).

As a second test of interrater reliability, we computed kappa for each of the coded dimensions. Kappa is a far more stringent measure of agreement, as it corrects for chance agreement (i.e., agreement resulting simply from skews in marginal totals). Fleiss (1981) considers a value below .40 to reflect poor agreement. By this more stringent criterion, almost all of the variables showed strong or good agreement for both the PAS and NAS responses. Only present time reference among PAS responses and past and future time orientation among NAS responses fell below .40, reflecting the severe skew in marginal totals for these variables.

Hypotheses

To recap, any response reflecting the concept affect as defined above should be coded to reflect present time only, affect, and discrete affect event and should not be coded for any other time frame, for personality trait, moral language, and metacommentary. Any other responses would be inconsistent with the assumptions concerning affect state. Such responses might reference another dimension of psychological well-being or might represent simple disagreement with the ABS item itself based on nonaffective grounds.

We hypothesized that the open-ended responses of most of our subjects would be in accord with our hypotheses, and labeled these responses “Bradburn congruent.” Responses that were not in accord with our hypotheses were labeled “Bradburn incongruent.”

We had no hypotheses concerning the other Bradburn variables that we had developed, i.e., mention of an accomplishment, self as focus, positive or negative social evaluation, or specific topics, but felt that information on these variables might provide insight into the nature of or the basis for positive or negative affect.

We hypothesized that responses that disagreed with the closed-ended ABS items, regardless of whether those items were from the PAS or NAS subscales, were more likely to contain metacommentary, challenging the wording or underlying assumptions of the items. They therefore were less likely to conform to our hypotheses concerning time frame, and so forth, than the responses signifying agreement with the ABS items.

Finally, we hypothesized that some of the ABS items would be better than others in measuring affect as defined by Bradburn.

RESULTS

We compared the open-ended responses to PAS and NAS items on each of the variables we had developed, using a chisquare statistic (see Table 3). The majority of both samples (64% for the PAS and 65% for the NAS) used a “present only” time frame when responding to the ABS items, and thus were in accord with our hypothesis regarding time orientation. However, a fairly substantial number of respondents used alternate time frames. A significantly greater number of the PAS-probed responses than NAS-probed responses (14%

vs 8%; $p < .05$) used the combined past-present time frame, implying a long-term time perspective. A significantly higher percent of the NAS- than PAS-probed responses (25% vs 16%; $p < .05$) were generalized statements that contained no reference to time.

Affect terms were used relatively frequently by members of both samples. Although positive terms were almost equally likely to be used by both groups (29% for PAS-probed responses, 23% for NAS responses), a significantly greater number of negative terms were used in NAS responses than PAS responses (27% vs 13%; $p < .001$).

References to time-limited affect events were relatively infrequent, and the NAS-probed responses were significantly less likely than PAS responses to contain them (16% vs 38%; $p < .001$). In a related vein, the NAS-probed responses were significantly more likely than PAS responses to contain references to personal traits or attributes, implying long-standing characteristics (37% vs 9%; $p < .001$).

Almost no one in either group referred to normative expectations or moral language. However, a full 10 percent of the PAS open-ended replies and 14 percent of NAS responses contained statements in which informants challenged the wording of the Bradburn item itself.

We initially used our most stringent set of criteria to determine the frequencies of probed responses that did or did not correspond with our hypotheses. We defined a “Bradburn congruent” open-ended response as one that was phrased in the present tense, contained an affect term, referred to a time-limited feeling rather than an on-going condition or attitude, and contained no references to personal traits, metacommentary, or moral language. A “Bradburn incongruent” response was initially defined as any response that did not fit these criteria. Using these very strict definitions, only 20 probed responses (7%) to PAS items and only 15 probed responses (7%) to NAS items were classified as “Bradburn congruent.”

We then focused on the variables that were most critical to our hypotheses (i.e., time orientation, event, and affect) to identify responses that were “Bradburn incongruent.” Using these criteria, a “Bradburn incongruent” response was defined as one that included one or more of the following: a time reference other than the present, a reference to an ongoing condition rather than a specific affect event, or an absence of affect terms. With this more relaxed set of criteria, 263 open-ended responses (86%) to the PAS items and 172 responses (80%) to the NAS items were classified as “Bradburn congruent.”

