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ABSTRACT
                An experiment was performed to obtain judgments of
'324 college students about a list of 18 causal explanations for good
or poor performance on an examination. These stimulus causes were
judged with respect to a description of two hypothetical situations
in which a student either did well or did poorly on the examination.
Half the sample judged the similarity or difference of the 153
possible pairings of these 18 causes for success or failure. The
other half of the sample was asked to rate the stimulus causes on 14
bipolar scales. Multidimensional scaling analysis of the similarities
data in the success and failure conditions indicated that the
subjects in each condition distinguished the causes on two
dimensions: internal versus external and intentional versus
unintentional. Analysis of the bipolar scale ratings provided
statistical support for the interpretation of these dimensions. The
results are discussed in relation to the a priori causal distinctions
made in current attribution models of success-failure.
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Multidimensional Scaling of the Causes for Success and Failure

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Running Head: Multidimensional Scaling.

Abstract

A study was conducted to determine the most salient dimensions underlying the layperson's perception of the causes for success and failure. 324 subjects were presented with 18 causal explanations for good or poor performance on an exam. Subjects rated the similarity of the 18 causes and rated the causes on 14 bipolar scales. Multidimensional scaling analysis of the similarities data in the success and failure conditions indicated that the subjects in each condition distinguished the causes on two dimensions: internal versus external and intentional versus unintentional. Analysis of the bipolar scale ratings provided statistical support for the interpretation of these dimensions. The results were discussed in relation to the a priori causal distinctions made in current attribution models of success-failure.

Multidimensional Scaling of the Causes of·Success and Failure

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In recent years much attention has been devoted toward examining the processes by which people attribute causality for the success and failure out- comes of achievement-related events. The impetus for much of the research in this area has been provided by several models which have sought to explain how people perceive causality for success and failure (Elig & Frieze, 1975; Heider, 1958; Rosenbaum, 1972; Rotter, 1966; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971). In general, these models make two sets of assumptions concern- ing the attribution process for success-failure. One set of assumptions pertains to the causes that people are presumed to use to explain achievement-related out- comes. For example, Weiner et al. (1971) propose that ability, effort, task difficulty and luck are the four causes that most often occur to people as possible explanations for success and failure. A second set of assumptions is that the perceived causes of success and failure can be distinguished from one another on the basis of certain underlying dimensions. To date, the attributional models have proposed that internality-externality (locus of control), stability-instability, and intentionality-unintentionality represent the major underlying dimensions of the causes of success and failure.

Several investigators have recently attempted to establish the validity of the first of these sets of assumptions by assessing the <u>individual causes</u> to which people actually attribute success and failure (Elig & Frieze, 1975; Falbo & Beck, in press; Frieze, 1976; Mann, 1974; Passer, Note 1). However, researchers have paid little attention toward determining the <u>general dimensions</u> on which people actually distinguish such causes. Unfortunately, the few studies that have examined this issue (Falbo & Beck, in press; Lee, Note 2) have failed to provide any defin- itive information regarding the nature of such perceived dimensions due to various methodological and/or interpretative problems. The lack of research on this issue is surprising, given the central importance of the dimensional schemes proposed

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in the various models to the study of the attribution process for success-failure
and to attributional research and theorizing in general. Thus, the present study
sought to determine empirically the general dimensions on which people distinguish
the causes of success and failure, and assess the correspondence between these
perceived dimensions, on the one hand, and the a priori dimensions specified in
the models, on the other.

Method

Subjects were 324 undergraduates recruited from an introductory psychology
course at UCLA. Subjects were run in groups of five to ten. Upon arrival at the
laboratory each subject was given a questionnaire that described a hypothetical
situation in which a student named Pat either did well (success condition) or did
poorly (failure condition) on an examination. A list of 18 possible causes for
that success or failure, respectively, was also presented to each subject. The
18 causes in the success and failure lists were correspondent with one another
(e.g. ability vs. lack of ability, easy vs. hard exam) and represented the most
salient perceived determinants of exam-related success and failure as determined
by the ratings of an independent sample of 168 undergraduates (Passer, Note 1).

