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The Causal Dimension Scale: A Measure of How Individuals Perceive Causes

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A shortcoming of previous attribution research has been the assumption that researchers can accurately translate causal attributions into causal dimensions. Attributional statements are often ambiguous and even when clearly stated may be perceived quite differently by the attributor and the researcher. The studies reported describe the development of the Causal Dimension Scale, a measure designed to assess how the attributor perceives the causes he or she has stated for an event. This scale assesses causal perceptions in terms of the locus of causality, stability, and controllability dimensions described by Weiner. Two studies are reported that test the reliability and validity of the Causal Dimension Scale. All three subscales were found to be reliable and valid, and a three-mode factor analysis confirmed the three-dimensional structure of the scale. Results also indicated differences in the perception of causes of success and failure, with attributions for success being perceived as more internal, stable, and controllable than attributions for failure. The relationship between the Causal Dimension Scale and other attribution measures (such as locus of control or "attributional style" measures) is discussed.

Previous attribution research has suffered from a basic problem that could be termed the "fundamental attribution researcher error" (i.e., assuming that the researcher can accurately interpret the meaning of the subject's causal attributions). In the traditional attribution paradigm, an essential step involves the translation by the researcher of causal attributions into causal dimensions, such as internal–external or stable–unstable. Based on this classification of the subject's causal attributions, the investigator can then test a variety of predictions about the attribution process.

The danger in this procedure is that the researcher and the attributor may not agree on the meaning of a causal attribution. One difficulty is that attributional statements are often ambiguous (see Ross, 1977). In our own research dealing with causal attributions in the sports pages (Lau & Russell, 1980), we found many statements very difficult to interpret. For example, is the causal explanation "They played better than we did" attributing causality to the attributor's own team or to the opposition?

Moreover, even when the meaning of a causal attribution is clear, the attributor may perceive the cause quite differently than the researcher. As Weiner (1979) has noted, the placement of a causal attribution in terms of causal dimensions may vary greatly from person to person, as well as from situation to situation. For example, one student may state that his or her failure in a mathematics course is due to lack of ability and perceive this cause as stable over time. Another student might also view the failure as caused by ability but believe that ability in mathematics can be improved through study. Situational variability in attributions can also occur. An ability attribution for performance in an academic subject is undoubtedly perceived differently than an ability attribution for performance in athletics, where improvements in skill occur through

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practice. The typical attribution paradigm does not allow for these variations in the perception of causes.

To address these problems, this article describes the development of the Causal Dimension Scale, a measure designed to assess how the attributor perceives the causal attributions he or she has stated. First, however, another issue must be addressed: Do people actually organize their thinking in terms of the causal dimensions described by attribution researchers and theorists?

Research supporting relationships between causal dimensions and the consequences of the attribution process, such as affective reactions and expectancies of future success, suggests that people do process information concerning causality in terms of causal dimensions. For example, how can ability attributions for success lead the attributor to anticipate future successes, unless he or she recognizes that ability is stable or unlikely to vary over time? Other research also suggests that causal dimensions underlie individuals' perceptions of causes. Passer (1977) asked subjects to judge the similarity of 15 causes of success and failure. Analyses revealed dimensions underlying these judgments corresponding to locus of causality and controllability. A multidimensional scaling analysis of causes of loneliness by Michela, Peplau, and Weeks (Note 1) found dimensions labeled as locus of causality and stability underlying perceptions of these causes, with controllability emerging as a third nonorthogonal dimension. Finally, a factor-analytic study by Meyer (1980) of causal attributions for success and failure outcomes revealed factors corresponding to the locus of causality, stability, and controllability dimensions underlying importance ratings of the causal explanations.[1]

Thus, it may be possible to assess directly how the *attributor* perceives his or her own causal attributions in terms of causal dimensions. Rather than having the researcher code the attributional statements into dimensions, the attributor does the coding. Assuming that such a Causal Dimension Scale is reliable and valid, responses on this measure should accurately reflect the meaning of causal attributions to the attributor.

