

Whence Cognitive Prototypes in Impression Formation? Some Empirical Evidence for Dialectical Reasoning As a Generative Process

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Within the context of research on impression formation, questions are raised in the present article concerning the adequacy of theoretical conceptions of cognitive prototypes as syntheses (e.g., mental averages) of previously experienced displays of specified attributes or characteristics of persons. An alternative perspective is offered, according to which cognitive prototypes are regarded as dialectically generated negations of present displays of specified attributes or characteristics. Empirical support for this alternative view is presented, and in the light thereof it is argued that there is a need for a decidedly more humanistic conception of human cognition than can be found in currently prevailing mediational accounts.

One prominent theoretical construct in contemporary accounts of human cognition is that of the *cognitive prototype* (Rosch, 1975; Rosch and Mervis, 1975). Undoubtedly, this construct reflects cognitive psychologists' deference to the position that in order for an individual to frame knowledge about an object or event in the empirical world, there must be some basis, or standard, or reference point from which to judge the meaning of that object or event. In recent years, Mischel and others (see, e.g., Cantor and Mischel, 1979; Higgins, Rholes, and Jones, 1977; Markus, 1983; Mischel, 1979, 1984; Wyer and Srull, 1981) have suggested that the prototype construct can fruitfully be applied to the study of cognition in the interpersonal realm as well as in the realm of non-personal objects and events. The essence of this view is that when Smith forms an impression of Jones as, say, extraverted, Smith engages a cognitive process whereby salient features of Jones' conduct are evaluated against Smith's idea of quintessential extravertedness. This latter idea would constitute the prototype, and the emerging view is that as part and parcel of the cognitive process just alluded to, prototypes are central to the process by which an individual frames impressions of others, and of oneself.

On the assumption that this basic notion is tenable, questions inevitably arise as to the source of the cognitive prototypes themselves. On Rosch's view, a prototype is essentially a *mental average* of previously encountered exemplars of the object/event being judged. Thus, for example, Smith's present idea of the quintessential chair is presumably a kind of composite made up of certain salient features of those chairs that he has encountered in the moments of his life prior to this one, and it is against or with reference to that composite that Smith judges the "chair-ness" of the object now before him. Similarly, the currently prevailing theoretical position among those who employ the prototype construct in the realm of impression formation is that Smith's idea of, say, quintessential extravertedness, is constituted of a mental average of previously encountered displays of that quality or characteristic. Cantor and Mischel (1979) put matters this way:

[A] categorization scheme [i.e., a set of "person prototypes"] allows one to structure and give coherence to one's *general store of knowledge about people*, providing *expectations about typical behavior patterns* and the *range of likely variation* between types of people and their characteristic behaviors. Every social experience helps to fill out one's knowledge of the likely behavior and attributes of different types of persons. The *resulting expectations*, in turn, affect one's impressions of individuals. (p. 6, emphases added)

For purposes of the present discussion, what is of particular note about this view is that it conforms to what Rychlak (1981a, 1981b) terms a *mediational* conception of human cognition. To simplify only a little, one holds on this conception that Smith's subjective judgment concerning the meaning of "today's input(s)" can only be framed with reference to the memory traces Smith has of "yesterday's inputs" (see also in this regard Neisser's [1967] discussion of the "reappearance" hypothesis). Thus, if Smith judges Jones to be a "fairly extraverted" individual, this can only mean that Smith sees Jones to be more extraverted than most, and less extraverted than only a relative few of the many other individuals Smith has previously encountered. The essence of this view has recently found expression in the writing of Epstein (1983), who avers that "it is *meaningless* to interpret the behavior of an individual without a frame of reference of others' behavior" (p. 381, emphasis added).

As widely endorsed (if often only implicitly, but see Ebbesen, 1979, 1981) as Epstein's view is among contemporary investigators, we strongly suspect that it is not generally valid, and we are certain that, as it stands, it merely begs at least one question of no small theoretical consequence: How does a person gauge the first empirical instantiation of a given cognitive category? If, for example, Smith's ability to judge the extent to which Jones is extraverted hinges on the existence in Smith's mind of a cognitive prototype for extravertedness, and if the existence of that cognitive prototype is itself to be explained in terms of Smith's prior experiences, i.e., in terms of his memories for previously encountered displays of varying degrees of extravertedness, then there was presumably a

time in Smith's life at which he did not yet possess any such store of prior experiences, and hence, a time at which he had no cognitive prototype for extravertedness. But if a cognitive prototype for extravertedness did not yet exist for Smith, then on the prevailing theory there was no way for him to recognize the first instance of extravertedness he encountered. And if there was no way for Smith to recognize that first-encountered instance of extravertedness, then no memory trace thereof would have been available to Smith as a basis, standard, or reference point for judging the second-encountered instance, or the third, or any other. All of this would, of course, leave Smith forever with nothing to mentally average, and for no shorter a time with nothing from which to fashion a cognitive prototype.

Clearly, there is something very wrong here, and though the problem does not require us to abandon the notion of cognitive prototypes altogether, it would seem to require abandonment of the passive, mediational conception of human cognition on which that notion has come to rest. More specifically, while cognitive prototypes may well play an important role in the psychological process by which subjectively meaningful conceptions of self and others are framed, it does not follow that an individual's cognitive prototypes are themselves best regarded as *mental averages* of *past displays* of various attributes. Instead, cognitive prototypes might more fruitfully be understood in terms of the human capacity to *dialectically negate present displays* of particular attributes. On this view, Smith's judgment of who Jones is at any given point in time depends immediately, directly, and fundamentally on a simultaneous judgment of who Jones *is not but might otherwise be*, and only subsequently, indirectly, and never necessarily on judgments of who others are, or on the memory traces thereof.

Since the difference between these two views may seem slight on first reading, we should emphasize here that under a dialectical conception of prototype generation, judgments concerning who a given individual is not but might otherwise be need not themselves be tied to any independently specifiable referents in the empirical world. On the contrary, the empirical referent for those judgments can be initially – and can in principle forever remain – nothing other than the observation(s) those judgements *negate*. Put more concretely, Smith can frame a subjectively meaningful judgment about who Jones is with reference to ideas about who Jones is not but might otherwise be, and never concern himself at all with the question of whether or not there are, have ever been, or ever will be any tangible exemplars of who Jones is not.