Topic Content of Open-Ended Replies

In general, most respondents based their answers on something they themselves had done or felt, rather than on someone else's experience. However, this was significantly more likely to be the case with NAS responders than with PAS responders (95% vs 80%; $p < .001$). On the other hand, an accomplishment achieved through the respondent's own effort or skill was the basis for almost half of the open-ended PAS responses, but was virtually irrelevant to NAS responses. Positive evaluations or recognition also had greater impact on PAS responses than on NAS responses (21% vs 4%; $p < .001$).

Rather than providing abstract, general statements regarding their emotional status or affect state, most respondents phrased their replies to the PAS open-ended probe in very concrete terms, citing specific domains of life experience (i.e., topics such as work, leisure, family, etc.) as the sources of their feelings (see Table 4). Personal competence seemed to be central to respondents' experience of positive affect. Instead of elaborating on the nature and details of their affect state, respondents focused on the antecedents of their feelings, which generally were based on personal ability or achievements, e.g., "I'm extremely excited and interested in my new job. I can't believe it is so great. People are actually looking up to me, asking me about respiratory therapy. It's also challenging to learn a new phase of my job." "Paid work" was by far the most frequently mentioned topic (27%) in PAS open-ended responses, reflecting the fact that 71 percent of our respondents were employed. Perhaps this area of life is so closely linked to positive affect because employment often offers more opportunities for accomplishment and for outside evaluation or recognition than other areas of life. Other topics most frequently mentioned in the open-ended responses were references to family that did not involve caregiving (such as family dinners or reunions) and leisure activities (for example, trips or hobbies).

The topics most frequently cited in the NAS open-ended responses were positive mental health (19%), which referred to respondents' statements about their experiences of general positive mental states or growth; family (18%); and "illfitting items" (16%). Instead of describing the antecedents of their feelings, respondents who agreed with the NAS items focused on the nature and impact of those feelings: "I can't focus. I've lost the ability to concentrate. I feel flat. The joy has gone out of little things. I appear happy, but I don't feel it inside." Respondents who disagreed with the NAS items either referred to factors (usually family relationships) that helped to ward off negative feelings: "My husband is my best friend. Don't feel lonely if you have someone to confide in" or to their own positive mental health: "I'm a content person, it doesn't take a lot to keep me happy." A fairly large number (16%) disagreed with the item because it was not relevant to their situation or recent experience. For example, in response to the question, "Did you feel upset because someone criticized you," one woman answered: "Just that nobody did criticize me, so I can't answer that question."

Positive vs Negative Responses to the Closed-Ended ABS Items

We suspected that negative responses to closed-ended ABS items might be based to some extent on subjects' disagreement with the wording or underlying assumptions of those items. If this were the case, their accompanying openended responses would be more likely to contain metacommentary and less likely to be "Bradburn congruent" than the responses of those who agreed with ABS items. However, an alternate interpretation of metacommentary is possible. Subjects who experienced negative affect may have been reluctant to discuss it in the open-ended response. They might have chosen to discuss the wording of the item instead, in an attempt to avoid thinking more explicitly about a negative state. If this were the case, we would expect higher rates of metacommentary among respondents who agreed with the closed-ended NAS items, rather than among respondents who disagreed with PAS and NAS items as originally hypothesized. (Recall that, according to Bradburn, the PAS and NAS subscales are independent, and lack of positive affect does not imply the presence of

negative affect. Therefore, a high rate of metacommentary in the open-ended responses of those who disagreed with PAS items would support the original hypothesis, i.e., negative responses implied disagreement with the wording of an item for some respondents, rather than the alternate hypothesis dealing with denial of negative feelings.)

The *t*-test analyses in Table 5 confirmed our original hypothesis. Responses of those who disagreed with the PAS and NAS items were significantly more likely to contain metacommentary than responses of those who agreed with these items. If the alternate hypothesis concerning metacommentary were also true, one would expect respondents who agreed with closed-ended NAS items also to have a high rate of metacommentary. This was clearly not the case, since the probed responses of only 3 percent of these subjects contained metacommentary. The higher rate of metacommentary for those who disagreed with the PAS items (34% compared to 18% of those who disagreed with NAS items) suggested that one or more of those items might be problematic (see below).