Study 1

This study had two goals: (a) generating a set of items for the Causal Dimension Scale, and (b) conducting reliability and validity tests of the generated items. A set of items was written to assess separately each of the three causal dimensions described by Weiner (1979): locus of causality, stability, and controllability. The conceptual definitions provided by Weiner of the locus of causality and stability dimensions were used for writing items. That is, locus of causality was defined as referring to whether the cause was something about the attributor (internal) or outside the attributor (external), whereas stability was defined as referring to whether the cause was constant over time (stable) or variable over time (unstable). For controllability, the definition was modified slightly to allow both internal and external causal factors to be considered controllable. A controllable cause was therefore defined as one that could be changed or affected by someone, either the actor or other people. Based on these definitions of the dimensions, a set of semantic differential scales was developed to measure perceptions of causes along each dimension.

Method

Participants in this study were 189 undergraduate students (117 females, 72 males) who served as subjects to fulfill a requirement for an introductory psychology course. The experimental design was $2 \times 2 \times 2 \times 2 \times 2$ factorial, with the factors being sex of subject, outcome (success or failure), locus of causality, stability, and controllability of the attribution. Sex of subject and outcome were between-subjects factors, whereas the three attribution dimensions were within-subjects factors. The eight different causal attributions used to manipulate the causal dimensions are shown in Table 1. An additional factor, order of the questionnaire materials, was included to control for order effects, with five random orders being used. No significant main ef-

[1] Falbo and Beck (1979) have also reported a multidimensional scaling analysis of causes of success and failure, in which the dimensions described by Weiner were not found. However, Falbo and Beck's interpretations of the dimensions derived from their analysis appears suspect, based on a replication by Weiner (Note 2). Because of this and other problems with the Falbo and Beck study, it is not discussed here (see Weiner, Note 2, for more details).

fects or interactions were associated with this variable, so it will not be discussed further.

Each subject completed a questionnaire that consisted of descriptions of eight different achievement situations, followed by the semantic differential scales. The achievement situations consisted of an outcome (success or failure) and one of the eight causal attributions shown in Table 1. The following is an example of one of the situations, for failure due to lack of ability:

> Imagine that you have received a very low score in a class that is very important to you. You feel the reason you received this low score is your lack of ability in the subject.

While imagining themselves in each situation, the students evaluated the cause of the success or failure outcome on 12 semantic differential scales. An example of one of the items assessing the locus of causality dimension was "Reflects on you–reflects your situation." Students rated the extent to which they felt the cause was internal or external on this scale, by circling a number from 1 to 9. The other 11 items that were used are shown in Table 2. In total, each student made 96 ratings, evaluating the eight causal attributions on all 12 semantic differential scales.

Table 1
Specific Causal Attributions Used to Manipulate Causal Dimensions

	Stability	
Controllability	Stable	Unstable
	Internal	
Controllable	Stable effort	Unstable effort
Uncontrollable	Ability	Mood
	External	
Controllable	Other's stable effort	Other's unstable effort
Uncontrollable	Task difficulty	Luck

Results and Discussion

To test the validity of the individual semantic differential scales, each item was subjected to separate analyses of variance. If a given item is indeed assessing the causal dimension it was designed to measure, the main effect for that dimension should be very large. So, for example, an item designed to assess the locus of causality dimension should produce significantly different ratings for internal versus external causes. Moreover, each item should also have *discriminant* validity. That is, an item designed to assess locus of causality should not also differentiate stable from unstable causes or controllable from uncontrollable causes.

Thus, the main effects for the three causal dimensions provide validity tests for the individual semantic differential scales. The results are presented in Table 2, along with the variance accounted for by each main effect. Considering the three locus of causality items first, the results clearly indicate that these items adequately distinguish between internal and external causes. The locus of causality main effect accounts for 46–59% of the variance in these items, while very little of the variance is explained by the other two causal dimensions. Turning next to the stability items, these rating scales were found to differentiate stable from unstable causes, with the stability main effect accounting for 18–19% of the variance in these items. For the controllability items, confounding by the locus of causality dimension is apparent, with main effects for the latter dimension accounting for substantial portions of the variance in these rating scales. Only one of the controllability rating scales (Unintentional–intentional) appears to adequately assess the controllability dimension.

