On the causal information conveyed by different interpersonal verbs: The role of implicit sentence context

Fiedler, K.; Semin, G.R.

published in
Social Cognition
1988

document version
Publisher's PDF, also known as Version of record

Link to publication in VU Research Portal

citation for published version (APA)
Fiedler, K., & Semin, G. R. (1988). On the causal information conveyed by different interpersonal verbs: The role of implicit sentence context. *Social Cognition*, *6*, 21-39.

ON THE CAUSAL INFORMATION CONVEYED BY DIFFERENT INTERPERSONAL VERBS: THE ROLE OF IMPLICIT SENTENCE CONTEXT

KLAUS FIEDLER
University of Giessen

GÜN R. SEMIN
University of Sussex

The study reported here addresses the issue of why two different verb categories in sentences regularly elicit causal attributions to either the subject or the object of the sentence. State verbs (e.g., "hate," "love") predominantly evoke object attributions, whereas interpretive action verbs (e.g., "cheat," "help") evoke subject attributions. Different attempts to explain the phenomenon of implicit causality are critically discussed, and an argument is advanced for an alternative approach that focuses on the differential information these verb categories provide about the antecedent and consequent conditions of a sentence. An empirical study examining the inferences subjects draw concerning sentence contexts provides support for this contention. In the context of sentences with state verbs, inferences about the objects of the sentences appeared as antecedent conditions, while inferences about the subjects appeared as consequences, thus implying object causation. The reverse pattern was observed for sentences with interpretative action verbs. The implications of these results for the issue of implicit causality are discussed.

The issue of how causality is ascribed in everyday life has been a central preoccupation for a variety of approaches in social psychology, largely inspired by Heider's work on phenomenal causality (see Heider, 1944, 1958). Chief among these is attribution theory, but there are

also approaches that have focused on an analysis of the properties of language, and the relationship between language and attribution of causality. In order to develop the rationale of the present study, a critical overview of the existing approaches is presented, revealing that most of these approaches are either theoretically or empirically equivocal. The study reported here was concerned with how inter-personal verbs affect causal inferences; it examined the different con-textual information that is mediated by different interpersonal verbs.

Interpersonal verbs are those linguistic devices that can be used to express behaviors or relations between individuals with reference to overt actions (e.g., "help," "follow"), accomplishments (e.g., "defeat," "reach"), emotional states (e.g., "like," "admire"), or cognitive states or events (e.g., "recognize," "believe"). Typically, these verbs are transitive, with a logical subject and object that allow for the formation of both active and passive sentences. This simple grammatical property alone points to the interesting fact that the use of interpersonal verbs goes beyond the mere description of social behaviors by providing interpretations, if only by the syntactic choice of the active or passive voice (thereby focusing on either the logical subject or object). Apart from this syntactic choice, however, the semantic choice of specific verbs can trigger many inferences about the sentence subject (S) and object (O), and can suggest interpretations about the context in which the stated behavior occurs. Thus the verb not only serves to explicitly express the stated sentence (cf. Miller & Johnson-Laird, 1976), but also conveys considerable implicit information about the antecedent and consequent conditions of the sentence; about the kinds of persons that S and O are; and about many other facets of the behavioral context.

The study reported here addressed one particular aspect of how "going beyond the information given" is mediated, by examining the implicit causality peculiar to interpersonal verbs. Various authors have already noted that certain verbs regularly create the impression that the origin or cause of the sentence is located within S, whereas other verbs direct causal ascriptions to O (e.g., Abelson & Kanouse, 1966; Au, 1986; Brown & Fish, 1983; Fiedler, 1978; Garvey & Caramazza, 1974; McArthur, 1972). Although the labels used to denote the categories of verbs that give rise to S or O attributions vary among authors, the reliability and replicability of the empirical findings are considerable. On the one hand, there are action verbs expressing manifest, observable behaviors (e.g., "help," "inhibit," "free," "cheat"), which usually imply causation by S. On the other hand, there are state verbs expressing emotional or cognitive states or changes of states (e.g., "like," "admire," "abhor," "respect"), which are mostly understood to imply causation

by O. Thus, the sentence "S inhibits O" appears to be due to something within S, whereas the sentence "S respects O" tends to be attributed to something within O. It is important to note that the aforementioned verb categories can be distinguished by independent linguistic criteria and do not rely merely on an intuitive understanding of their causal impact. Furthermore, it should be noted that the causal difference between the two verb categories is very regular and significant. Thus, in one study, it was possible to show that 23 out of 24 verbs were correctly categorized by a hierarchical cluster analysis based on causality data (cf. Fiedler, 1978). A recent study by Au (1986) failed to obtain unequivocal support for the observed regularities in the case of some action verbs. She identifies a number of "action" verbs that in S-verb-O sentences are not attributed to S as is regularly documented in the earlier literature. Closer inspection of her materials reveals, however, that this does not appear to invalidate the present premise. Au's sample of action verbs would appear to be nonrepresentative in several respects. The deviating verbs typically do not refer to overt action, but to speech acts (e.g., "praise," "punish," "congratulate"), and are typically used as metalinguistic devices to express attribution to O. These types of verbs, of course, imply O causation.[1]

What are the implications for the noted regularities between the two verb categories? Given the same behavioral referent (e.g., observing a child, S, behaving in much the same way as some adult person, O), one can either use an action verb ("S imitates O") to imply S causation, or an affective state verb ("S admires O") to imply that some attribute of O is the origin of the behavior. In a similar vein, the same observation can be commented on by either "S rewards O" (action verb) or "S respects O" (state verb), thereby giving different weights to either S's autonomous act or O's accomplishment. These examples raise two important points pertaining to the practical and theoretical relevance of the implicit causality issue.