Our hypothesis that the open-ended responses of those who disagreed with the ABS items were less likely to be “Bradburn congruent” received further support from the evidence displayed in Table 5. Compared to the responses of those who agreed with ABS items, the probed responses of those who disagreed were significantly more likely to be coded “no time reference” and were significantly less likely to refer to time-limited affect, two major indicators of “Bradburn congruence.” This was true for both PAS and NAS responses.

While there were consistent differences between the probed responses of those who agreed with ABS items and those who disagreed for the variables indicating “Bradburn congruence,” a different pattern of responses emerged for those variables (i.e., “accomplishment,” “self as focus,” and “social evaluation”) that were included in the analyses to explore the nature or basis of positive and negative affect. For these variables, the significant differences between those who agreed and those who disagreed with closed-ended items held true for only one subscale, either for PAS items or NAS items, but not for both. For example, although accomplishments were rarely mentioned in response to NAS items, they were highly significant for those who agreed (61%) with the closed-ended PAS items. This supports our earlier contention that personal achievement or accomplishments seem to be a critical basis for positive affect. The same held true for positive social evaluation or recognition, which also appeared important to positive affect (27% of those who agreed with the PAS items contained a reference to positive social evaluation, compared to only 3% of those who disagreed with PAS items). On the other hand, evaluation or recognition from outside, whether negative or positive, seemed largely irrelevant for negative affect.

Personal traits or characteristics were more frequently mentioned in response to the NAS closed-ended items than to PAS items. While responses to the PAS items were based to some extent on vicarious experiences of others' triumphs or defeats (83% of those who agreed with the PAS items and 73% of those who disagreed were coded “yes” for “self as focus”), responses to NAS items were much more selffocused (87% of those who agreed with the NAS items and 98% of those who disagreed).

These findings reinforce our earlier discussion that positive affect seemed to be based on personal ability or achievements along with the recognition such accomplishments tend to garner. Evaluation of negative affect, on the other hand, seemed to be a more interior process, focusing on the self and the presence or absence of particular personal traits rather than on evaluations from the outside.

Comparison of Individual ABS Items

Table 6 presents the results of a one-way analysis of variance that compares mean values on our variables for each of the five closed-ended PAS items. Table 7 presents the same information for the five NAS items. Because these comparisons violated the assumptions of homogeneity of variance (Levene's Test), Welch and Brown-Forsythe Equality of Means Tests (in which variances are not assumed to be equal) were used to assess differences in means across items. Post-hoc comparisons were significant at the .01 level using the Tukey Studentized Range Method. In examining Table 6, it is evident that responses to the item "Did you feel on top of the world?" differed significantly from the responses to the other items. Respondents were less likely to agree with this item. Only 49 percent agreed, compared to a range of 70 to 90 percent agreement for the other items. Responses to this item were less likely to contain any reference to time; less likely to refer to a time-limited affect, an accomplishment, or a positive social evaluation; more likely to contain a negative affect term; and more likely to contain metacommentary or comments on the PAS item itself.

If we examine specific open-ended responses to the "on top of the world" item we can see why it was so problematic. It evoked the greatest number of criticisms, comments such as "too extreme a statement!" or "On top of the world to me would mean euphoric." Some respondents viewed this item as an indicator of a mental disorder or instability rather than of a positive affect state: "I'm not a manic-depressive type person. I'm much more quiescent. It's not that I haven't felt good. It's just that I haven't felt that I could rule the world." Other respondents made similar comments: "I don't get quite that emotional." or "Don't have great mood swings. Don't get on top of the world." For individuals with this point of view, responding "no" to this PAS item in its closed-ended form would not indicate a lack of positive affect. This is consistent with Beiser's (1974) qualitative analysis of responses to this item in his data. As a result of his findings, he declared the item to be a "meaningless idiom" within the setting of his research (Stirling County, Canada) and dropped it from his analysis. Indeed, "on top of the world" may represent a dated slang phrase that evokes a different interpretation now than that originally intended.

Although it was not as problematic as the "on top of the world" item, the Bradburn item "Did you feel proud because someone complimented you on something you had done?" also elicited a significantly larger (at the .05 level) number of responses that contained metacommentaries. Examination of the qualitative responses to this item indicated that respondents reacted to the double-barreled nature of the question, the fact that it essentially asked two separate questions: "Did someone compliment you on something you have done?" and "Did you feel proud because you received this compliment?" One might receive a compliment, but not feel especially proud, as one respondent explained: "My husband

compliments me everyday, but I don't feel it's anything special.” On the other hand, the absence of a compliment may tell us more about other people's expectations of the respondent than about the uncomplimented respondent's affect state. One woman explained: “It's mostly that I hadn't heard any compliments from anybody. I'm just expected to do certain things both at work and within my family —without expecting anyone to say if it was good.”