From these validity tests, it appears that the locus of causality and stability dimensions are assessed reasonably well. The three items assessing these two dimensions can therefore be combined into subscales. One concern is the reliability of these three-item scales. A coefficient α value of .88 was found for both subscales.[2] Thus, these two measures also appear to be reliable. However, the scales assessing the controllability dimension are problematic. An examination

[2] In calculating the alpha coefficients, interitem correlations were computed by collapsing across the experimental conditions. Since each subject made eight ratings on each rating scale (one for each causal attribution) the data were treated as if there had been $189 \times 8 = 1152$ observations. Because the experimental conditions created a good deal of variation in the ratings on the semantic differential scales, this procedure seemed appropriate, as correlations among the items will also reflect covariation in ratings on the items across the experimental conditions.

of the individual rating scale items revealed the apparent source of the problem. The controllability items were found to be primarily of two types: (a) internal-controllable scales (e.g., Not under your control–under your control) and (b) external-controllable scales (e.g., Under control by others–not under control by others). These items obviously confound the locus of causality and controllability dimensions, as indicated by the large main effect for locus of causality found for these items. The single item that was found to adequately measure controllability (Unintentional–intentional) can refer to the person performing the achievement task or other people. Controllability is therefore specified independently of locus of causality.

To summarize these findings, the locus of causality and stability dimensions appear to be adequately assessed by their respective three-item subscales. All but one of the controllability items was found to be confounded by the locus of causality dimension. Two more controllability scales were therefore constructed based on these findings and added to the single adequate controllability item. The resulting nine-item Causal Dimension Scale was employed in the next study, in an attempt to replicate the findings from Study 1 and to test the adequacy of the controllability items once again.

Study 2

Method

Participants in this study were 99 undergraduates (38 females, 61 males) who participated to satisfy a requirement for an introductory psychology course. The experimental design was identical to that employed in Study 1, with the same scenarios used to manipulate causal dimensions (see Table 1). Students evaluated the

Table 2
Analysis of Variance Results and Variance Accounted for by Each Main Effect

	Effect					
	Locus of Causality		Stability		Controllability	
Item	F	ω^2	F	ω^2	F	ω^2
Locus of causality						
Reflects on you–reflects your situation	678.69***	.46	50.03***	.02	36.78***	.02
Outside of you–inside of you	720.65***	.59	40.71***	.02	29.86***	.01
Something about you–something about others	741.54***	.47	1.77	.00	2.60	.00
Stability						
Permanent–temporary	74.92***	.08	346.58***	.19	113.51***	.05
Variable over time–stable over time	80.05***	.07	290.30***	.18	89.81***	.07
Changeable–unchanging	26.47***	.03	276.35***	.18	54.70***	.04
Controllability						
Not under your control–under your control	973.45***	.49	47.79***	.02	240.02***	.08
You are responsible–you are not responsible	855.21***	.56	29.58***	.01	78.79***	.03
Uninfluenceable–influenceable	4.89*	.00	24.97***	.01	2.91	.00
Someone else is responsible–no one else is responsible	846.31***	.42	<1	.00	3.03	.00
Under control by others–not under control by others	786.29***	.40	<1	.00	3.97*	.00
Unintentional–intentional	69.53***	.08	102.61***	.05	333.53***	.23

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

Table 3
Analysis of Variance Results and Variance Accounted for by Each Main Effect

Item	Effect					
	Locus of causality		Stability		Controllability	
	F	ω^2	F	ω^2	F	ω^2
Locus of causality						
Reflects on you–reflects your situation	425.03***	.54	4.96*	.00	10.40**	.01
Outside of you–inside of you	356.20***	.56	1.05	.00	2.68	.00
Something about you–something about others	397.26***	.50	<1	.00	13.04***	.01
Stability						
Permanent–temporary	24.84***	.05	142.06***	.19	18.80***	.02
Variable over time–stable over time	41.52***	.08	82.16***	.15	11.68***	.01
Changeable–unchanging	7.95**	.02	106.24***	.14	2.11	.00
Controllability						
Uncontrollable by you or other people–controllable by you or other people	17.87***	.04	7.06**	.01	82.32***	.14
Intended by you or other people–unintended by you or other people	17.66***	.02	46.14***	.01	169.44***	.24
No one is responsible–Someone is responsible	3.06	.00	41.12***	.03	201.71***	.26

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

causes in each situation using the revised rating scales developed in Study 1. Five different random orders of the questionnaire materials were again used. No significant order effects were found.

Results and Discussion

Validity tests for the individual Causal Dimension Scale items were performed, identical to those reported in Study 1. These results are presented in Table 3. For each item, the largest main effect was found for the dimension the item was designed to assess. Results for the locus of causality and stability rating scales were very similar to the findings from Study 1. The controllability rating scales also appeared valid, with the controllability main effect accounting for 14–26% of the variance. Main effects for the other two causal dimensions were generally quite small. All three causal dimensions therefore appeared to be adequately assessed by the final nine-item measure.