First, it is important to note that competent language users are normally unaware of the implicit knowledge conveyed by their choice of different verbs. This may provide the basis for a rich source of misunderstandings and conflicts (e.g., quarrels in close personal relationships; conflicting arguments in a judicial trial about the interpretation of a delinquent's behavior that has to be encoded verbally;

---

1. It should also be noted that the specific methodology used by Au (i.e., a free-response format in the completion of "because" phrases) produces a general bias toward O-related completions. A meaningful completion of the sentence "The father punished his son because . . . " is to say something about the son, in accordance with the rule of reciprocation. However, another response format will often yield S attribution for the act of punishment.

etc.). Second, the examples given above illustrate the ambiguity that is always involved in the use of such interpersonal verbs. Neither "respect" nor "reward" can be objectively verified; both always involve some degree of interpretation and active inference. Given this interpretational element of interpersonal verbs, it is hardly surprising that they are associated with causal attributions.

This examination of the causal impact of verbs is incomplete, insofar as the linguistic devices used in expressing relations between individuals are not exhaustively covered by the aforementioned types of verbs alone. We (Semin & Fiedler, 1988) have shown that interpretive action verbs (IAVs) and state verbs (SVs) represent two intermediary categories within a four-level categorization, in which the extreme categories are occupied by descriptive action verbs (DAVs) and adjectives (Adjs). This complete four-level classification is described in detail in Table 1. In connection with this classification, it should be noted that as one moves upward from DAVs to IAVs to SVs to Adjs, the use of language is gradually detached from the situational context and the specific empirical events to which the propositions refer (cf. Semin & Fiedler, 1986, for details). Thus, "S hits O" (DAV) refers to a specific event and can only be interpreted (as aggression, distraction, etc.) in

TABLE 1
Fourfold Classification of Linguistic Terms Differing in Abstractness and Context Dependency

LEVEL	CATEGORY	EXAMPLES	CHARACTERISTIC FEATURES
I	Descriptive action verbs (DAVs)	Call Meet See Visit	Reference to single behavioral event; reference to specific object and situation; context essential for sentence comprehension; objective description of observable events.
II	Interpretive action verbs (IAVs)	Cheat Imitate Help Inhibit	Reference to single behavioral event; reference to specific object and situation; autonomous sentence comprehension; interpretation beyond mere description.
III	State verbs (SVs)	Admire Hate Like Abhor	Enduring states, abstracted from single events; reference to social object, but not situation; no context reference preserved; interpretation beyond mere description.
IV	Adjectives (Adjs)	Honest Aggressive Reliable Helpful	Highly abstract person disposition; no object reference or situation reference; no context reference; highly interpretive, detached from specific behaviors.

a situational context; "S attacks O" (IAV) already abstracts from the specific way of acting, but still conserves the reference to a certain behavioral referent; "S hates O" (SV) denotes a temporally more enduring state that no longer corresponds to an identifiable act; and "S is hostile" (Adj) represents the highest degree of abstraction (i.e., abstracting over time and situation, and even over O). With the increasing abstractness of the linguistic category in use, the validity of a sentence becomes more independent from its relation to an empirical event and thus increasingly determined by its relation to other abstract terms (e.g., "hostile" is validated by other adjectives, such as "aggressive," "outgoing," or "volatile").

Within such a framework it becomes evident that the verbal mediation of behavioral causes and reasons is particularly characteristic of the two intermediate levels of abstraction—namely, IAVs and SVs. In contrast, in the case of Adjs and DAVs, the question concerning causal origin becomes a "strange" or rather unnecessary one, although the reasons for this are different in the case of Adjs from that of DAVs. The question of causal origin is trivially relevant in the case of sentences with Adjs (e.g., "S is hostile"). This is because in the case of Adjs such sentences already abstract from factors outside the subject. In the case of a purely descriptive sentence, however (e.g., "S calls O"), we have a very specific reference that does not reveal any constant locus of causality outside of S. Thus, the restriction of the present investigation to IAVs and SVs should not be considered as an arbitrary decision within this broader framework, but rather as representing the linguistic level on which implicit causality is actually conveyed.

ALTERNATIVE ACCOUNTS FOR IMPLICIT CAUSALITY IN VERBS

In this section, a brief overview of different arguments is provided as a background to the study reported here.

MORPHOLOGY OF LANGUAGE

One of the possibilities that has been considered and rejected by Brown and Fish (1983) is that the regularity of causal inferences from verbs simply reflects an interesting morphological property of language. Adjectives derived from IAVs mostly point to the logical subject (e.g., "helpful" pertains to S in the sentence "S helps O"), whereas adjectives derived from SVs often point to the logical object (e.g., "likable"

points to O in the sentence "S likes O"). If such morphological pointers were responsible for, or merely related to, the causal impact of verbs, then one would expect a reversal (or at least a reduction) of causal attributions for those verbs that deviate from the morphological rule. There are a number of exceptions to the adjective derivation rule in English (e.g., "appreciative," "commendable"), as well as in other languages (e.g., in German, *liebevoll, feindselig, neidisch*), and yet the causal direction does not appear to be reversed for the corresponding IAV and SV sentences (see also Brown & Fish, 1983). Although there is no support for predictions based on this crude morphological account, it is possible that more sophisticated versions may prove of future interest.