One item in the NAS subscale, “Did you feel so restless that you couldn't sit long in a chair?” elicited open-ended responses that were far more likely than other items to contain references to personal traits and also contained more instances of metacommentary. Most respondents disagreed with this item, and the majority explained their lack of restlessness in terms of long-standing dispositions: “I am normally a high-energy person. Don't tend to sit long anyway, don't think it's ‘restless’.” or “Am always on the go. I'm active, but not restless.”

DISCUSSION

A survey question or scale item is useful to the extent that it conveys to a respondent the desired intent of the researcher. Does the meaning of the item, as inferred by respondents, match that required by the underlying concept of the research? In the past this match was accepted as unproblematic. Researchers assumed that questions could be phrased in such a way that they would be interpreted by most subjects as intended, thus stimulating valid responses (Suchman and Jordan, 1992). However, scientists investigating the cognitive processes underlying survey interviews recently have challenged this assumption (Clark and Schober, 1992; Cordes, 1985; Groves, Fultz, and Martin, 1992; Jobe and Mingay, 1990; Lessler, Tourangeau, and Salter, 1989; Mishler, 1986; Tanur, 1992; Turner and Martin, 1984). Post-interview qualitative probes of various items and analyses of interactions between respondents and interviewers have revealed the repeated failure of subjects to comprehend and respond to questions in the manner desired by researchers (Briggs, 1986; Clark and Schober, 1992; Mishler, 1986; Suchman and Jordan, 1992). Such misinterpretations are not captured in the quality control checks typically used in data processing. Fienberg (1990) has dubbed this undetected misunderstanding “errors of the third kind,” representing a discrepancy between the concept as intended by the researcher and the concept that is actually measured.

Our research echoes the above concerns. Do the items in the Affect Balance Scale convey the meaning intended? Do they elicit responses that accurately reflect the presence or absence of affect for a given individual?

Our use of the modified random probe technique allowed us a glimpse into the reasoning underlying respondents' agreement or disagreement with ABS items. We used this to test whether the items measure affect as Bradburn and others have defined it. Using our most restrictive set of criteria, i.e., that the response should be phrased in the present tense only, should refer to a time-limited affect event rather than an ongoing condition, should include an affect term, should not include references to a personal trait, should not include moral language or normative statements, and should not challenge or question the meaning or

wording of the ABS item itself, very few produced responses that were strictly “Bradburn congruent.”

When we used a more relaxed definition that focused on the variables that were most critical to Bradburn's definition to identify the “Bradburn incongruent” responses, i.e., those responses that did not refer to the present, did not refer to a time-limited affect event, or did not contain an affect term, only 43 PAS open-ended responses (14%) and 42 NAS open-ended responses (20%) were completely outside the appropriate framework.

We thus discovered three groups of responses representing three levels of conformity to our set of criteria: a small group (7% of PAS responses and 7% of NAS responses) that conformed to all criteria; a somewhat larger group (14% of PAS responses and 20% of NAS responses) that conformed to none of the criteria; and the majority of responses (79% of PAS responses and 73% of NAS responses) that conformed to at least one of the Bradburn criteria. While it was rare that ABS open-ended responses displayed none of the characteristics deemed important in achieving congruence with Bradburn's assumptions concerning affect, it was also rare that responses were totally congruent with all factors.

The probed responses revealed the criteria respondents used in evaluating affect. Positive affect, as reflected in the open-ended responses to PAS items, was based to a large extent on the presence or absence of accomplishments and on the recognition of others, especially in regard to work, family, or leisure activities. The assessment of negative affect, on the other hand, seemed to be a much more interior or self-focused process, with the presence or absence of various personal traits much more critical than any visible achievement or evaluation from outside.

We found a strong relation between negative response to the closed-ended items and metacommentary, indicating that, for a significant subgroup of respondents, a negative response to an ABS item may imply disagreement or discontent with the question rather than absence of the affect in question. The very low rate of metacommentary found in the open-ended responses of those who agreed with the closed-ended NAS items indicated that respondents were not focusing on the wording of an item simply to avoid discussion of a negative state.

