EMPIRICAL STUDIES USING BOUNDARY AMBIGUITY SCALES: RELIABILITY AND VALIDITY

OVERVIEW

This section reviews research using the boundary ambiguity concept. Continuing studies using varied and/or larger samples are in progress and this publication will be updated as information becomes available. See Appendix 1 for the six scales and Appendix 2 for coding information.

As boundary ambiguity is expected to change over time, we need to establish internal consistency reliability (Cronbach's alpha) for each scale rather than rely on test-retest measures of reliability. The validity of the construct is based on the verification of a positive relationship between degree of boundary ambiguity and level of individual and family dysfunction across many different samples.

To date, studies have been conducted with samples of wives of men missing-in-action in Viet Nam, widows, parents of adolescents leaving home, divorcees, and families of Alzheimer's patients. Specific discussions of reliability and validity are included, when available, in the brief description of each study that follows. See the original articles for more details.

MIA STUDY

The Family Boundary Ambiguity Scale was originally developed out of findings from a study of families with a husband/father who was missing-in-action (MIA). It was tested with factor analytic techniques in the second phase of the study (for details see Boss, 1977, 1980a).

The factor that surfaced in this study was labeled "psychological father presence." It is empirically presented in Table 1. The original research scale based on this factor is presented in Boundary Ambiguity Scale #1 in Appendix 1.

In this study of MIA families, Boss (1977) empirically established the *construct validation* of the Psychological Presence Scale (now titled the Boundary Ambiguity Scale). In accordance with her prediction, psychological father presence was significantly related to wife and family functioning. A low degree of psychological father presence was found to be related to a high degree of functionality for the MIA wife ($r=-.35$, $p<.05$).

Boss (1980a) also reported that MIA wives' scores on the Boundary Ambiguity Scale were significant predictors of their functioning ($R^2=.14$, $p<.025$). A low degree of psychological father presence appeared to be related to a high degree of family functioning. Using the Moos and Moos environment scales (1981), correlations were $r=.35$ for the achievement scale, $r=.34$ for the organization scale, $r=.30$ for the control scale, and $r=.33$ for the rigidity/flexibility scale; $p=.05$ for all.

STUDIES OF WIDOWHOOD

This scale was subsequently adapted for use with widows whose husbands had died within the preceding six to twelve months. Separate studies were conducted by Blackburn at Montana State University-Bozeman (Blackburn, Greenberg, and Boss, 1987) and by Friday at the University of Wisconsin-Madison (Friday, 1985). The Boundary Ambiguity Scale #2 (Appendix 1) was used in these widowhood studies. Except for deleting military terms and

references to parents, the scale was essentially the same as the original which was used with the MIA families.

To investigate changes over time, ranch and non-ranch women in the Montana study were interviewed twice, at six and at twelve months after the spouse's death. Six months after, 75% of the ranch and 72% of the non-ranch widows agreed with the seven items representing *low* psychological husband presence. Agreeing with the seven items representing high psychological husband presence were 26% of the ranch and 27% of the non-ranch widows.

Twelve months after the death of their spouses, the percentage of widows who agreed with the seven items representing low psychological husband presence increased to 82% for the ranch widows and 83% for the non-ranch widows. The percent agreeing with the seven items representing high psychological husband presence decreased to 18% of the ranch and 17% of the non-ranch widows.

As hypothesized, there was a decrease between the levels of boundary ambiguity at six months versus twelve months after being widowed. Even in six months time, there was empirical evidence suggesting that perceptual restructuring was occurring.

A hypothesized inverse relationship between psychological husband presence and self-esteem was also significant at six months after widowhood ($r=-.39$, $p<.01$). Moreover, although not reaching statistical significance, the correlation between psychological husband presence and psychosomatic complaints was in the hypothesized positive direction.

At twelve months after widowhood, the great majority of widows in the study had completed the normal grief process and, as expected with a clear loss, no significant relationship remained between psychological husband presence and self-esteem or psychosomatic complaints. These findings were indeed in sharp contrast to those found with the MIA wives, who

Table 1. MIA Study: Items contained in the psychological father presence factor (18 items).