PRINCIPLES OF ATTRIBUTION

Among the most universal rules of causal attribution (cf. Kelley, 1967, 1973; McArthur, 1972; Pruitt & Insko, 1980) are the principles of consensus, distinctiveness, and consistency. Accordingly, a sentence should be attributed to S if the behavior expressed in the sentence is specific to this S (low consensus) but is generalizable across different Os (low distinctiveness) and across various situations (high consistency). By the same token, a behavior that can be observed in many Ss (high consensus) and situations (high consistency) but only in relation to a specific O (high distinctiveness) indicates something peculiar to this O as the causal origin. In fact, there is some empirical evidence that IAV sentences are more S-specific and SV sentences are more O-specific. For instance, given the sentence "Steve helps Paul," language users are likely to infer that Steve will help other persons as well; given the sentence "Susan likes Eve," they may infer that Eve will be liked by other persons too. In other words, IAVs and SVs may create the patterns of consensus and distinctiveness that lead to S and O attributions, according to Kelley's model of attribution. It should be noted, parenthetically, that the empirical evidence on generalizing and generic inferences (Abelson & Kanouse, 1966; Fiedler, 1978; McArthur, 1972) cannot be interpreted unequivocally and does not necessarily support this hypothesis. Nevertheless, the argument depicted here constitutes a plausible and parsimonious explanation of the causal impact of different verb categories.

A logically very similar argument has been formulated by Brown and Fish (1983) within a psycholinguistic framework. Instead of IAVs and SVs, they refer to verbs that activate an "agent–patient schema" (if "S helps O," S is the agent and O is the patient) as contrasted with

verbs that activate a "stimulus–experiencer schema" (if "S likes O," O is the stimulus and S is the experiencer). The agent in the former schema and the stimulus in the latter schema are regularly perceived as the causal origins of behavior. According to these authors, agent–patient schemas may be applicable to a larger class of patients than of agents (everyone can be helped, flattered, cheated), whereas stimulus–experiencer schemas may apply to more experiencers than stimuli (it is an intrinsic property of all people to like, hate, fear). As a consequence, agent–patient sentences are more informative regarding S (the agent), and stimulus–experiencer sentences are relatively more informative regarding O (the stimulus).

Both of these logically related explanations rely at present on only correlational evidence. The same verb classes that lead to S or O attributions may also trigger different inferences about the specificity of Ss and Os. However, the crucial question that remains open is whether inferences really mediate the implicit causality of verbs. Is some implicit assessment of S specificity and O specificity involved in the cognitive process by which people extract implicit causality? While there is presently no positive evidence to support such a claim, we know of at least one negative finding (Fiedler, 1978): When sentences included explicit temporal quantifiers (e.g., "S always helps O" or "S sometimes likes O"), the verb-specific pattern of generalization across S and O was shown to disappear, although the causal impact of the verb remained. Thus, before the specificity hypothesis is put to a more thorough empirical test, we prefer to regard the causal inferences as primary and the correlated generalizing inferences to S or O as a secondary phenomenon that reflects, rather than explains, implicit causality.

IMPLICIT ANTECEDENTS AND CONSEQUENCES: A NEGLECTED ACCOUNT

Despite the intriguing ideas that one encounters in reviewing these different attempts to explain the causal impact of verbs, we are left with the negative conclusion that most hypotheses fail, are insufficient, or at least are not supported by empirical evidence. In fact, the strength and immediacy of the verb–causality relation place a heavy burden on any account, so that some authors actually consider the phenomenon to be a basic one (i.e., a basic property of verb semantics) not requiring a pragmatic or psychological explanation. This seems to be the position advocated by Garvey, Caramazza, and Yates (1976). Before we resort to such a "final" position, however, it seems worthwhile to consider

one further possibility that is intimately related to any systematization of causality, although it has not been considered so far—namely, an account of implicit causality in terms of antecedents and consequences.

Whenever we use a sentence in a text or in natural discourse, it is embedded in a context of antecedent and consequent sentences or in the context of referential behaviors. These either precede or are anticipated to follow the focal sentence. Granting that this context is necessary to understand the full meaning of all but the simplest sentences, then people may be expected to infer or imagine the temporal sentence context when no context is explicitly provided. Thus the argument advanced here is that the causal impact of verbs somehow reflects an implicit sentence context—that is, the kind of behaviors that are inferred as preceding and/or following the behavior stated in a focused sentence.

To illustrate this argument, let us once more compare the IAV sentence "S helps O" with the SV sentence "S likes O." A typical sequence embedding the IAV sentence is as follows:

Antecedent: "S cared for O."
IAV:"S helps O."
Consequent: "O will thank S."

For the SV sentence, the embedding context could be as follows:

Antecedent: "O encouraged S."
SV:"S likes O."
Consequent: "S will invite O."