Within each of the experimental conditions (defined by success-failure)
subjects performed one of two tasks. Half of the subjects were presented with
all possible pairings (N=153) of the 18 stimulus causes and were asked to judge
the degree of similarity of the two causes within each pair on a nine-point scale
ranging from 1 = "Very Different" to 9 = "Very Similar." To avoid systematic
context-effects, each subject was provided with a unique random order of the
153 pairs and of the position of the two causes within each pair. The remaining
subjects were asked to rate the stimulus causes on 14 bipolar scales. These
scales were chosen to represent dimensions on which the stimulus causes might be

perceived to vary. The 14 scales were presented to each subject in a different random order. Additionally, the order of the 18 causes appearing beneath every scale was randomly determined for each scale of each subject. Subjects were randomly assigned, within sex, to experimental condition (success vs. failure) and to type of task (similarity judgments vs. bipolar scale ratings).

Results

For each experimental condition a set of one-, two-, and three-dimensional solutions was obtained from a INDSCAL multidimensional scaling analysis (Carroll & Chang, 1970) of the similarity judgments. Based upon two criteria, "variance accounted for" and "interpretability," the two-dimensional solutions were chosen to represent the similarities data in each condition.

Interpretation of solutions. The two-dimensional solutions for the success and failure conditions are shown in Figures 1 and 2, respectively.[1] Each solution accounts for 40% of the variance in the similarities data. An examination of the causes at the extremes of Dimension 1 in each solution indicates that this dimension contrasts causes that are internal versus external to the actor. The correspondence between Dimension 1 of the success solution and Dimension 1 of the failure solution is demonstrated by the high correlation between their respective sets of stimulus coordinates ($r = .91$).

Turning to Dimension 11 of each solution, one extreme is anchored by causes which indicate that success or failure was due to some intentional or volitional cause on the part of the actor (e.g. effort/lack of effort, caring/not caring about grades) while the causes at the other extreme represent unintentional causes for the achievement outcome (e.g. good/bad mood, calm/nervous, and for failure, hard exam and unclear questions). Thus, Dimension 11 of each solution appears to contrast intentional versus unintentional causes. The correspondence between Dimension 11 of the success and failure solutions is demonstrated by the high

correlation between their respective sets of stimulus coordinates (r = .88).

Statistical support for interpretations. The mean ratings of the 18 causes on each of the bipolar scales were determined, separately, for the success and failure conditions. These ratings were than correlated, scale by scale, with the 18 stimulus coordinates of each dimension of the INDSCAL success and failure solutions, respectively, as shown in Table 1. Thus, these correlations indicate the correspondence between the location of the causes in the dimensions derived through INDSCAL and the ordering of the causes in terms of each of the bipolar scales.

As Table 1 indicates, the highest correlations for Dimension 1 of the success and failure solutions are found with the scales "Pat--situation," "inside--outside Pat," "Pat's trait--not Pat's trait," and "under--not under Pat's control," offering support for the interpretation of this dimension in each solution as one contrasting internal versus external causes. For Dimension 11 of the failure solution the highest correlations are found with the scales "intentional-- unintentional" and "deliberate--accidental," indicating the appropriateness of the label intentional versus unintentional. For Dimension 11 of the success solution, however, all the correlations are of relatively low magnitude and fail to provide any clear information regarding the meaning of this dimension. An examination of Figure 1 suggests a reason for these results. It can be seen that the six causes located on the external side of Dimension 1 possess very weak loadings on Dimension 11. In total, these six causes account for only 1.40% of the variance in Dimension 11 of the success solution. Thus, whatever the underlying property represented by Dimension 11 may be, this property distinguishes only among internal causes. When bipolar scale x stimulus coordinate correlations for Dimension 11 of the success solution are recomputed for the subset of 12 internal causes, support for the interpretation of this dimension as contrasting intentional versus unintentional causes is found. As the data in the far right-hand column of Table 1 indicate, the highest correlations are found with the scales "intentional--unintentional"

and "deliberate--accidental."

Discussion

The results from this study suggest that, within the domain of academic achievement, subjects distinguish the causes of another's success and failure on two dimensions: internality and intentionality. These findings demonstrate that there is a general correspondence between the types of underlying properties on which the attribution theorist and the layperson judge the causes of achievement outcomes, and offer support for the validity of the dimensional schemes proposed in the attributional models of success-failure.

Although the scaling analysis does not provide any direct information regarding why the subjects distinguished the causes on the dimensions of internality and intentionality, an answer to this question is suggested by supplementary data that were collected in this study (and which could not be reported due to length considerations). These data indicate that the actor's perceived responsibility for success-failure, and the reward-punishment of the actor, are strongly associated with the perceived internality and intentionality of the cause for that outcome. Thus, the salience of these dimensions for the subjects may have arisen from their general concern with the attribution of responsibility and with the dispensation of reward-punishment for achievement-related performance. This assumption seems reasonable since the subjects in this study were students and the determination of responsibility for such performance is a common and important occurrence in the academic environment.