The notion that human cognition in general, and the cognitions underlying impression formation in particular, can and often do entail reasoning that is essentially dialectical in nature is not, of course, a new one. On the contrary, traces of this notion can be found in the writings of philosophers and scientists alike throughout the history of Western thought (cf. Rychlak, 1981b, esp. Chapter 9). Moreover, the thesis that human cognition is fundamentally dialectical is at least implicit in many of the classical theories of personality, and is quite explicit

in some (e.g., Jung, Kelly). Unfortunately, and perhaps largely as a consequence of the lack of adequate methodologies, theoretical discussions of dialectical reasoning have for the most part been unbuttressed by rigorously adduced empirical evidence. Consequently, the dialectical themes in much of the relevant theorizing about human cognition have remained ambiguous and/or unelaborated (Mancuso, 1976).

Among other things, therefore, the research to be discussed presently seeks to contribute to the eventual resolution of this problem. For as argued at length by Rychlak (1976a, 1976b, 1976c, 1977, 1981a, 1981b, 1981c), firm empirical evidence for the role of dialectical reasoning in human thought/judgment would mandate a decidedly more humanistic conception of human cognition—and thus of the entities who cognize—than currently prevailing mediational/information-processing accounts seem capable of providing. Nor, it should be noted, is this matter devoid of ethical implications, a fact to which Muscari (1985) has recently drawn attention.

Some Relevant Empirical Evidence

The task employed in the present research was an exceedingly simple one: each of 67 subjects (40 female and 27 male students enrolled in an undergraduate psychology course at Georgetown University) was presented with a series of 40 activity protocols, where each protocol depicted the self-reported frequency with one of the subject's peers "typically" engaged in each of the 16 activities displayed in Table 1. The activity frequency information in each target protocol was presented in terms of a 10-point scale ranging from zero (0; indicating that the target reported typically spending "very little or no" time or effort in a given activity) to nine (9; indicating that the target reported typically spending "very much time or effort" in the activity). The subject's task was to consider the 16 items of activity-frequency information displayed in each target protocol, and then to rate that protocol in terms of the degree to which it reflected, in the subject's judgment, each of three underlying attributes. A rating was to be made on a 21-point integer scale ranging from zero (0) to twenty (20) and anchored semantically with the terms used to define Attributes 1, 2, and 3 as shown at the bottom of Table 1. Once the subject had rated the first target with respect to all three attributes, she/he turned to a consideration of the second target, and so on, until all 40 targets had been rated.

Rationale for and Procedure of Analysis

Our overriding objective in analyzing the data obtained in this and other similar studies (cf. Lamiell, Foss, Larsen, and Hempel, 1983; Lamiell, Foss, Trierweiler, and Leffel, 1983) has been to submit to empirical test the relative adequacy of mediational versus dialectical theoretical accounts of the judgment

TABLE 1

Weights or "Relevance Values" of 16 Activities
for Three Attributes
As Specified By One Subject

Activity	Attribute		
	1	2	3
1. Studying or reading intellectual material	+ .30	-.26	+ .19
2. Engaging in artistic or creative activities	-.12	+ .20	-.08
3. Casual dating	-.20	+ .15	-.19
4. Engaging in athletic/physical fitness activities	+ .03	+ .08	.00
5. Working at a part time job	-.21	+ .20	+ .08
6. Discussing/debating science religion, philosophy, etc.	-.32	+ .08	+ .09
7. Attending parties	-.07	+ .14	-.32
8. Getting high on marijuana/alcohol	+ .12	+ .11	-.50
9. Nurturing a familial or personal friendship	-.50	-.13	-.10
10. Engaging in activities of a religious nature	-.21	-.21	+ .06
11. Attending lectures/seminars outside of coursework	-.07	.00	+ .14
12. Cutting classes for casual reasons	+ .06	-.18	-.40
13. Nurturing an intimate relationship with spouse/lover	-.39	+ .14	+ .16
14. Watching television	+ .06	-.16	-.41
15. Reflecting/thinking in quiet solitude	-.27	-.40	.00
16. Engaging in political activities	+ .18	+ .14	-.11

Attribute 1: Warm or impassioned (-) vs. cool or dispassionate (+)

Attribute 2: Withdrawn or introverted (-) vs. outgoing or extraverted (+)

Attribute 3: Pleasure or fun-oriented (-) vs. work or achievement-oriented (+)

process through which subjects determine their ratings of the targets. To this end, we begin by formalizing the parallel that can be seen to exist between the initial phases of the subjective judgment process, on the one hand, and the procedure by which personality investigators have themselves traditionally assessed subjects with respect to underlying attributes, characteristics, predis-

positions, or traits, on the other hand. Elsewhere, Lamiell (1981, 1982) has pointed out that the essential features of the latter can be formally represented by Equation (1):

$$S_{pa} = \sum_{i=1}^m (V_{pi}) (R_{ia}) \quad (1)$$

where

S_{pa} represents the "raw" score assigned to person p to index his/her manifestation of some underlying attribute a of a set of m observations;

V_{pi} is one of m variables, or items of information, in terms of which empirical observations about person p are defined or recorded; and

R_{ia} is one of m "relevance values" or "weights" reflecting the investigator's view concerning the degree to which the i -th item of information about any given individual should be weighted in determining that individual's overall status with respect to underlying attribute a .

In words, Equation (1) simply states that in formal personality assessment, an investigator assigns a "raw" score (S_{pa}) to person p in such a way as to index the latter's manifestation of attribute a as an additive function of m empirical observations about person p (V_{pi}), each of which is weighted by the investigator's judgment of its relevance of (R_{ia}) to attribute a .

Given Equation (1), and bearing in mind the assessment/judgment analogy to which we alluded above, a formal representation of the initial phase of the subjective judgment process can be represented formally by Equation (1a):

$$J_{ta} = \sum_{i=1}^m (V_{ti}) (R_{ia}) \quad (1a)$$

where

J_{ta} represents the *covert judgment* that a subject makes of target t with respect to underlying attribute a ;

V_{ti} represents one of m items of information available to the subject concerning target t 's behavior pattern; and

R_{ia} is one of m "relevance values" or "weights" reflecting the *subject's* (rater's) judgment of the degree to which the i -th item of information about the target (ratee) should be weighted in arriving at a judgment about that target's overall status with respect to underlying attribute a .