Obviously, an antecedent sentence tells us something about the circumstances that lead to the behavior in question, whereas a consequent sentence entails information about the effect of behavior. In other words, we may regard the antecedent sentence as a statement about the origin and the consequent behavior as a statement about the aim of the behavior. If the causal direction is from S to O (i.e., S is the origin and O the aim), the antecedent sentence should express what S did (i.e., have S in the subject position) and the consequent sentence should express what O will do as a reaction (i.e., have O in the subject position). Note that this pattern is exemplified above by the context of the IAV "help." On the other hand, if O appears as the origin (O in the subject position of the antecedent sentence) and S as the aim (S in the subject position of the consequent sentence), the whole sentence should be understood as caused by O. And this case corresponds to the example above for the SV "like."

If such differential patterns of inferred antecedents and consequences could be shown to hold empirically, not just for arbitrarily selected examples but for IAVs and SVs in general, then we would have situated the issue of implicit causality within the classical constituents of the concept of causality: antecedent and consequent conditions.

METHOD

PARTICIPANTS

Eighteen male and female students of psychology at the University of Giessen completed a questionnaire in which they were asked to supply inferences concerning the antecedent and consequent conditions of simple sentences. They participated in this study in partial fulfillment of their course requirements. None of them knew about the psychological background of the study. The study was conducted in German, and replications of earlier work (e.g., Semin & Fiedler, 1988) in German confirmed that the subtleties of interpersonal verbs in German correspond to those found in English.

MATERIALS

Each questionnaire contained 38 stimulus sentences composed of 19 IAVs and 19 SVs, with different male first names inserted in the subject and object positions. Thus stimulus sentences were always of the form "Paul helps George," "Mike likes Peter," and the like. Each single questionnaire presented the verbs in a different random order and with a different random allocation of names (drawn from a pool of 21 common names). Above and below each stimulus sentence, a blank space was left so that the subject could fill in the inferred antecedent and consequent conditions to make up an appropriate context for the stimulus sentence. Thus, the stimulus and response format was as follows:

What could have preceded this sentence? _____
Paul helps George.
What might follow subsequently? _____

The two sets of IAV and SV stimuli selected for this investigation were identical with the stimuli used in a former investigation (Semin

& Fiedler, 1988). These constituted a random sample from all IAVs and SVs drawn from an exhaustive assessment of all interpersonal terms in the dictionary. Through this procedure, it was ensured that the empirical results would not be particular to an arbitrary subset of verbs, but generalizable to the universe of interpersonal IAVs and SVs. The complete set of stimulus verbs is listed in Table 3, below.

PROCEDURE

The participants were required to work through the questionnaire systematically—namely, in the order in which the stimulus sentences appeared. The instructions emphasized that although the responses to the task might sometimes appear quite arbitrary, it would still be quite common for language users to go beyond the given information. The subjects were told that the meaning of sentences is colored by the context in which they appear and that language users infer the interpretational context if it is not explicitly provided. With the rationale for the task thus provided, the subjects were then given specific instructions about how to complete the questionnaire. In particular, they were encouraged to write down simple sentences that revealed their inferences about antecedent and/or consequent conditions. It was explicitly mentioned that either an antecedent statement or a consequent statement or both could be omitted if the participant felt that either or both context components were irrelevant to a certain stimulus sentence.

RESULTS

The inferences of antecedent and consequent behaviors were coded according to the following criteria:
    1. Whether an inference was drawn or not (i.e., omission).
    2. Whether the S or O was in the subject position in the inferred sentence.
    3. Whether the predicate of the sentence consisted of an IAV, an SV, or an Adj, or whether the predicate could not be classified in this way because the sentence did not relate to the dyad of S and O (e.g., "S recently had a great success at school"). There was also an extremely small number (fewer than 10 overall) of DAV sentences (cf. Table 1) (e.g., "S called O"), which were treated like IAV sentences in the present analysis.
    The intercoder reliability for the resulting 8-category code (S, O × 3 word types + no inference + not codable) showed 90% agree-

ment between two independent coders. On the basis of this threefold coding, proportion scores could be computed for each individual stimulus verb (for the proportion of S sentences in the antecedent position, the proportion of O sentences in the consequent position, the proportion of omitted antecedent sentences, etc.) by counting the relative number of respondents who produced an inference of a given type for that stimulus verb. Thus verbs rather than participants were treated as the units of the analysis, because verbs can be regarded as a proper random sample, whereas the procedure of sampling the participants (cf. "Procedure," above) was selective and nonrandom.

The proportion data were analyzed as a function of the kind of stimulus verb (IAV vs. SV, which is a between-verb factor), the context position (antecedent vs. consequent, a within-verb factor), and the nature of the inferences (S vs. O as subject; type of predicate; omitted or not). The means of the pertinent proportions, averaged over all 19 verbs within the same class, are presented in Table 2. Similar data on the level of individual verbs appear in Table 3, along with the complete listing of stimulus verbs.