Loading	Item
-.8926	I no longer consider myself an "MIA" wife.
-.6572	I feel I have prepared myself for a change in status.
-.6023	My children are able to talk about their father without becoming emotionally upset.
-.5894	My children are aware of all "the facts" and have reconciled to their father's loss.
-.4998	I feel I am able to plan my future without feeling guilty for not continuing to wait for my husband.
-.4680	I hope to remarry.
-.4570	The Armed Services have done everything reasonably possible to account for my husband.
.8164	I find myself still wondering if my husband is alive.
.8162	I continue to keep alive my deepest hope that my husband will return.
.7722	I feel guilty about dating (or wanting to date).
.7094	My children still believe that their father is alive.
.5791	I will never be satisfied until I have positive proof of my husband's death.
.4705	My children and I talk about their father seemingly quite often.
.4368	I think about my husband a lot.
.4255	I feel it will be difficult, if not impossible, to carve out a new life for myself without my husband.
.3490	I feel incapable of establishing a meaningful relationship with another man.
.2623	Conflicts with my own parents over my husband's change of status have presented a problem for me.
.2873	My in-laws do not or would not approve of my plans to develop a life for myself.

Eigen value = 6.25. Total observed variance accounted for = 33%.
Total explained variance accounted for = 39%

showed symptoms even 3-5 years after the loss of their husbands (Boss, 1977, 1980a).

Friday (1985) measured boundary ambiguity in a sample of 80 urban and rural women who had been widows for from six to twelve months. In this study, boundary ambiguity scores ranged from 20 to 41, with a mean of 34.76, and a standard deviation of 3.94. The reliability computed using the SPSS reliability procedure was .58. She found no rural/urban differences.

Friday makes the points that the overall level of boundary ambiguity in her sample was moderate, and that examining more recently widowed persons would possibly reveal higher levels of boundary ambiguity.

A number of interesting correlations were reported by Friday (1985). Women reporting high boundary ambiguity also reported high marital quality (r=.309, p=.015) and high levels of religiousness (r=.321, p=.012).

The duration of the husband's illness before death was also positively correlated with boundary ambiguity (r=.309, p=.015). As expected, boundary ambiguity was negatively related to length of widowhood (r=-.274, p=.044), indicating, as in the other study of widows, that it did take *time* for widows to close their deceased husband out of the family system.

The present publication's authors examined the frequencies found for the Montana ranch widows and the more urban Madison, Wisconsin, widows to determine whether or not the Boundary Ambiguity Scale for widows discriminates between community contexts. Although further verification is needed, it can tentatively be said that there are some differences between these two populations.

On the items inferring beliefs in an after-life (items 5 and 6) and in self-sufficiency (item 10), a higher focus on religiosity and self-sufficiency for the Montana ranch widows was apparent. Overall, however, these urban and rural samples of widows both appeared to be lower on boundary ambiguity than the women in previous military samples where husbands were missing rather than clearly dead. This appears consistent with the nature of the losses: death is not an ambiguous loss, "missing in action" is. However, these statements require further empirical verification.

PSYCHOLOGICAL PRESENCE OF AN ADOLESCENT WHO HAS LEFT HOME

Another version of the Boundary Ambiguity Scale (Boundary Ambiguity Scale #3, Appendix 1) was used to study a normative population of Minnesota mid-life couples with an adolescent leaving home (see Boss, Pearce-McCall, and Greenberg, 1987). The original boundary ambiguity questions were again used, and some items based on the adolescent literature and on clinical judgement were added.

In this sample of mid-life families, the Cronbach alpha *reliability* for the Boundary Ambiguity Scale was .74, calculated using the SPSS reliability subprogram.

The *content validity* of this scale was determined with a panel of twenty psychiatrists who reviewed the scale and judged that the items "made sense" and were relevant to the population under study.

As a check on the *construct validity* of this scale, scores were compared with respondents' ratings of how stressful it was for them when their adolescent moved out of the household. For both husbands and wives, boundary ambiguity scores and responses to this item were significantly correlated (husbands: r=.29, p=.014 / wives: r=.37, p=.003). Men's scores on the Boundary Ambiguity Scale ranged from 16 to 38, x- = 26.57, standard deviation = 5.27; women's scores ranged from 16 to 42, x- = 27.84, standard deviation = 5.94.

Fathers' scores on the scale were the best predictors of the amount of psychosomatic complaints they reported, accounting for 14% of the variance in somatization scores. The regression using the women's somatization scores was not significant.

For mothers, patterns were found relating their levels of boundary ambiguity to the fathers' somatization scores and to both partners' general affect about life (see Boss, Pearce-McCall, and Greenberg, 1987).

NORMATIVE MID-LIFE FAMILIES

A second validation test was performed, this time using an eight state sample of mid-life families from the U.S.D.A. North Central 164 study (Greenberg, 1988). This is the first test of boundary ambiguity using a large, normative sample of families.

Sampling Method

The data set used in this research resulted from an eight state regional project on stress, coping, and adaptation during the middle years. The following three criteria were used in sampling mid-life families: (a) husband and wife were both present in the household, (b) the wife was between the ages of 35 and 54, and (c) there was at least one child present in the home.