It should be apparent that Equation (1a) is formally identical to Equation (1). The symbol J and the subscript t in Equation (1a) are thus merely intended to remind us that we are here seeking to represent the covert judgment (J_{ia}) that a given subject makes of a given target t with respect to some underlying attribute a .

To the end of determining what the R_{ia} component of Equation (1a) should be for any given subject, she/he was asked to rate in a session prior to that during which the peers' target protocols were rated, each of the 16 activities listed in Table 1 with respect to each of the three underlying attributes. That is, each subject was asked to indicate directly how "warm/impassioned versus cool/dispassionate" (and "withdrawn/introverted versus outgoing/extraverted," and "pleasure/fun-oriented versus work/achievement-oriented") she/he regarded each of the 16 activities ("studying or reading intellectual material," "engaging in artistic or creative activities," etc.). For analytic purposes, these ratings were numerically coded on a scale ranging (arbitrarily) from $- .50$ through 0 to $+ .50$, and the resultant values defined the R_{ia} component of Equation (1a) for the subject in question. The activity ratings actually obtained in this phase of the study from one of the 67 subjects, "Smith," are displayed for illustrative purposes in Table 1 above. Note that Table 1 also provides an indication of the direction in which the activities have been scaled with respect to each of the underlying attributes (dimensions of judgment). It should be clear, therefore, that for Attributes 1, 2, and 3, activities with negative weights were regarded by Smith as more or less "warm/impassioned," "withdrawn/introverted," and "pleasure/fun-oriented," respectively, while activities with positive weights were regarded by Smith as more or less "cool/dispassionate," "outgoing/extraverted," and "work/achievement-oriented," respectively.

The V_i component of Equation (1a) was, of course, defined by the activity frequency information displayed in the 40 target ("stimulus") protocols, and was, thus, the same for each of the 67 subjects.

For each subject, the 40×16 (targets by activities) matrix of activity frequency values was post-multiplied by the 16×3 (activities by attributes) matrix of "relevance values" or weights specified by that subject. This operation yielded a 40×3 (target by attributes) matrix of J_{ia} values in accordance with Equation (1a) as described above. The J_{ia} values thus generated for one of the 67 subjects are displayed outside parentheses in Table 2 below (the values shown inside parentheses will be explained presently).

As noted earlier, numerical quantities of the sort displayed outside parenthesis in Table 2 are being treated in the present context as empirical representations of Smith's *covert judgments* about each of 40 peers with respect to each of three underlying attributes. Assuming for the moment the fidelity of these representations, the question of primary concern to us here finally surfaces: How does a person—in this case Smith—manage to *translate* any given one of his covert judgments into an *overt rating* on a 0-20 "response" scale?

TABLE 2

Estimates of "Smith's" Covert Judgments of Each of 40 Targets
With Respect To Each of Three Attributes

Target	Attribute 1	Attribute 2	Attribute 3
1.	- 4.43 (+1.45)	-3.77 (-1.80)	-3.02 (+ .16)
2.	- 8.38 (- .40)	+2.65 (+2.32)	-8.87 (-2.05)
3.	- 6.14 (+ .65)	+1.54 (+1.62)	-4.16 (- .27)
4.	- 8.18 (- .30)	-2.02 (- .67)	+2.13 (+2.11)
5.	-12.32 (-2.24)	-2.40 (- .92)	- .95 (+ .94)
6.	- 3.21 (+2.02)	-2.45 (- .95)	-3.50 (- .02)
7.	- 5.82 (+ .80)	-1.58 (- .39)	-5.30 (- .70)
8.	- 8.72 (- .56)	+2.71 (+2.37)	-5.81 (- .89)
9.	- 7.33 (+ .09)	+ .35 (+ .85)	-2.46 (+ .37)
10.	-10.65 (-1.46)	-1.45 (- .31)	-1.59 (+ .70)
11.	- 5.90 (+ .76)	- .57 (+ .26)	-1.92 (+ .58)
12.	- 8.87 (- .63)	-3.01 (-1.31)	-4.13 (- .26)
13.	- 8.64 (- .52)	-2.17 (- .77)	-1.81 (+ .62)
14.	- 8.39 (- .40)	-1.79 (- .52)	-4.84 (- .52)
15.	- 7.49 (+ .02)	- .45 (+ .34)	-5.10 (- .62)
16.	-10.54 (-1.41)	- .96 (+ .01)	-8.26 (-1.82)
17.	-11.03 (-1.64)	+ .92 (+1.22)	-6.45 (-1.13)
18.	-11.05 (-1.64)	-1.03 (- .04)	+2.27 (+2.16)
19.	- 7.99 (- .21)	+2.27 (+2.08)	-2.59 (+ .32)
20.	- 4.71 (+1.32)	+ .28 (+ .80)	-5.58 (- .80)
21.	- 6.47 (+ .50)	-2.03 (- .68)	- .63 (+1.06)
22.	- 7.19 (+ .16)	- .87 (+ .06)	-2.55 (+ .34)
23.	- 9.02 (- .70)	-1.19 (- .14)	-4.52 (- .40)
24.	+ 5.39 (+1.00)	-3.08 (-1.35)	- .87 (+ .97)
25.	- 5.12 (+1.13)	-1.80 (- .53)	-2.87 (+ .22)
26.	- 8.67 (- .53)	- .02 (+ .61)	-5.70 (- .85)
27.	- 8.21 (- .32)	-1.33 (- .23)	-5.55 (- .79)
28.	- 6.24 (+ .60)	- .20 (+ .50)	-6.18 (-1.03)
29.	- 7.68 (- .07)	- .14 (+ .72)	-9.00 (-2.09)
30.	- 5.17 (+1.10)	-1.28 (- .20)	-4.75 (- .49)
31.	- 3.36 (+1.95)	-1.11 (- .09)	-4.77 (- .50)
32.	- 6.19 (+ .63)	-3.08 (-1.35)	-1.65 (+ .68)
33.	- 6.03 (+ .70)	- .19 (+ .50)	-4.34 (- .34)
34.	- 8.03 (- .23)	-1.96 (- .63)	-4.06 (- .23)
35.	- 7.81 (- .13)	- .45 (+ .34)	-2.30 (+ .43)
36.	- 7.69 (- .07)	+ .39 (+ .88)	-3.08 (+ .14)
37.	- 9.80 (-1.06)	-1.36 (- .25)	- .40 (+1.15)
38.	- 4.49 (+1.42)	- .73 (+ .16)	-2.05 (+ .53)
39.	- 9.39 (- .87)	-3.53 (-1.64)	+2.51 (+2.24)
40.	- 9.54 (- .94)	-2.29 (- .85)	-3.30 (+ .06)
Mean	-7.53	- .97	-3.45
Stand. Dev.	2.14	1.56	1.56