Our analysis of open-ended responses to the individual closed-ended ABS items indicated that some items were better measures of affect than others. The PAS item “Did you feel on top of the world?” elicited responses that were least “Bradburn congruent,” because they were significantly less likely to be phrased in the appropriate time frame or to contain a reference to a discrete affect event and more likely to contain metacommentary or challenges to the wording of the item itself. Other critics have also voiced dissatisfaction with this item, and have gone so far as to delete it from the scale (Beiser, 1974; Beiser, Feldman, and Egelhoff, 1972). Somewhat less problematic, the PAS item “Did you feel proud because someone complimented you on something you had done?” nevertheless elicited a significant number of responses that contained metacommentary. Of the NAS items, the item “Did you feel so restless that you couldn't sit long in a chair?” evoked a

significant number of responses that contained metacommentary and references to personal traits.

Conclusion

We initially embarked on this study because affect represented a major variable in the PGC study of family caregiving and mental health, and we wanted to investigate the properties of the ABS with our sample of women caregivers. We recognize the limits on the generalizability of our work, given that women have traditionally scored differently from men on measures of affect, and strongly encourage future research replicating our basic approach with a male sample.

We also recommend that future researchers modify our procedure somewhat by following the model employed by Groves, Fultz, and Martin (1992), which we discovered after our data collection. After asking an open-ended question that probed the intent of an item on self-perceived health, they followed with a series of closed questions to more clearly ascertain various characteristics of response behavior, e.g., the time frame employed in answering the question or the impact of affect on the response. In a similar fashion, one could follow the open-ended probe of an ABS item with a series of closed-ended questions directly inquiring about the 14 variables discussed above. This approach would enable one to avoid some of our more arbitrary decisions, e.g., using the presence of affect terms to operationalize feelings or assuming the use of the present time frame unless there were explicit references to the contrary. However, it is unclear whether this refined approach would increase the overall proportions of “Bradburn congruent” responses, since the expected change in one variable (e.g., more “Bradburn congruent” responses in regard to affect) might be cancelled by the expected change in another (e.g., fewer “Bradburn congruent” responses in regard to time orientation).

Given our findings, we recommend that the ABS be used with an awareness of its limitations. Researchers should recognize the difficulty in interpreting low PAS and NAS scores since negative responses, especially to the more problematic items, may not always indicate the absence of affect. Although the PAS item “Did you feel on top of the world?” may have been an appropriate indicator of affect in the past, it now represents a dated slang phrase that is especially open to misinterpretation, and we recommend that it be dropped from the scale.

Researchers in general should be alert to the possibility that gradual shifts in language and social attitudes over time may influence the meanings of scale items. The cohort-specificity of popular expressions or idioms may leave even our most widely used and established scales open to misinterpretation by both subjects and researchers.

Our modified random probe technique proved effective for assessing the validity of the ABS and its individual items. We recommend that it be used with other widely used scales to determine whether they measure what they propose and with various populations to determine whether these scales are equally valid for different cohort, gender, racial, ethnic, and socioeconomic groups. The routine inclusion of an abbreviated version of the modified random probe technique will be of increasing importance as biomedical, behavioral, and

social research heeds the mandate to examine the full range of racial, ethnic, and gender diversity within our population.

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Table 1Characteristics of PAS and NAS Samples^a

	<u>PAS (n = 306)</u>		<u>NAS (n = 214)</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Caregiver Sociodemographics				
Caregiver age at baseline interview	50.20	10.35	48.59	9.75
Self-rated health (10 = excellent)	7.71	1.43	7.70	1.41
Number of health conditions (0 = none)	1.50	1.72	1.46	1.48
Caregiver education (yrs)	14.20	2.60	14.50	2.58
CESD (range = 0–60, 60 = high depression)	10.33	9.91	9.45	9.68
Income (14 = \$70,000 +)	7.70	4.31	8.06	4.17
Race (% African American)	14		10	
Caregiving Intensity Measures				
Elder IADL (24 = no impairment, 8 = most impaired)	16.99	5.59	17.61	5.61
Elder ADL (21 = no impairment, 7 = most impaired)	18.53	3.97	18.64	
Number of elder health conditions (0 = none)	5.14	2.92	5.00	2.92
Caregiver hours/week	19.00	26.83	14.53	
Total number of helpers	2.54	1.61	2.35	
Total hours of caregiving/week, all sources	29.97	37.96	23.20	28.87
Caregiving burden (range = 9–5, 45 = high burden)	20.15	8.36	19.08	7.98
Caregiving satisfaction (range = 6–30, 30 = low satisfaction)	15.24	4.89	15.72	4.86

^aPAS = Positive Affect Scale; = NAS Negative Affect Scale.