The sample was randomly selected from a list provided for each state by a commercial marketing firm. The response rate, which varied somewhat from state to state, was between 30-35%. The eight state sample totaled 1631 couples.

From this base sample, a subsample of couples was selected for the validation of the Psychological Presence Scale. The couples selected for the present study were those who had a child who had left home within the past year and who had completed the Psychological Presence Scale. These additional criteria reduced the sample to 355 mid-life couples.

Sample Descriptions

The sample is about evenly divided between urban and rural respondents with rural defined as farms and towns having populations of less than 2,500 residents. The number of children ranged from 2 to 9 with a mean family size of 4.8. Most of the respondents had high school educations, a mean of 13 years. Respondents had lived in their communities for an average of 29 years. The median family income before taxes was $32,000. Over 30% of the wives were employed full-time with an additional 20% employed part-time outside the home. Ninety-eight percent of the respondents were white and 70% were Protestant.

Findings

The results of the study provided general support for the reliability and validity of the Psychological Presence Scale. Reliability of the scale was .71, which is acceptable and comparable to reported reliabilities of many scales widely used in the family field. Ten of the 14 hypotheses tested, 71%, were supported. (Tables 2 through 4.)

The results of this study led to a greater specification of the concept of psychological

Table 2. Table of hypotheses.

Hypotheses	Supported by Data?	
	Fathers	Mothers
1. There will be a significant positive relationship between PPS and somatization.	Yes .16*	Yes .16*
2. There will be a significant negative relationship between PPS and positive individual affect.	Yes –.18*	No –.04
3. There will be a significant positive relationship between PPS and family stress.	No .03	No .03
4. There will be a significant negative relationship between PPS and the parent's overall rating of how positively he/she felt about the adolescent leaving.	Yes –.44*	Yes –.49*
5. There will be no significant relationship between PPS and family satisfaction.	Yes –.05	Yes .00
6. There will be no significant relationship between PPS and marital satisfaction.	Yes –.01	Yes .00
7. There will be no significant relationship between PPS and life satisfaction.	No –.09*	Yes .02

n=355; *p<.05

Table 3.Parameter estimates for one factor model husbands and wives.

	Items	Factor Loadings Husbands	Wives
1.	Difficult	.52	.76
2.	Prepared	.21	.43
3.	Grown up	.45	.68
4.	Alive/hope	.33	.30
5.	Bothered/miss	.71	.80
6.	Bothered/lonely	.63	.74
7.	Talk	.23	.16
8.	Think	.32	.27
9.	Think/doing	.44	.36

Husbands
Chi square = 271.54 df = 27, p = .000
Goodness of fit = .84
Root mean square residual = .09

Wives
Chi square = 225.75 df = 27, p = .000
Goodness of fit = .87
Root mean square residual = .07

Table 4.Parameter estimates for two factor model husbands and wives.

		Factor I Affective Preoccupation		Factor II Cognitive Preoccupation	
		Husbands	Wives	Husbands	Wives
1.	Difficult for me	.56	.77	.00	.00
2.	Prepared self	.24	.44	.00	.00
3.	Difficult accepting	.48	.69	.00	.00
4.	Continue/hope	.35	.30	.00	.00
5.	Bothered/miss child	.72	.80	.00	.00
6.	Bothered/loneliness	.67	.76	.00	.00
7.	Talk about	.00	.00	.44	.36
8.	Think about	.00	.00	.58	.52
9.	Think/doing	.00	.00	.53	.45

Correlation between Parental Role and Preoccupation: Husbands .419; Wives .460

Husbands
Chi square = 91.20 [df = 26, p = .000]
Goodness of fit = .942
Root mean square = .069

Wives
Chi square = 79.2 [df = 26, p = .000]
Goodness of fit = .95
Root mean square residual = .058

presence as used in boundary ambiguity research. The psychological preoccupation consisted of both an *affective* and a *cognitive* component. It was noted that the affective component includes negative expressions of emotions.

Revisions of the scale should attempt to achieve a balance between negative and positive emotions. Future research will need to examine which of these two components, affective or cognitive, is the best predictor of individual and family dysfunction.

Future work also needs to analyze gender differences in the factor structure of the Psychological Presence Scale. The results presented to date do not provide an answer. Rather than independently analyze husbands and wives, future work needs to statistically compare the factor structures using the group comparison analysis available with LISREL VII. (For details see Greenberg, 1988.)