The support provided by this study for the validity of the attributional models of success-failure must be qualified in two respects. First, the model-specified dimension of stability did not emerge from the scaling analysis. (It should be noted that this was not an artifact of the selection of the two-dimensional solutions) Thus, while research has consistently demonstrated that the distinction

between stable and unstable causality is important to subjects in situations where they must use current performance outcomes to formulate expectancies of future task success (see Valle & Frieze, 1976; Weiner, Nierenberg, & Goldstein, 1976), the present data suggest that subjects do not distinguish the causes of success and failure in terms of their stability-instability in situations where the need to formulate such performance expectancies is not salient.

Second, the distribution of causal elements throughout the space defined by the INDSCAL-derived dimensions of internality and intentionality does not correspond fully to the a priori distribution of causes as specified in the attribution models. That is, recent attribution models (Elig & Frieze, 1975; Rosenbaum, 1972) have proposed that the property of intentionality-unintentionality can be used to distinguish between subsets of internal (e.g. effort vs. mood) as well as external (e.g. effort or help of others vs. task difficulty, luck) causes. An examination of Figures 1 and 2, however, reveals that internal causes show greater differentiation on the dimension of intentionality than do external causes. In other words, the intentional-unintentional distinction is a salient one primarily for internal causes.

The reason for this finding might be as follows. The attribution of success or failure to a cause external to the actor is usually sufficient, in and of itself, to alleviate the actor of responsibility for that outcome. Thus, to the extent that attributors are concerned with establishing the actor's responsibility (or lack of it) for success or failure, the question of whether an external cause is intentional or unintentional would not be a particularly meaningful one. Of course, conditions could arise which make it important for the attributor to determine whether such external causes reflect impersonal environmental factors or the intentional actions of other people. However, within the context of ascribing responsibility to the actor, the need for the attributor to attend to the intentionality or unintentionality of external causes would not appear to be great. On the other hand, since internal

causes may or may not reflect the actor's intentions (e.g. effort vs. mental or physical state), the ascription of success of failure to an internal cause is not sufficient, by itself, to establish the actor's responsibility for that outcome. In this case the issue of intentionality would be quite salient to the attributor.

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Footnotes

[1] Due to limitations of the INDSCAL computer program at UCLA, the scaling solutions in the success and failure conditions could not be computed using the full sample (N = 82) in each condition. Thus, within each condition, separate solutions were obtained for male (N = 42) and female (N = 40) subjects to allow for an examination of possible sex differences in the perceived dimensions of success-failure. The success-male and success-female solutions were virtually identical (r = .99) as were the failure-male and failure-female solutions (r = .99). Thus, for parsimony in the presentation of the data (given the absence of sex differences and the fact that this variable was not of primary concern in the present study), Figures 1 and 2 were plotted by averaging the 18 coordinates of the male and female success solutions, and the male and female failure solutions, respectively. These averaged coordinates were then used in the subsequent INDSCAL coordinate x bipolar scale analyses presented in Table 1.

It should also be noted that, for the failure-male and failure-female solutions, the intentional-unintentional dimension emerged from the INDSCAL analysis first, and the internal-external dimension second. The numeration of these dimensions in Figure 2 has been reversed, however, to maintain consistency with Figure 1 and thereby facilitate a clearer presentation and discussion of the results. Inasmuch as repeated INDSCAL analyses of the same data can yield solutions where the order of extraction of the dimensions varies, the numeration of the dimensions should not be viewed as unalterable or as indicating the relative importance of the dimensions.