Table 2

Ranges of Interrater Reliability for ABS Variables

	PAS Reliability	NAS Reliability
Past	.83 < R < 1.00	.29 < R < .69
Present	.83 < R < .92	.76 < R < .81
Future	.89 < R < .97	.65 < R < .94
Event	.69 < R < .86	.88 < R < .94
Positive affect	.67 < R < .94	.76 < R < .94
Negative affect	.92 < R < .97	.71 < R < .94
Self	.69 < R < .83	.94 < R < 1.00
Positive social evaluation	.94 < R < 1.00	.94 < R < 1.00
Negative social evaluation	1.00 < R < 1.00	1.00 < R < 1.00
Metacommentary	1.00 < R < 1.00	.65 < R < 1.00
Moral language	.94 < R < 1.00	.94 < R < 1.00
Accomplishment	.75 < R < .94	1.00 < R < 1.00
Trait attribution	.97 < R < 1.00	.53 < R < .81

Table 3

Bradburn Open-Ended Responses: Descriptive Statistics for Coded Qualitative Variables and a Chi-Square Comparison of PAS and NAS Probed Responses

Variables	Frequencies and Percent of Excerpts in Which Variable Is Present				X ²
	PAS (<i>n</i> = 306)		NAS (<i>n</i> = 214)		
	<i>N</i>	%	<i>N</i>	%	
Time Reference					
Present only	196	64	139	65	.057
No time reference	49	16	54	25	6.38 *
Past and present	43	14	17	8	4.78 *
Present and future	9	3	3	1	2.70
Other (future only, past only, etc.)	9	<u>3</u>	1	<u>1</u>	
		100		100	
Affect-Specific					
Positive affect term	87	29	50	23	2.49
Negative affect term	41	13	57	27	16.05 ***
Event-Specific					
Discrete event	117	38	34	16	31.80 ***
Accomplishment	142	46	6	3	126.16 ***
Person-Specific					
Self as focus	245	80	203	95	26.70 ***
Mention of personality trait	28	9	80	37	58.31 ***
Norm-Specific					
Use of moral language	6	2	6	3	.51
Positive social evaluation	64	21	8	4	33.35 ***
Negative social evaluation	3	1	8	4	4.62 *
Question-Specific					
Metacommentary	31	10	29	14	1.96

** $p < .01$;

* $p < .05$;

*** $p < .001$.

Table 4

Topical Focus of Bradburn Open-Ended Replies

Topic	PAS		NAS	
	<i>N</i>	%	<i>N</i>	%
Any Topic Mentioned	299	98.0	206	96.0
Paid work	82	26.8	20	9.3
Family	46	15.0	39	18.2
Leisure	31	10.1	7	3.3
Caregiving	25	8.2	4	1.9
Home	17	5.6	4	1.9
Education	10	3.3	1	0.5
Volunteer work	6	2.0	2	0.9
Finances	5	1.6	0	0
Friends	5	1.6	13	6.1
Physical health	2	0.7	6	2.8
Possessions	2	0.7	0	0
Personal appearance	1	0.3	0	0
Positive mental health	22	7.2	41	19.2
Negative mental health	3	1.0	11	5.0
Coping strategy	0	0	8	4.0
Ill-fitting item	17	5.6	35	16.0
Other	25	8.2	15	7.0
No Topic Mentioned	<u>7</u>	<u>2.0</u>	<u>8</u>	<u>4.0</u>
	<i>n</i> = 306	100.0	<i>n</i> = 214	100.0

Table 5

t-Test Analyses Comparing Respondents Who Agreed or Disagreed With PAS Items and NAS Items With Respect to Qualitative Variables