Formally Representing a Normative/Mediational Theoretical Conception of the Impression Formation Process

Because this question has not been — and cannot be — satisfactorily addressed using the actuarial methods that have heretofore dominated studies of impression formation (cf. objections to this and other relevant methodological points by Conger [1983] and by Woody [1983]; see also reply to these critics by Lamiell, Trierweiler, and Foss [1983]), precise statements of prevailing theoretical views on this question are not readily found. However, one plausible view, and without question that which heretofore has been implicitly endorsed by virtually all investigators in the field, is that in translating covert judgments of individuals into overt ratings, the lay person resorts to a reasoning process that is essentially equivalent to the logic of the normative measurement operations by which personality investigators have themselves translated raw *assessments* of individuals into interpretable *measurements* (the term “raw assessments” refers here to numerical quantities of the sort represented by S_{pa} on the left-hand side of Equation (1) above; cf. Lamiell [1982]). The implication here, of course, is that the meaning to Smith of any covert judgment he makes of Jones, and hence of the rating by means of which Smith overtly expresses that judgment, is grounded in Smith’s consideration of how, with respect to the dimension of judgment, Jones differs from other individuals Smith has known.

Clearly, this view is consonant with (one is tempted to say prototypical of) the mediational conception of person perception to which contemporary usage of the cognitive prototype construct is tied (see above). Insofar as this theoretical conception of the subjective judgment process is valid, and insofar as the 40 targets rated by Smith can be said to sample with fidelity the population of individuals from which Smith’s personal knowledge of relevant norms has been derived, it follows that accurate estimates of the numerical ratings Smith has actually made of the targets should be derivable by applying normative measurement operations to the J_{ia} values displayed in Table 2.

As is well known, the arithmetic of normative measurement typically entails the transformation of “raw” assessments into z -scores expressing the respective magnitudes of each of the former relative to their collective mean and standard deviation. Consistent with the theoretical position just described, therefore, our approach here was to generate *predictions* of what each subject’s actual ratings of each target would be on the theoretical presumption that the subject’s reasoning process could validly be represented by the arithmetic of normative measurement. In the case of Smith, for example, each J_{ia} value shown in Table 2 was standardized (converted to a z -score) on the basis of the mean and standard deviation of all 40 J_{ia} values computed for a given attribute. The relevant means and standard deviations are shown at the bottom of Table 2, and the resulting z -scores are given in parentheses adjacent to their corresponding J_{ia} values. Pursuant to these calculations, the derived z -scores (normative measurements)

were linearly interpolated, attribute by attribute, onto a 0-20 scale, for the sole purpose of "translating" those values into the "response language" Smith was required to use as he rated the targets. The results of this procedure are displayed in Panel 1 of Table 3, under the heading "Predictions From Normative Model (N)."

If the logic of our derivations has been made apparent, it should be clear to the reader that the first three values displayed row-wise under that heading indicate that if Smith was reasoning in a normative, mediational fashion as he framed his judgments of Target #1, then the three attribute ratings that Smith in fact made of that target should have been well approximated by the values 17.32, 0.00, and 10.39.¹ By the very same token, the three attribute ratings assigned by Smith to Target #2 should have been well approximated by the values 8.65, 19.81, and .22, as shown in the second row of Panel 1 of Table 3.

The values displayed in the remaining 38 rows of Panel 1 in Table 3 were generated in exact accordance with the procedures just described. Thus, each of those values bears interpretation as a prediction of the actual response scale rating that Smith would make of a given target with respect to a given attribute, on the theoretical assumption that the reasoning process underlying that rating was normative and hence mediational in nature.

Formally Representing a Dialectical Theoretical Conception of the Impression Formation Process

Though the foregoing account of the judgment process under investigation here seems plausible enough on its surface, and indeed has been assumed to be valid by virtually all previous investigators in this area, considerations of the sort discussed at the outset of this article lead us to suspect that that account might not regularly be, and in any case cannot always be, valid. For as we have seen, any theory which postulates that the psychological context for a meaningful judgment rendered by Smith "here and now" must in some way be constituted of the memory traces of prior judgments rendered by Smith, leaves unanswered the question of how Smith framed the first meaningful judgment. As a result, the question of how the memory traces of Smith's prior experiences could have begun to accumulate is also left begging. Out of respect for these important theoretical issues, we were led to consider the possibility that judgments of the sort under investigation here might not be the products of a normative/mediational reasoning process after all, and might instead be framed via reasoning that is essentially dialectical in nature.

In our efforts to explore this latter possibility, we have employed a model for psychological measurement that is *interactive* in a sense once described by

¹ Note, therefore, that with respect to Attribute 2, Target #1 was, normatively speaking, the most "withdrawn/introverted" of the 40 targets rated.