First, we examined the proportions of S sentences and O sentences produced in the antecedent and consequent positions, collapsed across all other aspects. These data pertain most directly to the theoretical

TABLE 2

Mean Proportions of S Inferences and O Inferences Involving Different Predicates as a Function of Stimulus Verb and Context Position

PREDICATE IN INFERRED SENTENCE	ANTECEDENT POSITION		CONSEQUENT POSITION	
	S INFERENCES	O INFERENCES	S INFERENCES	O INFERENCES
STIMULUS SENTENCE = SV				
IAV	.02	.50	.38	.12
SV	.05	.01	.07	.11
Adj	.01	.17	.01	.11
Uncodable	.01	.16	.02	.03
Overall	.09	.84	.48	.37
STIMULUS SENTENCE = IAV				
IAV	.10	.36	.05	.40
SV	.12	.05	.03	.20
Adj	.07	.12	.02	.18
Uncodable	.03	.06	.00	.06
Overall	.30	.59	.10	.84

TABLE 3
Proportions of Different Inferences for Individual Stimulus Words

STIMULUS VERBS[a]	O Inferences		S Inferences	
	ANTECEDENT	CONSEQUENT	ANTECEDENT	CONSEQUENT
SVs				
Respect (*Achten*)	.87	.58	.13	.42
Commiserate (*Betrauern*)	.94	.57	.06	.43
Prefer (*Bevorzugen*)	.71	.38	.14	.31
Admire (*Bewundern*)	.89	.45	.06	.55
Hate (*Hassen*)	.81	.15	.12	.85
Envy (*Beneiden*)	.89	.23	.06	.77
Desire (*Verlangen nach*)	.39	.81	.56	.19
Like (*Moegen*)	.77	.33	.00	.33
Understand (*Verstehen*)	.78	.40	.11	.40
Worry (*Sich aergern ueber*)	.94	.14	.06	.79
Abhor (*Verabscheuen*)	.87	.08	.13	.77
Love (*Lieben*)	.67	.21	.07	.36
Suspect (*Misstrauen*)	1.00	.50	.00	.43
Recognize (*Anerkennen*)	.88	.45	.06	.27
Hold in contempt (*Verachten*)	.88	.50	.12	.50
Accept (*Akzeptieren*)	.81	.33	.00	.13
Fear (*Fuerchten*)	.94	.06	.00	.94
Forgive (*Vergeben*)	1.00	.56	.00	.12
Mourn (*Betrauern*)	1.00	.22	.00	.67
IAVs				
Deride (*Verspotten*)	.67	.88	.27	.12
Denigrate (*Verraten*)	.69	.81	.25	.12
Correct (*Verbessern*)	.87	.93	.07	.00
Harass (*Belaestigen*)	.64	.94	.29	.06
Command (*Befehlen*)	.36	.94	.50	.00
Hurt (*Verletzen*)	.22	.75	.39	.19
Inhibit (*Behindern*)	.43	.88	.36	.06
Threaten (*Bedrohen*)	.69	.88	.25	.12
Encourage (*Ermutigen*)	.94	.94	.00	.06
Hurry (*Bedraengen*)	.57	.88	.36	.06
Blackmail (*Erpressen*)	.75	1.00	.25	.00
Thank (*Danken*)	.89	.25	.11	.50
Embarrass (*Verwirren*)	.40	.93	.47	.07
Manipulate (*Manipulieren*)	.36	.93	.50	.07
Denounce (*Denunzieren*)	.53	.81	.35	.12
Restrict (*Hemmen*)	.63	.87	.37	.07
Attack (*Attackieren*)	.71	.94	.18	.06
Mislead (*Verleiten*)	.60	.69	.13	.12
Terrify (*Erschrecken*)	.29	.76	.57	.18

[a] The original German stimulus verbs appear in parentheses.

predictions. As the two "overall" rows of Table 2 reveal, the results were largely in accordance with the predictions. In the context of SV sentences, O inferences appeared in the antecedent position (mean proportion .84) more frequently than in the consequent position (.37). In contrast, S inferences appeared in the consequent position relatively more frequently (.48) than in the antecedent position (.09). This pattern confirms precisely what would be expected from the conjecture that SV sentences imply some preceding behavior by O (i.e., the stimulus or instigator), who appears to be the origin of the whole episode, whereas inferences concerning S's own behavior typically appear in the consequent position, reflecting that S is the experiencer who reacts as a consequence to what was done before. Such a pattern is of course completely consistent with the causal ascription of the episode to O.

IAV sentences, on the other hand, yielded exactly the reverse pattern of results. O inferences typically appeared in the consequent position (.84) rather than the antecedent position (.59), indicating the recipient role of O, who seems to display the subsequent effect of the stated action. And S inferences appeared in the antecedent position more often (.30) than in the consequent position (.10).

To test these differences for significance, separate analyses of variance (with stimulus verb class and context position as independent factors) were performed on the proportions of O inferences and S inferences. (The separate analyses were performed because of the nonindependence of inferences about S and O. Since participants inferred only one sentence, responding with an O inference precluded responding with an S inference.) In both analyses, the critical verb class × context position interaction was highly significant, $F (1, 36) = 64.09$, $p < .001$ for O inferences and $F (1, 36) = 50.72$, $p < .001$ for S inferences.

There were less pronounced main effects for verb classes; that is, IAVs produced more O inferences than SVs, $F (1, 36) = 9.16$, $p < .01$, and fewer S inferences, $F (1, 36) = 5.83$, $p < .05$. There were also less pronounced main effects for context position; that is, there were more O inferences in the antecedent position, $F (1, 36) = 5.96$, $p < .01$, and more S inferences in the consequent position, $F (1, 36) = 5.98$, $p < .05$. These main effects, however, are not of theoretical interest, but reflect only the fact that the overwhelming interaction is not perfectly symmetrical.