Variable	Disagreed With PAS Items		Agreed With PAS Items		Disagreed With NAS Items		Agreed With NAS Items		t
	N	%	N	%	N	%	N	%	
Time Reference									
Present only	37	53	152	68	94	62	45	73	1.49
No time reference	23	28	25	11	46	30	8	13	-3.05**
Past and present	12	14	31	14	12	8	5	8	.04
Present and future	7	2	9	4	0	0	3	5	—
Affect-Specific									
Positive affect term	7	8	80	36	46	30	5	8	-4.23***
Negative affect term	34	41	7	3	18	12	39	63	7.60***
Event-Specific									
Discrete event	10	12	107	48	17	11	18	29	2.93**
Accomplishment	6	7	136	61	6	4	0	0	—
Person-Specific									
Self as focus	61	73	185	83	149	98	54	87	-2.46*
Personality trait	11	13	16	7	59	39	20	32	-1.00
Norm-Specific									
Use of moral language	3	4	2	1	2	1	4	6	1.57
Positive social evaluation	2	3	10	27	8	5	0	0	—
Negative social evaluation	2	2	0	0	5	3	4	6	1.12
Question-Specific									
Metacommentary	28	34	5	2	27	18	2	3	-3.78***

Variable	Disagreed With PAS		Agreed With PAS		<i>t</i>	Disagreed With NAS		Agreed With NAS		<i>t</i>
	<i>N</i>	%	<i>N</i>	%		<i>N</i>	%	<i>N</i>	%	
	83	27	223	73		152	71	62	29	

* $p < .05$;
** $p < .01$;
*** $p < .001$.

Table 6

ANOVA Comparing PAS Items Across Coded Qualitative Variables

	(A) Accomplishment	(B) Top of World	(C) Excitement	(D) Compliment	(E) Going My Way	<i>F</i>	Significant Group Means **
<i>N</i> =	61	75	54	57	59		
% Yes ^a	90	49	83	79	70	9.61 ***	B < A, C, D
Time Reference							
Present only	.63	.52	.67	.72	.70	1.82	
No time reference	.12	.32	.04	.16	.10	6.15 ***	B > A, C, E
Affect-Specific							
Positive affect	.31	.29	.28	.26	.29	.09	
Negative affect	.10	.25	.06	.07	.15	3.85 *	B > C
Event-Specific							
Discrete event	.46	.31	.43	.49	.25	2.74 *	
Accomplishment	.66	.25	.48	.58	.41	7.07 ***	B < A, D
Person-Specific							
Self as focus	.90	.71	.80	.79	.85	2.28	
Norm-Specific							
Positive social evaluation	.15	.09	.13	.56	.17	15.49 ***	D > A, B, C, E
Question-Specific							
Metacommentary	.03	.20	.02	.18	.07	4.93 ***	B > A, C D > C *

Notes. Total *N* = 306; Qualitative variables in which frequencies were low in particular Bradburn questions were dropped in the analysis.

^aResponse to Bradburn item in closed-ended format.

*
p < .05;

**
p < .01;

p < .001.

Table 7

ANOVA Comparing NAS Items Across Coded Qualitative Variables

	(A) Restless	(B) Lonely	(C) Bored	(D) Depressed	(E) Upset/ Criticized	<i>F</i>	Significant Group Means**
<i>N</i> =	44	46	42	41	41		
% Yes ^a	30	24	25	37	26	1.49	NS
Time Reference							
Present only	.61	.72	.67	.61	.63	.38	NS
No time reference	.39	.17	.21	.20	.29	1.787	NS
Affect-Specific							
Positive affect	.18	.30	.33	.22	.12	1.81	NS
Negative affect	.23	.15	.26	.39	.32	1.81	NS
Event-Specific							
Discrete event	.09	.15	.17	.20	.20	.58	NS
Accomplishment	.00	.00	.07	.02	.05	1.55	NS
Person-Specific							
Self as focus	.98	.96	.98	.85	.98	2.47	NS
Trait	.61	.30	.38	.24	.32	4.02**	A>B,D,E
Norm-Specific							
Positive social evaluation	.00	.04	.00	.05	.10	1.94	NS
Negative social evaluation	.00	.00	.00	.00	.20	10.24***	E>A,B,C,D
Question-Specific							
Metacommentary	.25	.00	.10	.17	.17	3.54**	A>B

Notes. Total *N* = 214; Qualitative variables in which frequencies were low in particular Bradburn questions were dropped in the analysis.

**p* < .05;

^aResponse to Bradburn item in closed-ended format.

***p* < .01;

****p* < .001.