TABLE 3
 Predicted Ratings, Actual Ratings,
 and Proportional Profile Dissimilarities

Target	PANEL I Predictions from Normative Model (N)			PANEL II Predictions from Interactive Model (I)			PANEL III Actual Ratings (A)			PANEL IV Profile Dissims.	
	Attribute			Attribute			Attribute			Nvs. A	Ivs. A
	1	2	3	1	2	3	1	2	3		
1.	17.32	0.00	10.39	12.01	7.14	12.54	10	8	13	.55	.11
2.	8.65	19.81	.22	9.19	12.67	7.95	5	15	4	.27	.23
3.	13.57	16.39	8.41	10.79	12.67	7.95	4	9	8	.53	.36
4.	9.09	5.40	19.34	9.33	8.65	16.58	8	8	12	.38	.23
5.	0.00	4.23	13.99	6.37	8.32	14.16	8	12	11	.57	.25
6.	20.00	4.07	9.56	12.88	8.28	12.16	9	14	8	.69	.38
7.	14.27	6.76	6.43	11.01	9.03	10.75	14	8	8	.09	.19
8.	7.90	20.00	5.54	8.95	12.72	10.35	7	13	7	.32	.17
9.	10.95	12.72	11.36	9.94	10.69	12.98	7	8	7	.34	.33
10.	3.67	7.16	12.38	7.57	9.14	13.66	6	5	8	.24	.30
11.	14.09	9.88	12.30	10.96	9.90	13.40	7	8	8	.40	.32
12.	7.57	2.34	8.46	8.34	7.80	11.67	8	8	7	.27	.22
13.	8.08	4.94	12.49	9.00	8.52	13.49	8	13	8	.43	.33
14.	8.63	6.11	7.23	9.18	8.84	11.11	7	10	8	.21	.20
15.	10.60	10.25	6.78	9.82	10.00	10.91	7	10	12	.31	.15
16.	3.91	8.67	1.28	7.64	9.56	8.42	6	13	4	.22	.23
17.	2.83	14.48	4.43	7.30	11.18	9.85	6	14	8	.21	.16
18.	2.79	8.46	19.58	7.28	9.50	16.69	8	8	14	.35	.14
19.	9.51	18.64	11.14	9.47	12.34	12.88	9	14	9	.24	.20
20.	16.71	12.50	5.94	11.81	10.63	10.53	7	9	11	.57	.25
21.	12.84	5.37	14.54	10.55	8.64	14.42	12	7	9	.28	.28
22.	11.26	8.91	11.21	10.04	9.63	12.91	12	8	11	.06	.16
23.	7.24	7.96	7.78	8.73	9.36	11.36	8	12	12	.28	.14
24.	15.21	2.13	14.13	11.32	7.73	14.23	10	7	12	.37	.13
25.	15.81	6.08	10.65	11.52	8.84	12.66	10	12	14	.43	.18
26.	8.01	11.57	5.73	8.98	10.37	10.44	8	12	10	.22	.10
27.	9.02	7.53	5.99	9.31	9.24	10.55	8	12	7	.22	.22
28.	13.34	11.02	4.90	10.72	10.22	10.06	7	13	4	.28	.31
29.	10.19	12.07	0.00	9.69	10.51	7.84	6	13	6	.31	.20
30.	15.70	7.68	7.38	11.48	9.28	11.18	13	13	7	.26	.26
31.	19.67	8.21	7.35	12.78	9.43	11.17	11	7	5	.40	.30
32.	13.46	2.13	12.77	10.75	7.73	13.62	8	7	8	.41	.29
33.	13.80	11.05	8.10	10.87	10.22	11.50	8	13	12	.34	.19
34.	9.42	5.57	8.58	9.44	8.70	11.72	7	8	12	.23	.12
35.	9.90	10.25	11.64	9.60	10.00	13.10	10	8	11	.12	.15
36.	10.16	12.84	10.29	9.68	10.73	12.49	8	8	11	.26	.17
37.	5.53	7.44	14.94	8.17	9.22	14.60	7	14	11	.35	.28
38.	17.19	9.38	12.08	11.97	9.76	13.30	9	11	15	.41	.17
39.	6.43	0.74	20.00	8.47	7.35	16.88	7	12	18	.45	.20
40.	6.10	4.56	9.90	8.36	8.42	12.32	7	12	9	.36	.24

Means of the profile dissimilarity values: .33 .22
 Standard deviations of the profile dissimilarity values: .13 .07
 t-value for differences between correlated means (N vs I): 5.71 (p < .01)

Cattell (1944). More specifically, and in a fashion consonant with the view that interactive measurement is "*measurement within a restricted framework defined by the test [itself]*" (Cattell, 1944, p. 293, emphasis added), the following expression was used as a basis for testing the hypothesis that the subjects of the present study were reasoning dialectically rather than normatively as they formulated and expressed their judgments of the targets:

$$I_{pa} = \frac{S_{pa} - S'_{pa \min}}{S'_{pa \max} - S'_{pa \min}} \quad (2)$$

where

I_{pa} represents an interactively derived measurement of person p with respect to attribute a ;

S_{pa} is defined by Equation (1); and

$S'_{pa \max}$ and $S'_{pa \min}$ refer, respectively, to the maximum and minimum "raw" assessments obtainable in a particular instance given the procedure used to generate S_{pa} itself, i.e., given the $V_{pi} - s$, $R_{ia} - s$, and integration function \sum_{il}^m of Equation (1).

As an approach to psychological measurement, the essence of the interactive model is that the meaning of a "raw" assessment made of any given person p with respect to some underlying attribute a is defined *not* with reference to the "raw" assessments made of other persons (as is true of normative measurement), or even with reference to other "raw" assessments made of the same person (as is true of ipsative measurement), but instead with reference to the maximum and minimum "raw" assessments that are, in principle, obtainable under the constraints inevitably imposed by the assessment procedure itself (Lamiell, 1981, 1982). As a formal model of the psychological process by which Smith framed or contextualized his judgments of the targets, therefore, Equation (2) can be written as Equation (2a):

$$D_{ta} = \frac{J_{ta} - J'_{ta \min}}{J'_{ta \max} - J'_{ta \min}} \quad (2a)$$

where

D_{ta} represents the dialectically framed judgment of target t with respect to attribute a ;

J_{ta} is defined by Equation (1a); and

$J'_{ta \max}$ and $J'_{ta \min}$ represent judgments corresponding, respectively, to the least and greatest amounts of attribute a target t could possibly be judged

to have, given the basis for the judgment, i.e., given the V_{it} - s and R_{ia} - s of Equation (1a).