To examine the factor structure of the final scale, a factor analysis was performed on the rating scales. Since the data formed an Individuals × Experimental Conditions × Rating Scales matrix, a three-mode factor analysis was conducted (Tucker, 1966). This procedure allows the derivation of factors for each mode (individuals, conditions, and rating scales), as well as a core matrix relating the factor structure for each mode to all others. Attention will be focused on the factor structure found to underlie the rating scales.[3] Three principle component factors were extracted for the rating scales and rotated by varimax procedures to simple structure. The resulting factor-loading matrix is shown in Table 4. As can be seen, the factor structure for the scale very clearly corresponds to the three causal dimension subscales. Also shown in Table 4 are the alpha coefficients for the three subscales. Consistent with the factor analysis results, all three scales were found to be internally consistent.

[3] More detailed information on the factor analysis results may be obtained by writing the author.

Table 4
Factor Analysis Results for the Causal Dimension Scale Items

Item	Factor loadings		
	Locus of causality	Stability	Controllability
Reflects on you–reflects your situation	.558	.056	−.004
Outside of you–inside of you	.534	.018	.093
Something about you–something about others	.621	−.068	−.071
Permanent–temporary	.052	.529	.005
Variable over time–stable over time	.011	.577	.040
Changeable–unchanging	−.064	.602	−.053
Uncontrollable by you or other people–controllable by you or other people	.046	−.045	.575
Intended by you or other people–unintended by you or other people	.031	.109	.548
No one is responsible–someone is responsible	−.086	−.058	.593
α coefficient	.867	.837	.730

Note. These are the factor loadings following a varimax rotation.

As in Study 1, scores were computed for the three causal dimension subscales by summing the responses to the individual semantic differential scales. Correlations were computed among the subscale scores, collapsing across the experimental conditions (see Footnote 2). As suggested by the factor analysis results, the subscales were only moderately related to one another, the correlations ranging from .19 to .28. Analyses of variance were performed on the subscale scores. The between-subjects factors were sex of subject and outcome and the within-subjects factors were the three attribution dimensions. As would be expected for the attribution dimensions, the largest effects were the main effects for the dimension measured by the respective causal dimension subscales (see Table 5). For the between-subjects factors, no significant main effects for sex of subject were found. Significant differences were found for the achievement outcome. Overall, subjects tended to view the causes of success as more internal, $F(1, 95) = 3.31$, $p < .10$, more stable, $F(1, 95) = 24.33$, $p < .001$, and more controllable, $F(1, 95) = 81.8$, $p < .01$. These differences between the evaluations of causes following success and failure outcomes suggest that a process similar to hedonic bias is influencing the ratings of causes (see Bradley, 1978; Zuckerman, 1979). In contrast to previous research on hedonic bias, the current findings deal with how individuals *perceive* causal attributions, and not *which* causal attributions are used to explain success and failure. These findings indicate that specific causal attributions are viewed differently following success and failure. So, for example, ability attributions are perceived

Table 5
Analysis of Variance Results for the Causal Dimension Subscales

Scale	Effect					
	Locus of causality		Stability		Controllability	
	F	ω^2	F	ω^2	F	ω^2
Locus of causality	541.63***	.62	<1	.00	<1	.00
Stability	28.94***	.05	156.14***	.20	14.28***	.01
Controllability	22.81***	.03	43.98***	.04	238.50***	.29

*** $p < .001$.

as more internal, stable, and controllable following success than following failure. Finally, no significant interactions between sex of subject and the achievement outcome were found for the ratings on the three causal dimension subscales.

To summarize the findings from Study 2, the three subscales that form the final Causal Dimension Scale appear to measure the dimensional properties of causes identified by Weiner (1979). A three-mode factor analysis confirmed the three-factor structure of the Causal Dimension Scale and all three subscales were found to be internally consistent. Finally, the ratings of causes on the Causal Dimension Scale following success and failure outcomes suggest that a process similar to hedonic bias may influence how causes are perceived by the individual.

General Discussion

The items, recommended administration format, and scoring for the Causal Dimension Scale are presented in Table 6. This administration format is designed for settings in which the investigator is assessing both the respondent's causal explanation for an event and the respondent's perceptions of the causes he or she has stated. Applications of the measure to settings in which the causal attributions are experimentally manipulated would, of course, eliminate the need for respondents to state causal attributions.