RESEARCH IN PROGRESS ON AMBIGUOUS LOSS IN FAMILIES

NON-NORMATIVE LOSS: DIVORCE

Divorce and remarriage are family boundary changes that, although not considered normative, have become increasingly common and must be addressed by family researchers and clinicians (Ahrons and Rogers, 1987; Pasley, 1987; Pasley and Ihinger-Tallman, 1987, 1989). In these families, there is a high potential for boundary ambiguity, which could present a barrier to postdivorce reorganization. The hypothesis is that the degree of boundary ambiguity will be negatively related to the level of family adaptation after divorce and remarriage. Boundary ambiguity scales for the situations of divorce and remarriage have been prepared for the parental generation and for adolescent and young adult "children of divorce."

The divorced adults scale (Scale #5, Appendix 1) is based on the original Boundary Ambiguity Scale with slight modifications in wording and a few changed items. A sample of 12 family researchers and clinicians who have personal and professional experiences with divorce examined the items and judged the scale as having content validity.

The scale for children of divorce (Scale # 4, Appendix 1) was constructed from a content analysis of the literature and a series of interviews with adult children of divorce, using previous boundary ambiguity scales and research as guides. The scale was piloted with a sample of adult children of divorce and revised.

In a second sample of adult children, scores on the 21-item scale applicable to *all* adult children of divorce ranged from 32 to 78, mean = 53.63, SD = 10.45. Ratings on the five additional questions answered only by those with remarried parents were not included in these analyses. In this sample, the Cronbach alpha reliability was .75, calculated using the SPSS reliability subprogram. On the basis of the results, one item was revised. The revised scale is Scale #4 in this manual.

This study was only exploratory, but some interesting patterns and correlations were found deserving further empirical investigation. Boundary ambiguity was significantly and positively correlated with the level of tension that adult daughters perceived in their parents' current relationship ($r = .47$, $p = .007$). Boundary ambiguity scores were negatively correlated with three items measuring the amount of contact daughters currently had with their mothers ($r = -.48, -.55, -.34$; $p = .002, .042, .005$).

Support for the general theory of boundary ambiguity was found. Boundary ambiguity scores were positively correlated with the level of felt stress daughters reported having when in the presence of both parents ($r = .42$, $p = .025$). Also, the less a daughter accepted the present reality of her parents' relationship (denial), the higher her boundary ambiguity scores were ("I wish my parents got along better" $r = .59$, $p = .001$; "I am hopeful that their relationship will improve" $r = .35$, $p = .035$).

Copies of these instruments are included in Appendix 1 as Boundary Ambiguity Scales #4 and #5. More information about boundary ambiguity in post-divorce/remarried families can be found in a dissertation on adult children of divorce (Pearce-McCall, 1988). Both qualitative and quantitative analyses are used in that study. The revision of the scale is presented in this manual, and other researchers are encouraged to replicate this work.

CHRONIC ILLNESS

Caring for an aged member with Alzheimer's

disease is one of the most stressful challenges for a family in later life. Research suggests that the stress experienced by caregiving families results not only from the burdens of providing physical care, but also from the nature of the care and the impact this has on the family's perception of the patient.

These perceptual factors have been shown to contribute greater strain than the actual burdens of physical care (Zarit, Reever, and Bach-Peterson, 1980). It is hypothesized that caregiver strain will be primarily due to their perception of the boundary ambiguity resulting from the patient's continued physical presence but increasing psychological absence from the family.

The original Boundary Ambiguity Scale has been adapted for use with caregivers and other family members of Alzheimer's patients (found in Appendix 1 as Boundary Ambiguity Scale #6). The scale remains much like Scale #1, which was used in the original MIA study, except that references to the military and to parents have been deleted. Noted, however, are both Greenberg's findings (1988) for a two-factor structure, and plans by the authors of this publication to test those findings.

Scale #6 is being validated in a five-year longitudinal study of Alzheimer's disease and family stress, presently underway at the University of Minnesota and the Veterans Administration Medical Center of Minneapolis.[2]

The authors invite researchers to test this work, especially those researchers interested in studying the impact on families of chronic illness where there is ambiguous loss. There is a current focus on families of dementia from Alzheimer's disease, but testing this work on families where there are ambiguous losses from other chronic illnesses, such as AIDS, schizophrenia, autism, alcoholism, or Parkinson's disease is encouraged.

It is proposed that boundary ambiguity, more than the illness itself, immobilizes caregivers and families of the chronically ill. The theoretical hypotheses of this entire project now need to be tested by other investigators on a variety of samples where there is unclear loss--divorced, remarried, mid-life/launching, chemically ill and missing persons. It is toward that end, that this manual has been produced.

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[2] National Institute on Aging Grant #1-P50-MH40317-01, Project #5: "The Psycho-Social Impact of Dementia on the Caregiver and Family of Alzheimer Patients," April 1968-1991; Gabe J. Maletta, Principal Investigator for the Dementia Center Grant; Pauline Boss, Principal Investigator for the Dementia Family Project.