Note that in this context, Equation (2a) implies that the cognitive reference points used by Smith to judge any given target t with respect to attribute a were not *retrieved* as memory traces of prior judgments—whether of other persons or even of target t —but instead *generated* through a process of mentally *negating* the presented information about the target to its polar extremes along the dimension in question.² On this view, it is as if Smith says to himself: “Asked to judge how withdrawn/introverted versus outgoing/extraverted this target’s activity pattern is, I will consider how withdrawn/introverted ($J'_{ia\ min}$) and outgoing/extraverted ($J'_{ia\ max}$) the activity pattern is not but might possibly be, given the information on which my judgment is to be based.”

To apply the logic of this measurement model in the present context, the first step was to compute the $J'_{ia\ min}$ and $J'_{ia\ max}$ values of Equation (2a). To illustrate, consider that the first-listed J_{ia} value in Table 2 above, -4.43 , was obtained by applying Equation (1a) under circumstances where the values of V_{it} (i.e., the frequency values of the 16 activities in the protocol of Target #1) were as follows:

8,2,0,4,4,2,3,3,8,0,0,2,0,2,6,0

The corresponding 16 values of R_{ia} , by which these activity frequency values were weighted, were as shown in the left-most column of Table 1. Given this as the procedure used to generate the J_{ia} value -4.43 , it is not difficult to see that in this instance the value $J'_{ia\ max}$ would have been obtained if the activity protocol in question had revealed that each activity weighted positively with respect to Attribute 1 was engaged in with a maximum frequency value of 9, while each activity weighted negatively with respect to Attribute 1 was engaged in with a minimum frequency value of 0. That is, if instead of the activity frequency values displayed above the target’s protocol had assumed the pattern

9,0,0,9,0,0,0,9,0,0,0,9,0,9,0,9

then the same assessment operation that yielded the value -4.43 would instead have yielded the value $+6.75$. In this instance, therefore, the $J'_{ia\ max}$ value of Equation (2a) equals $+6.75$.

By the same token, it can be seen that the obtained J_{ia} value for this same target would have equaled $J'_{ia\ min}$ if the activity protocol for that target had indicated that each activity weighted negatively with respect to Attribute 1 was engaged in with a maximum frequency value of 9 while each activity weighted

² For a more extensive discussion than can be offered of the conceptual relationship between dialectical reasoning and the logic of what Cattell (1944) called interactive measurement—a relationship that Cattell himself seems not to have considered at all—the reader is referred to Lamiell (1987).

positively with respect to Attribute 1 was engaged in with a minimum frequency value of 0. That is, if the target's activity protocol had assumed the pattern

$$0,9,9,0,9,9,9,0,9,9,9,0,9,0,9,0$$

then the same assessment operation that yielded the value -4.43 would instead have yielded the value -21.24 . In this instance, therefore, $J'_{ta\ min}$ in Equation (2a) assumes the value -21.24 .

Substituting the values -4.43 , $+6.75$, and -21.24 for, respectively, J_{ta} , $J'_{ta\ max}$, and $J'_{ta\ min}$ in Equation (2a), the reader can easily verify that in this instance D_{ta} equals $.60$. Interpolating from the 0.00-to-1.00 scale on which D_{ta} values are naturally defined to the 0-to-20 scale that Smith was required to use in making his ratings, the value $.60$ "translates" into the value 12.01. Accordingly, it is this value that the reader will find entered first in Panel II of Table 3, under the heading "Predictions From Interactive Model (I)." That is, on the theoretical assumption that the reasoning process through which Smith determined his rating of Target #1 for the attribute "warm/impassioned versus cool/dispassionate" could be represented validly by the arithmetic of Equation (2a), we would expect the value 12.01 to well approximate the rating Smith did in fact make of Target #1 for that attribute.

Each of the remaining values shown in Panel II of Table 3 was generated according to the basic procedure just described. Thus, each of those values bears interpretation as a *prediction* of the actual response scale rating that Smith would make of a given target with respect to a given attribute, on the theoretical assumption that the reasoning process underlying the rating was dialectical rather than normative/mediational in nature.

Predictive Efficacy of the Alternative Models

Given the alternative sets of predicted ratings displayed in Panels I and II of Table 3, the question is obviously: Which of the two formal models of the impression formulation process yields better approximations of the ratings Smith actually made?

To understand how this question was approached in the present research, let us begin by considering the first row of Panel III in Table 3, where it is indicated that the three ratings Smith actually assigned to Target #1 were 10, 8, and 13, respectively. Recalling that each of those ratings was rendered on a numerical scale ranging from 0 at one end to 20 at the other, it is readily seen that by the index of overall profile dissimilarity recommended by Cronbach and Gleser (1953), the maximum possible dissimilarity between *any* set of predictions and the ratings Smith in fact made of Target #1 is given by the expression:

$$[(10-20)^2 + (8-20)^2 + (13-0)^2]^{1/2} = 20.32$$

Now, expressed as a ratio of this maximum possible value (see Budescu, 1980), the overall dissimilarity between the normatively derived predictions of

Smith's ratings of Target #1 and his actual ratings of that target is given by the expression:

$$[[[(17.32-10)^2 + (0-8)^2 + (10.39-13)^2]^{1/2}/20.32] = .55$$

By comparison, the overall dissimilarity between the interactively derived predictions of Smith's ratings of Target #1 and his actual ratings of that target is given by the expression:

$$[[[(12.01-10)^2 + (7.14-8)^2 + (12.54-13)^2]^{1/2}/20.32] = .11$$

These two values, .55 and .11, are, therefore, the values entered in the first row of Panel IV of Table 3, under the heading "Proportional Profile Dissimilarities." Quite obviously in the case of Target #1, the interactive (dialectical) model of the judgment process yielded substantially more accurate predictions of Smith's actual ratings than did the normative (mediational) model. As each pair of values entered in the remaining 39 rows of Panel IV of Table 3 was derived in accordance with the procedures just described, it should be apparent to the reader that this outcome held up for no less than 31 of the 40 targets Smith rated. Moreover, and as indicated at the bottom of Table 3, the mean overall profile dissimilarity value obtained for the interactive model, .22, was significantly lower (indicating greater accuracy) than that obtained for the normative model, .33.