A reanalysis of the data in which participants were treated as the units of analysis rather than verbs provides the same pattern of evidence, with the critical F values for the interactions for both O inferences and S inferences being significant. The respective values were as follows: $F (1, 36) = 132.32$ and $F (1, 36) = 70.46$.

Although these findings agree perfectly with the present theoretical reasoning, two aspects of the data render the pattern of proportions somewhat asymmetric and unregular. First, there was obviously a strong bias in favor of O inferences; the absolute proportion of O inferences (regardless of verb class and context position) was about 66%, compared to only 24% S inferences. This is regarded here as a reflection of a general principle of reciprocation or turn taking (i.e., to let S and O act in alternation). Such a subsidiary finding is not surprising, nor does it interfere with the empirical test of our central hypotheses.

Second, it is evident from Table 2 that the two most pronounced data points were the 84% O inferences in the antecedent position of SV sentences and the same extreme figure of 84% O inferences in the consequent position of IAV sentences. These inferences almost appear to represent an obligatory part of the implicit sentence context. Furthermore, these two outstanding proportions are in accordance with the prediction that IAV sentences render consequences more important, whereas SV sentences give more weight to antecedent events. In order to quantify this differential accentuation, we computed the difference for each verb between the proportion of S sentences and the proportion of O sentences, such that differences in the theoretically expected direction were always given a positive sign. In the case of IAV sentences, the difference scores computed for the consequences were systematically higher than those computed for antecedent inferences ($d^1 = .74$ vs. $d^2 = .29$), $t(37) = 4.09$, $p < .001$. In the case of SV sentences, however, the differences for the antecedent inferences were more pronounced ($d^2 = .76$), as predicted, than those for the consequences ($d^1 = .12$), $t(37) = 7.04$, $p < .001$.

An inspection of the frequency of omitted responses lends further support to the conclusion above concerning the differential importance of antecedent and consequent inferences for IAVs and SVs. In general, the option of giving no response was chosen quite infrequently (13%). However, if the number of omitted consequences was subtracted for each stimulus verb from the number of omissions in the antecedent position, the resulting score was reliably higher (i.e., more positive) for IAVs ($\bar{x} = +0.37$) than for SVs ($\bar{x} = -2.58$), $t(36)$, $p < .005$, indicating that antecedent events of IAVs and consequences of SVs were more negligible. On the level of individual verbs, the number of omitted consequences was greater than or equal to the number of omitted antecedent inferences for 18 out of the 19 SVs and the number of omitted antecedent inferences was greater than or equal to the number of omitted consequences for 13 out of the 19 IAVs.

All the results reported so far were based on proportions collapsed across the type of predicate in the inferred sentence. If we distinguish among inferences that represent IAV sentences, SV sentences, and Adj sentences, another interesting aspect of the implicit sentence context becomes apparent. Although the breakdown of proportions as a function of the predicate is already included in Table 2, these results are best illustrated graphically. In Figure 1, it can be seen that the predicted and obtained characteristic interaction among verb classes, context position, and subject of the context statement was largely due to inferences about IAVs when SV sentences were given and to inferences about SVs when IAV sentences were given. That is, the preponderance of O behaviors preceding and S behaviors following SV sentences was mainly due to inferences about IAV predicates (bottom right-hand portion of Figure 1). In other words, the informative context of SVs consisted of inferences involving IAVs. The opposite seemed to be the case with IAV sentences, in the context of which inferences involving SV predicates seemed to be especially informative