Although the results of the current studies clearly support the validity of the measure, some precautionary comments are also in order. The validity of the measure in assessing causal dimensions in real-world settings needs to be established. A variety of other factors may influence responses to the Causal Dimension Scale in actual achievement settings, which could adversely affect the validity of the measure. Other evidence suggests that the scale is valid in assessing causal dimensions in actual achievement settings (see Russell, Note 3). A similar issue arises in applying the Causal Dimension Scale to settings other than achievement.

Table 6
The Final Causal Dimension Scale

Instructions: Think about the reason or reasons you have written above. The items below concern your impressions or opinions of this cause or causes of your outcome. Circle one number for each of the following scales.

1. Is the cause(s) something that:										
Reflects an aspect of yourself	9	8	7	6	5	4	3	2	1	Reflects an aspect of the situation
2. Is the cause(s):										
Controllable by you or other people	9	8	7	6	5	4	3	2	1	Uncontrollable by you or other people
3. Is the cause(s) something that is:										
Permanent	9	8	7	6	5	4	3	2	1	Temporary
4. Is the cause(s) something:										
Intended by you or other people	9	8	7	6	5	4	3	2	1	Unintended by you or other people
5. Is the cause(s) something that is:										
Outside of you	1	2	3	4	5	6	7	8	9	Inside of you
6. Is the cause(s) something that is:										
Variable over time	1	2	3	4	5	6	7	8	9	Stable over time
7. Is the cause(s):										
Something about you	9	8	7	6	5	4	3	2	1	Something about others
8. Is the cause(s) something that is:										
Changeable	1	2	3	4	5	6	7	8	9	Unchanging
9. Is the cause(s) something for which:										
No one is responsible	1	2	3	4	5	6	7	8	9	Someone is responsible

Note. A total score for each of the three subscales is arrived at by summing the responses to the individual items as follows: (1) locus of causality—Items 1, 5, and 7; (2) stability—Items 3, 6, and 8; (3) controllability—Items 2, 4, and 9. High scores on these subscales indicate that the cause is perceived as internal, stable, and controllable.

Although the measure may be valid in assessing the perceptions of causes in achievement contexts, the validity of the scale also needs to be established in other settings where attributions occur.

Another issue is the construct validity of the measure. If the Causal Dimension Scale does in fact assess the dimensional properties of causes described by Weiner (1979), then scores on the measure should be related to other variables as predicted from Weiner's model. So, for example, scores on the locus of causality subscale should be related to affective reactions following success and failure. Additional research of mine provides some preliminary evidence for the construct validity of the Causal Dimension Scale, indicating strong relationships between scores on the locus of causality subscale and affective reactions to success and failure (Russell, Note 3, Note 4). Although these validity findings are encouraging, more research employing the measure to test other predictions from Weiner's model is clearly needed.

Finally, the relationship between the Causal Dimension Scale and other measures in the attributional domain should be mentioned. A number of measures of locus of control beliefs have been developed for a wide range of life situations (Rotter, 1966) and more specifically for achievement (Crandall, Katkovsky, & Crandall, 1965) and health-related situations (Lau & Ware, 1981; Wallston & Wallston, 1980). Measures more closely related to attribution research have also been devised (Laird & Berglas, 1975; Lefcourt, von Baeyer, Ware, & Cox, 1979). Recently an attributional style measure has been developed by Seligman, Abramson, Semmel, and von Baeyer (1979) to assess the respondent's perceptions of the causes of hypothetical achievement and affiliative events. This measure employs a format very similar to the Causal Dimension Scale. It asks respondents to state a causal attribution for the hypothetical event and then to rate the cause on a set of semantic differential scales assessing the attributional dimensions of locus of causality, stability, and globality. All of these previous measures are designed to assess the individual's general or cross-situational perceptions of causality. For example, the attributional style measure developed by Seligman et al. (1979) assesses the extent to which an individual generally perceives achievement or affiliative events as internally or externally caused. By contrast, the Causal Dimension Scale assesses the respondent's perceptions of causes in a *particular situation.* Although attributional styles or general beliefs concerning locus of control may influence how an individual perceives causes in a specific situation, causal perceptions are also greatly influenced by situational factors (see Weiner, 1979). Future research needs to address trait and situational influences on causal perceptions by examining the impact of attributional styles or general causal beliefs and situational factors on the attribution process, employing measures such as the Causal Dimension Scale.

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