Of course, the results displayed in Table 3 are merely those obtained for one subject, and space limitations preclude presenting in such detail the results for all of the subjects of this study. It should be understood, however, that data analyses identical to those we have just described were carried out on each of the remaining subjects, case by case. Of the total of 67 individuals investigated, we found in 10 cases that neither model outperformed the other to a statistically significant degree as a basis for predicting the ratings of the target protocols. For 57 individuals, the interactive model significantly outperformed the normative model in this regard, and *for no individual did the normative model significantly outperform the interactive model.*³

Some Important Additional Findings

In reaction to previous presentations of findings in line with the above, two major questions have repeatedly been posed. The first of these can be phrased as follows: "Is it not possible that subjects resort increasingly to a normative reasoning process as they 'work through' the set of targets and thus become more cognizant of prevailing sample norms?" Certainly, this possibility exists, and, in research of this sort, results consistent therewith would be found in evidence that the proportional profile dissimilarities between a subject's actual ratings and normatively-derived predictions systematically decrease in magnitude as a function of target number.

³ The interested reader will be provided with detailed results upon request.

Consistent with this rationale, Pearson product-moment correlations were computed for each subject between target order and the proportional profile dissimilarity values obtained for normatively-derived predictions (e.g., in the case of Smith, the first column of values in Panel IV, Table 3), after partialing from the latter any non-independence from the proportional profile dissimilarities obtained for interactively-derived predictions (e.g., the second column of values in Panel IV, Table 3). For Smith, the obtained semipartial correlation was found to be $+0.12$, a value not deviant from zero to a statistically significant degree. Among the remaining 66 subjects, non-significant correlations were likewise obtained in 51 cases, and statistically significant *positive* correlations—indicating that normatively-derived predictions became *less* accurate as the subjects proceeded through the set of 40 targets—were obtained in 15 cases. For *none* of the 67 subjects did these analyses yield a statistically significant negative correlation, and these results are really quite damaging indeed to the notion that subjective personality judgments are guided by considerations of a normative nature.

A second question that has often been raised in reaction to findings such as those presented here is: "If you simply ask subjects to describe to you how they make their judgments, what do they say?" Though we have not kept detailed records of subjects' responses to this question, we have often posed the question informally, and in so doing we have found most subjects asserting that their judgments were guided by essentially normative considerations. Taken at face value, these answers would flatly contradict our findings.

In an attempt to pursue this question more systematically, each of the 67 subjects in the present study was interrupted at some point during his/her ratings of the 40 targets (the exact point varied from subject to subject), and asked to complete a series of six blank activity protocols patterned after those used to describe the activity patterns of the targets. In each case, the subject was asked to construct the activity frequency protocol that she/he would have to see in order to warrant a rating at either extreme of a given rating scale. The objective here, of course, was to induce the subject to specify explicitly the activity protocols that in his/her own mind "anchored" each of the three response scales/rating dimensions.

Subjects' responses to the above mentioned question notwithstanding, our expectation here was that the anchoring protocols the subjects claimed they were using would correspond closely to the hypothetical extreme protocols on the basis of which the values of $J'_{ia \max}$ and $J'_{ia \min}$ were determined (see above). By and large, however, this did not occur. Accordingly, we then undertook additional analyses in which the anchoring protocols specified by a given subject were used as the basis for generating predictions of the ratings that subject would actually make of the targets. This procedure thus yielded a third set of predicted ratings for each subject, paralleling those displayed in Panels I and II of Table 3. Having generated these predictions, proportional profile dissimilarities between them and the subject's actual ratings could then be derived according to procedures identical to those described above.

Here again, space limitations preclude a full tabular presentation of the results. For 60 of the 67 subjects, however, the analyses revealed that predictions based on the interactive model of the judgment process were significantly more accurate than predictions based on the anchoring protocols the subjects themselves claimed to be using. For none of the 67 subjects did the latter predictions prove to be significantly more accurate than the former.

Discussion

In his discussion of dialectical logic, Kosok (1976) noted that

[T]he very act of *affirming* an immediacy, asserting or announcing a given, or recognizing what is present, is to set up the *condition* for its negation, since to affirm is to reflect, and allow for the *possibility of its negation*. Both $+e$ and $-e$, or the assertion of and negation of e , are functions of e , which is to say that the *content* or reference-base e of assertion and negation is the same, expressed, however, in contrary forms. That which is initially given can be *referred to* positively as that which is *present* (called positive presence) and negatively as that which is *lacking* (called negative presence, since the given makes *itself* evident as a *lack*). The concept of negation viewed dialectically as a type of negative presence is therefore qualitatively different from the standard notion of logical negation. Given a term A , its negation not- A is usually [i.e., under the standard notion of logical negation] interpreted to be a positive presence of something other than A , " $-A$," called, e.g., " B ," such that A and B are not only distinct but *separable* "truth values." (p. 328, all emphases in original)

It has perhaps already occurred to the reader that the currently prevailing conception of cognitive prototypes in impression formation as mental averages of previous experiences incorporates what is identified by Kosok (1976) as the standard notion of logical negation. For insofar as one speaks at all—under the mediational view—of a cognitive prototype as a negation of some present "input A ," one does so only in the sense that the prototype is itself to be accounted for in terms of the positive presence(s) of something(s) other than A , the latter being constituted either of (a) one or more other present "inputs," B , C , D , etc., distinct and separable from A and from one another, or (b) the memory traces thereof. This is, of course, precisely the view implicit in a normative theoretical conception of the reasoning process by which subjective personality judgments are formulated and expressed, and it is for just this reason that the normative model formally represented in the research reported above qualifies as one (though by no means the only possible) particular version of the mediational view.

In the light of the findings we have reported, however, a normative/mediational conception of the judgment process in question seems difficult indeed to defend. In our view, those findings strongly suggest that the negations with reference to which the subjects judged the targets were not of the standard logical sort at all, but were instead dialectical in just that sense of *negative presence* to which Kosok alludes.