Table 1

Correlations between INDSCAL stimulus coordinates and bipolar

scale ratings for success and failure conditions

Scale	Failure Dim. I	Failure Dim. II	Success Dim. I	Success Dim. II	Success (Internal 12) Dim. II
1. Active--Passive	.11	.59	.73*	.49	.76
2. Strong--Weak	.05	.38	.52	.54	.73
3. Good--Bad	-.51	-.62	.62	.41	.75
4. Direct--Indirect	-.16	.55	.10	.55	.59
5. Appropriate--Inappropriate	-.52	-.62	.60	.54	.78*
6. Inside--Outside Pat	.89*	.50	.95*	.04	.05
7. Pat--Situation	.88*	.53	.95*	.12	.26
8. Pat's Trait--Not Pat's Trait	.94*	.43	.96*	.00	-.13
9. Under--Not Under Pat's Control	.77*	.72*	.95*	.24	.65
10. Permanent--Temporary	.31	.42	.74*	.37	.46
11. Stable--Unstable	.12	.45	.70*	.47	.58
12. Intentional--Unintentional	.45	.93*	.78*	.50	.84*
13. Deliberate--Accidental	.42	.91*	.80*	.50	.80*
14. Frequent--Rare	.30	.61	.65	.56	.79*

* $p < .001$, one-tailed.