FIGURE 1

The interaction among verb classes, context position, and subject of context statement.
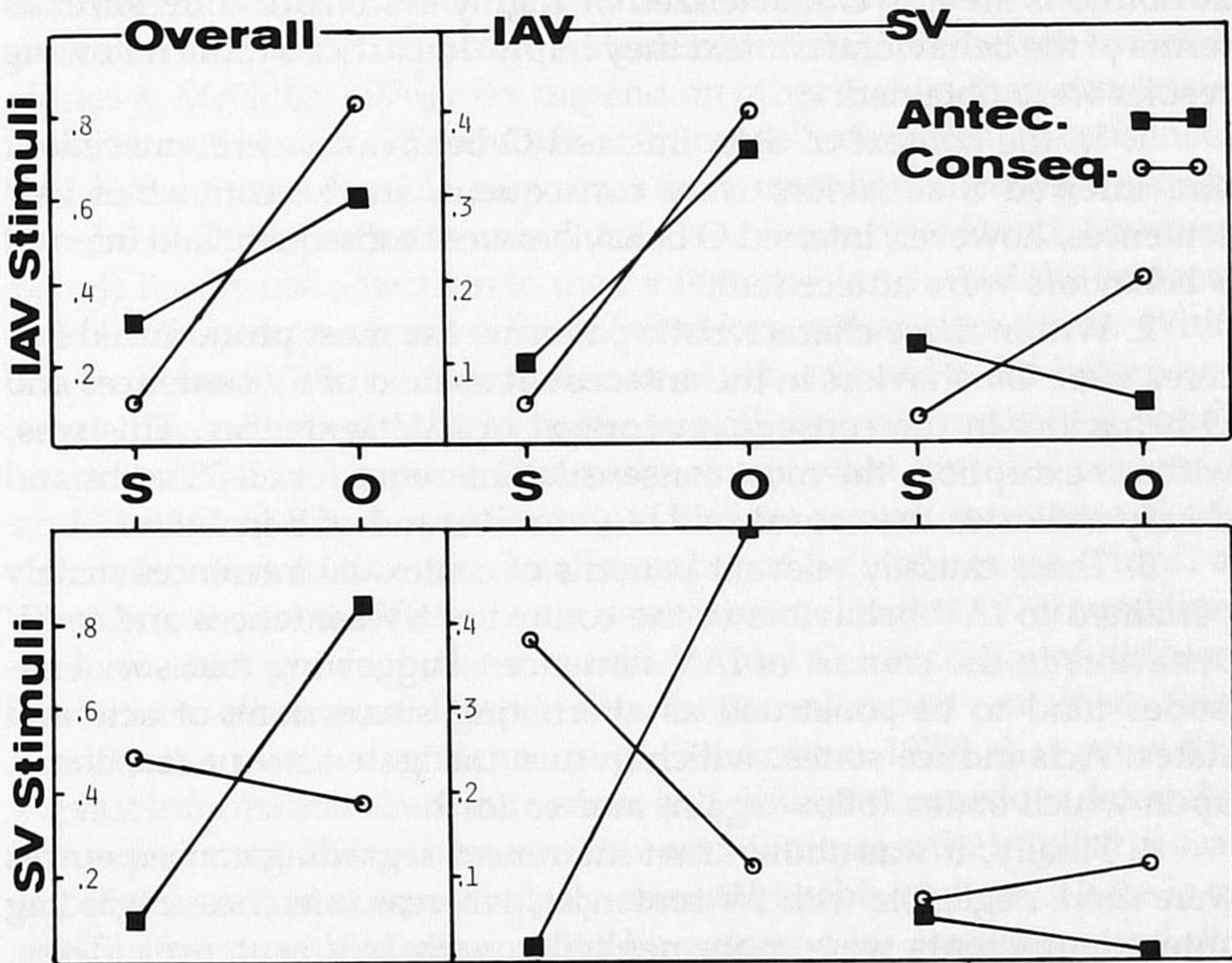
(top right-hand portion of Figure 1). Despite the low absolute frequency of SV predicates, the shape of the trends for this particular kind of inference bears the greatest similarity to the theoretically expected pattern of interaction (i.e., the preponderance of O statements following and S statements preceding SV). The numerical values corresponding to the data points in Figure 1 can be seen in Table 2.

Neither the SV inferences for SV sentences nor the IAV inferences for IAV sentences appear to provide a context by which the causal impact of the verbs can be explained sufficiently. Likewise, there is no indication that adjective attributions (Adj inferences) play an important role (see Figure 1). The only noteworthy aspect of the Adj inferences was that adjectives consistently appeared in O inferences more frequently than in S inferences. This tendency can be attributed to the aforementioned general reciprocity principle (i.e., the greater absolute frequency of O inferences).

DISCUSSION

The results of the present study demonstrate that different interpersonal verbs that have repeatedly been shown to lead to opposite causal attributions are also characterized by highly systematic differences in terms of the behavioral context they imply. In particular, the following results were obtained:

1. In the context of SVs, inferred O behaviors were antecedent and inferred S behaviors were consequent. In the context of IAV sentences, however, inferred O behaviors were consequent and inferred S behaviors were antecedent.

2. Within these characteristic patterns, the most pronounced features were O behaviors in the antecedent context of SV sentences and O behaviors in the consequent context of IAV sentences. This was, without exception, the most consensual inference for all 38 verbs and clearly indicates the causal role of O in SVs and of S in IAVs.

3. These causally relevant patterns of contextual inferences mainly pertained to IAV behaviors in the context of SV sentences and to SV behaviors in the context of IAV sentences, suggesting that social episodes tend to be construed as alternating successions of acts and states. Acts induce states, which in turn instigate acts (or reactions), upon which states follow again, and so forth.

4. Finally, it was shown that inferences regarding consequences were more negligible with SV sentences, whereas inferences regarding antecedent events were more negligible with IAV sentences. Thus,

the events preceding subjective states (SVs) and the events following manifest actions (IAVs) seem to indicate the causal origins most clearly.

In our view, these results suggest that the present account of the implicit causality phenomenon should be included with those reviewed in the introduction. The claim here is, of course, not that all the hypotheses proposed by other authors have to be refuted. There is little systematic research to date that would permit us to draw such a negative conclusion. The argument here is, however, that the present account is intuitively and psychologically more sensible in several respects. Let us compare it with the most promising of the other accounts—namely, Brown and Fish's (1983), according to which IAVs are characterized by less consensus and less distinctiveness than SVs. Even though empirical evidence may confirm the premise that IAV sentences are more S-specific and that SV behaviors are more O-specific, it is by no means clear that implicit assessments of consensus and distinctiveness really mediate the causal information of the verb. There are at least four reasons to doubt this particular conclusion.