If we can resort briefly to the language of the (highly dubious) computer metaphor for human cognition, we would have to say in discussing the present

findings that our subjects somehow managed to “encode” ideas corresponding to the hypothetical activity protocols used to derive the $J'_{ta\ max}$ and $J'_{ta\ min}$ values of Equation (2a), despite the fact that those activity protocols *were* hypothetical. That is, $J'_{ta\ max}$ and $J'_{ta\ min}$ had no distinct and separable referents in the domain of to-be-processed “information.” In effect, this implies that the subjects “saw” activity protocols they were never shown, and that judgments corresponding to those never-shown protocols, i.e., judgments corresponding to the $J'_{ta\ max}$ and $J'_{ta\ min}$ parameters of Equation (2a), were integral *psychological* components of the *meanings* being expressed in the ratings of the protocols they *were* shown. Hence, to understand what a subject said in any given instance, i.e., to grasp the meaning of the rating that she/he assigned to a given target with respect to a given attribute, it was necessary to locate the same not within the context of judgments expressed in other instances, but instead within the context of judgments *not* expressed in *that* instance. The evidence suggests not that this latter context was simply *available* to the subject in the sense of being “stored” in some memory “bank” that she/he could “access,” but rather that it was *generated* by the subject through the mental activity of *negating the given*.

It is, we would suggest, just this capacity to conceptualize the given with reference to the not-given that enables a person to know—frame the personal meanings of—the objects and events in his/her own life even under circumstances where the memory traces of prior experiences emphasized under purely mediational accounts of human cognition are irrelevant, inaccessible, or simply non-existent. It is, in short, this capacity to reason dialectically that enables a person to render what we have referred to previously as “the first judgment.”

Although the research presented here has required lengthy labor over the rather circumscribed question of how subjects arrive at numerical ratings of peers given information about the latter’s behavioral patterns, we would not wish to leave the reader with the impression that we take those ratings to be of any particular interest in and of themselves. What is of interest—because it is of theoretical consequence—is the *reasoning process* through which the subjects *produce* their ratings. Stated otherwise, it is in the rationale by which the ratings are produced, and not in the ratings themselves, where we find the most significant implications of this research for theoretical conceptions of human cognition. As a means of amplifying this point, and by way of a conclusion, the reader will perhaps indulge us the following anecdote.

A few years ago, the senior author of the present article received from a colleague at another university some correspondence in which questions were raised concerning the need to concern ourselves at all with the reasoning processes underlying subjective interpretations of one’s own and others’ actions. In an attempt to bolster his argument through analogy to the physical sciences, that correspondent asked, not unfacetiously, if in developing theories about the origin of the universe, the expansion of galaxies from each other, and so on,

scientists had found it necessary to concern themselves with the interpretation placed by a planet on its own trajectory and velocity. In a personal reply to that correspondent, a confession of astonishment was made at the inclination to analogize the subjects of inquiry in psychology—persons—to the subjects of inquiry in physical science, rather than to the *inquirers* in physical science. In an attempt to provide a glimpse of what might emerge were we, as psychological theorists, more sympathetic to this latter and surely more apt analogy, the correspondent was then invited to consider the following passage from William Barrett's marvelous book, *The Illusion of Technique*, in which the focus of the discussion is on, of all people, Galileo.

The chief theoretical part of the new science was to be mechanics . . . and to establish mechanics mathematically, it was necessary to have a decisive and clear-cut concept of inertia as a fundamental characteristic of moving bodies. What does Galileo do? He does not turn to the "irreducible and stubborn" facts; rather, he sets up a concept that could never be realized in actual fact. Imagine, he says, a perfectly smooth and frictionless plane; set a ball rolling upon this plane, and it will roll on to infinity unless another body and force interpose to stop it. *Well, experience never presents us with perfectly frictionless surfaces nor with planes infinite in extension.* No matter; these conditions supply us with a concept of inertia more fruitful for theory than any that would be yielded by the "irreducible and stubborn" facts themselves.

Rationalism does not surrender itself here to the brute facts. Rather, it sets itself over the facts in their haphazard sequence; *it takes the audacious step of positing conditions contrary to fact, and it proceeds to measure the facts in the light of the contrafactual conditions.* Reason becomes legislative of experience—this was the decisive point that Kant's genius perceived as the real revolution of the new science and that he, consequently, proclaimed should become the revolution within future philosophy. (Barrett, 1979, pp. 200-201, emphasis added)

In citing this passage, an attempt was being made to draw to the aforementioned correspondent's attention the fact of Galileo—the scientist but also the person—(a) reasoning away from what was "out there" in the realm of "irreducible and stubborn" facts or observations, and then (b) proceeding to make sense out of—i.e., measure or give meaning to—what was "out there" with reference to what was not "out there," but conceivable nonetheless.

Nor, we would suggest, is the parallel here at all obtuse. On the contrary, the research reported above can in our view readily be seen as a systematic attempt to make salient that little bit of Galileo that exists in subjects the above mentioned correspondent would so readily analogize to planets! For like Galileo—but quite unlike the objects Galileo studied—it would seem that the subjects in our research reasoned away, dialectically, from activity protocols we *did* present them with to ideas about activity protocols we *did not* present them with, and it appears that they proceeded to "measure" or give meaning to the former with reference to the latter. The subjects' "rating behaviors" were thus not mere "responses," but *rational actions*, rooted in the capacity of those subjects to "calibrate the facts," as it were, not with reference to other "facts," or to the

memory traces thereof, but instead with reference to contrafactuals that were implicit in the very assertion of the facts, and to which the subjects could reason dialectically.

The results obtained when the interactive/dialectical model was compared for its predictive accuracy with a model based on anchoring protocols the subjects themselves claimed to be using raise the theoretically intriguing possibility that the dialectical movements of thought involved in the impression formation process are unconscious, in the sense of being out of awareness. Since we cannot truthfully claim to have anticipated these results, and since in any case they are the findings of only one research project, we allude to this possibility very gingerly, and only by way of suggesting that it is a matter worthy of further systematic appraisal. For now, the point to be stressed is simply this: if rather than existing as the memory traces of prior experiences, cognitive prototypes in impression formation are generated—consciously or otherwise, but either way in a distinctly Galileo-like fashion—as negations of present experience, and if from the subjective point of view the question is moot as to whether or not those negations have, or have ever had, independently specifiable referents in the empirical world, then it would seem that we do indeed require a rather more humanistic theoretical conception of human cognition than contemporary mediational accounts seem capable of providing.

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