Note. In interpreting the correlations, the high values of the scale ratings coincide with the scale term at the left. The high values for the dimensions correspond to "Internal" for Dimension I and "Intentional" for Dimension II.
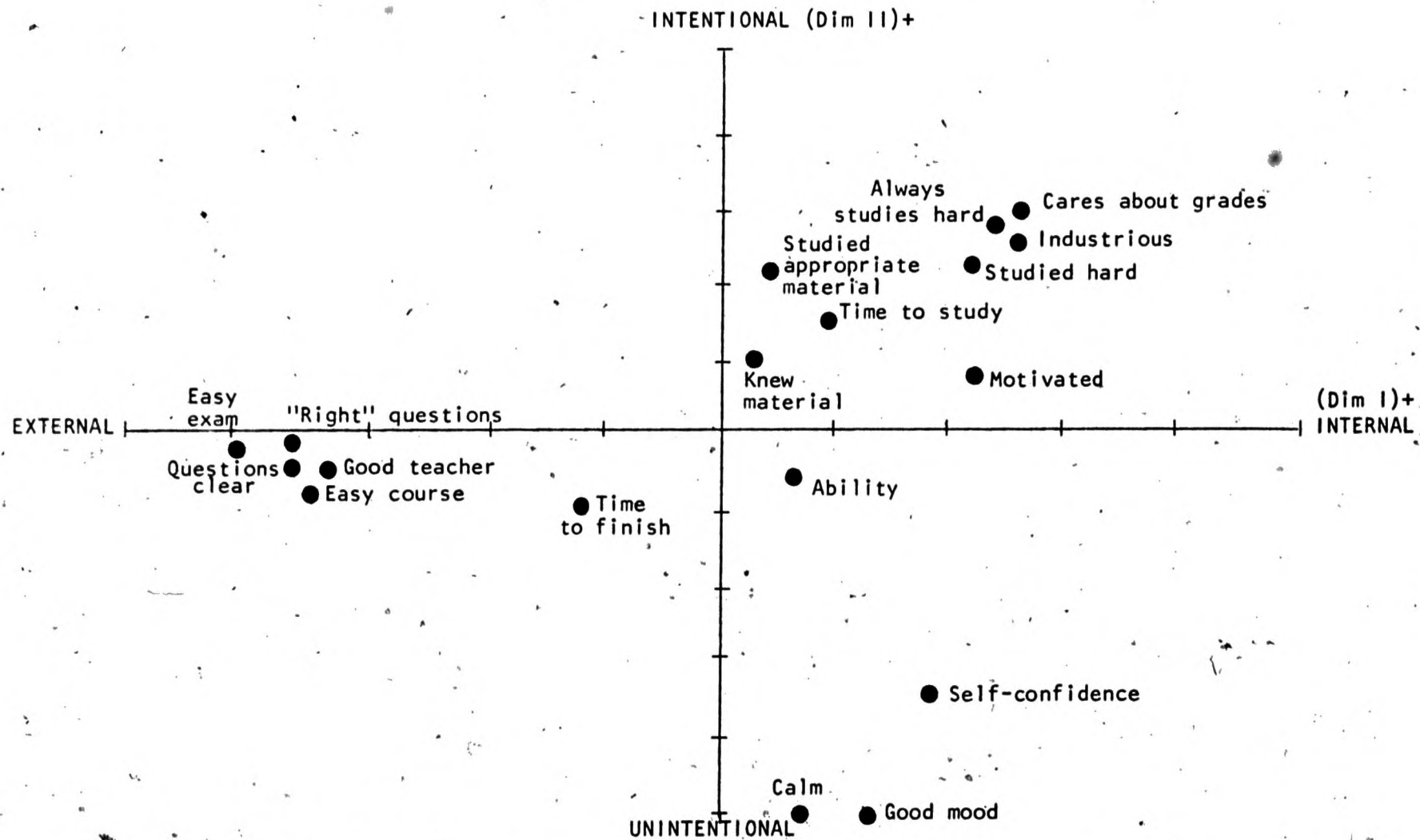
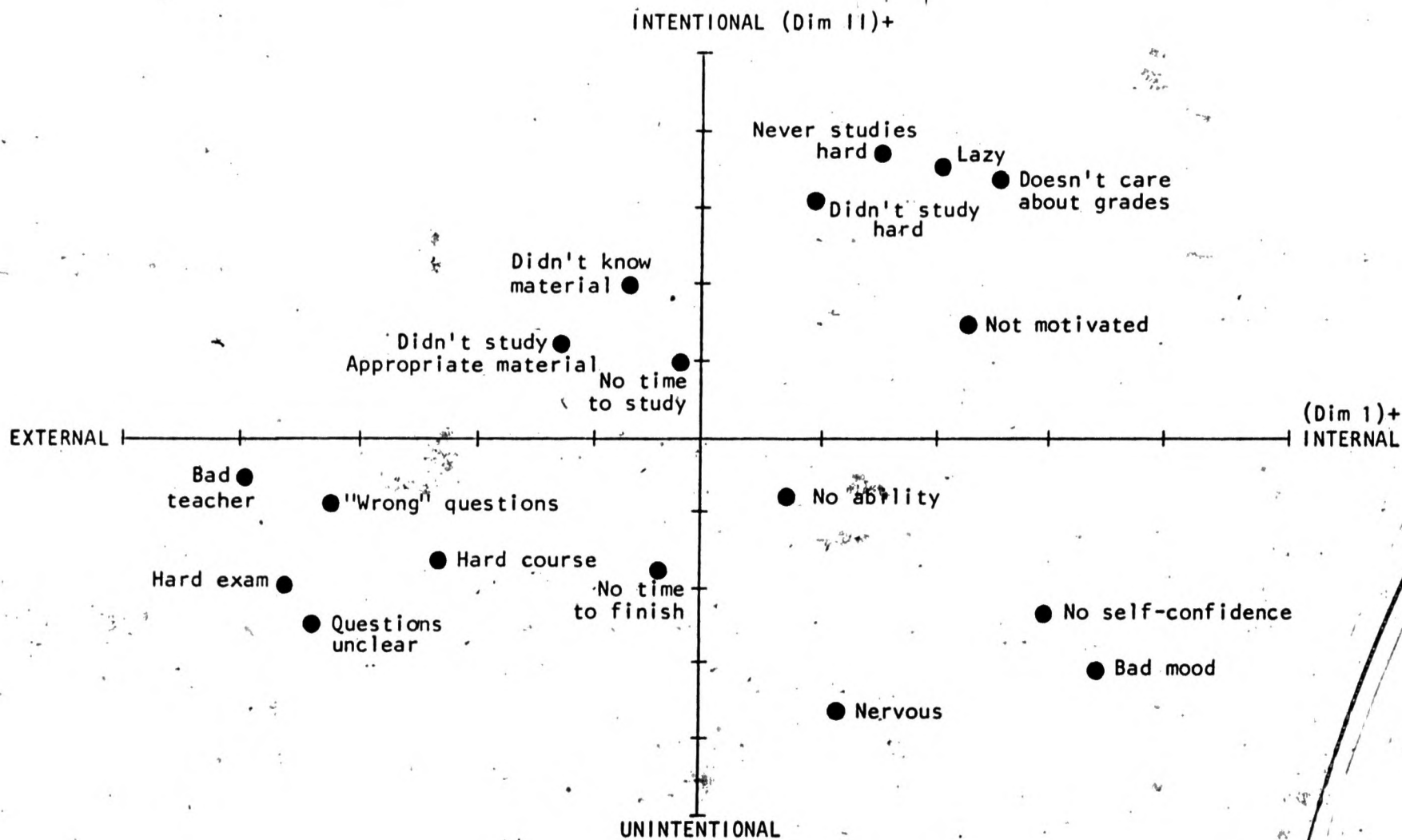Figure 1. Two-dimensional INDSCAL solution for success condition.

Figure 2. Two-dimensional INDSCAL solution for failure condition.