First, assessments of (implicit) consensus and distinctiveness intuitively appear to require more cognitive processing than judgments of implicit causality, which usually come quite automatically (cf. Semin, 1981). We do not think that the same reservation applies to contextual inferences, which may be natural and necessary for sentence comprehension. Second, causality judgments of single-behavior episodes (Jones & McGillis, 1976) may depend on other factors than consensus and distinctiveness. The mediation of causal inferences by consensus and distinctiveness would mean that there must be something invariant about S or O that indicates causal direction. As we have found, however, people hardly use adjectives in their inferences, but embed the sentence in a local context of more finite behaviors rather than traits. While the verb carries in itself implications of what O and S did before and what they will do afterward in the specific episode context, it would seem that the assumption that verbs reveal what kinds of persons S and O are in general is too strong. Here we would once more like to draw attention to the very small number of Adj inferences. Third, as already mentioned earlier, in one investigation (Fiedler, 1978) conditions were created in which the S specificity and O specificity of different verbs were eliminated. Despite this, the causal impact remained. And, finally, the positive evidence (e.g., McArthur, 1972) that providing explicit information about consensus and distinctiveness does determine the causal attribution of the sentence and dominates the implicit causality of the verb is not particularly relevant in this context. There is no doubt that causal inferences can be enforced by consensus and dis-

tinctiveness. A completely different question, however, is whether people use these criteria spontaneously.

For the same reasons, we did not explicitly manipulate antecedent and consequent sentences in a further experiment in order to show that the direction of the effects is from context information to causality, and not the opposite. This study was not conducted because it would have been "illusory." Undoubtedly, one *can* influence causal attributions by explicit information. For example, a stimulus sentence such as "S hurts O," usually attributed to S, will of course elicit more O attributions if we find out that "O had hurt S before" and that "S regrets this action subsequently." However, the demonstration that the *explicit* sentence context is efficient does not necessarily mean that *implicit* context information is logically or causally prior to causal attributions. In fact, the present study does not permit us to infer whether inferred contexts give rise to causality or whether the causal information of the verbs is the primary mediator of the inferred contexts. It may indeed be the case that the relation between causality and inferred context is bidirectional. It is possible to advance this view because in the dialectical process of linguistic development, which involves the alternating roles of language production and language comprehension, we may have learned that specific contexts sometimes require specific verbs and that specific verbs imply specific contexts at other times. Nevertheless, we think that it makes more sense to conceive of causal attribution as a result rather than the source of contextual inferences. If the causal information of verbs were primary and the contextual inferences secondary, then why should experimental subjects find it much easier and more natural to provide contextual inferences than causal judgments in S-verb-O sentences? Why should verbs conserve their meaning and produce no distraction when explicit contextual information reverses the causal direction? The causal impact of verbs can be changed easily by sentence context, but the causal impact of antecedent sentences is largely invariant over different verbs. Why, then, should one assume that such a logical order is reversed in psychology?

REFERENCES

Abelson, R. P., & Kanouse, D. E. (1966). Subjective acceptance of verbal generalizations. In S. Feldman (Ed.). *Cognitive consistency: Motivational antecedents and behavioral consequents* (pp. 171–197). Academic Press.

Au, T. K.-F. (1986). A verb is worth a thousand words: The causes and consequences of interpersonal events implicit in language. *Journal of Memory and Language, 25,* 104–122.

Brown, R., & Fish, D. (1983). The psychological causality implicit in language. *Cognition*, 14, 233–274.

Fiedler, K. (1978). Kausale and generalisierende Schlüsse aufgrund einfacher Sätze. *Zeitschrift für Sozialpsychologie*, 9, 37–49.

Garvey, C., & Caramazza, A. (1974). Implicit causality in verbs. *Linguistic Inquiry*, 5, 459–464.

Garvey, C., Caramazza, A., & Yates, J. (1976). Factors influencing assignment of pronoun antecedents. *Cognition*, 3, 227–243.

Heider, F. (1944). Social perception and phenomenal causality. *Psychological Review*, 51, 358–374.

Heider, F. (1958). *Psychology of interpersonal relations*. Wiley.

Jones, E. E., & McGillis, D. (1976). Correspondent inferences and the attribution cube: A comparative reappraisal. In J. H. Harvey, W. J. Ickes, & R. F. Kidd (Eds.), *New directions in attribution research* (Vol. 1, pp. 389–420). Hillsdale, NJ: Erlbaum.

Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), *Nebraska Symposium on Motivation* (Vol. 15, pp. 192–238). Lincoln: University of Nebraska Press.

Kelley, H. H. (1973). The process of causal attribution. *American Psychologist*, 28, 107–128.

McArthur, L. (1972). The how and what of why: Some determinants and consequences of causal attribution. *Journal of Personality and Social Psychology*, 22, 171–193.

Miller, G. A., & Johnson-Laird, P. (1976). *Language and perception*. Cambridge, MA: Harvard University Press.

Pruitt, D. G., & Insko, C. A. (1980). Extension of the Kelley attribution model: The role of comparison–object consensus, target–object consensus, distinctiveness and consistency. *Journal of Personality and Social Psychology*, 39, 39–58.

Semin, G. R. (1981). A gloss on attribution theory. *British Journal of Social and Clinical Psychology*, 19, 291–300.

Semin, G. R., & Fiedler, K. (1988). The cognitive functions of linguistic categories in describing persons: Social cognition and language. *Journal of Personality and Social Psychology*.