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Theory and Configurality in Clinical Judgments of Expert and Novice Psychologists

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This article shows that in judging the degree of pathology of mental patients, expert psychologists, more than novices, assign heavier weight to the more pathological information. This difference is explained in terms of the professional socialization process of clinical psychologists.

Judgment in general, and professional judgment in particular, requires the integration of various pieces of information to arrive at an overall judgment. For example, social workers are required to integrate various pieces of information about a family in arriving at an intervention recommendation in a child abuse case, and clinical psychologists are required to integrate the results of various tests to arrive at a diagnosis of a mental patient.

The integration rules that guide judgment may be characterized by the degree to which they are linear or configural. Linear (or compensatory) rules are those in which overall judgment is a weighted average of the attributes' values, with the weight of each attribute directly reflecting its subjective importance. Configural rules are those in which the impact (weight) of a given attribute depends on the level of other attributes. Two types of configural rules are especially important when the relationship between attributes and judgment is monotonic: the disjunctive rule and the conjunctive rule. A *disjunctive rule* leads to judgments that are based primarily on the attribute(s) whose value(s) is (are) high. A *conjunctive rule* leads to judgments that are based primarily on the attribute(s) whose value(s) is (are) low. Note that high and low do not necessarily reflect a value judgment (i.e., they do not mean favorable and unfavorable) but are defined vis-à-vis the judgment. The convention used in this article (which is implicitly implied in previous articles, e.g., Einhorn, 1971; Goldberg, 1971; Ogilvie & Schmitt, 1979) is that attributes' values are scaled to have a positive correlation with judgments.

It is often argued that configurality is more characteristic of the judgment of experts than of the judgment of novices. Whereas novices are likely to use simple linear strategies, experts are more likely to use intricate configural strategies that let attribute weight change as a function of the context (see Camerer & Johnson, 1991, for a review). For example, in an address to the Educational Testing Service invitational conference, Meehl (cited in Goldberg, 1969, p. 523) stated:

> I expect the discriminant function [a linear function that separates psychotics from neurotics] to excel the fledgling cliniker, but I expect the skilled cliniker to do still better. . . . The student clinician follows a near linear and unconfigured function, non-optimal weights, and low diurnal reliability for identical profiles. The discriminant function eliminates the unreliability and non-optimal weights. The skilled cliniker employs a configural function, and in the case of the MMPI [Minnesota Multiphasic Personality Inventory], this is so important that the superimposed errors of non-optimal weights and unreliability do not wash out the configural gain.

Although the view that experts are more configural than nonexperts is rather compelling, there is very little evidence that the outcome of expert judgment does indeed exhibit more configurality. Whereas a number of studies have shown that the process of expert judgment is nonlinear (e.g., Chase & Simon, 1973; Elstein, Shulman, & Spafka, 1978; Ericson & Polson, 1988; Johnson, Hasserbrook, Duran, & Moller, 1982), only a few have shown configurality in the outcome of expert judgment (Einhorn, Kleinmuntz, & Kleinmuntz, 1979; Ganzach, 1994; Hitt & Barr, 1989). Of these studies, only Ganzach (1994) directly contrasted experts and nonexperts, by comparing the intervention judgments of expert social workers with those of nonexperts in child abuse cases. This study showed that, in this domain, experts' judgments are more configural than the judgments of nonexperts in that more

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positive cues receive higher weight. This difference in configurality was traced to the dominant theories in social work, which emphasize family strengths and resources in arriving at an intervention decision. Thus, for example, in judging the appropriate degree of intervention intrusiveness in the case of a child whose father's attitude toward him is adequate and whose mother's attitude is poor, experts, but not laypersons, are likely to assign relatively greater weight to the former element of the input information.

Because this difference between expert social workers and nonexperts is so far the only documented example of the relationship between professional socialization processes and configurality in judgment, an interesting question is whether this relationship exists in other domains. To answer this question, I compare, in the present article, the diagnostic judgments of expert psychologists with those of novices.

Weighing of Pathological and Nonpathological Cues in Clinical Psychology

One characteristic of the professional socialization process of clinical psychologists is directing attention toward the psychopathological aspects of the mind (Bieri et al., 1966; Sarbin, Taft, & Bailey, 1960; Soskin, 1959; Turk & Salovey, 1985). The training of clinical psychologists concentrates on issues such as the origins of psychopathology, its development, and its remedy; the focus is on the diagnosis of the pathological rather than the identification of the benign and on the study of the deviant rather than the understanding of the normal. Furthermore, to a certain extent, even normal behavior is often understood by clinical psychologists as the result of unconscious pathological aspects of the mind, such as murder impulses, incestuous fantasies, and death wishes.

A few empirical studies have examined whether clinicians emphasize pathological information in their judgments (e.g., Ganzach, 1997; Langer & Abelson, 1974; Renaud & Estes, 1961; Rosenham, 1972). Rosenham's (1972) article "On Being Sane in Insane Places" is the best-known contribution. In this article, Rosenham reported that behaviors that would otherwise appear normal were judged as pathological by the staff of psychiatric hospitals. More recently, Turk and Salovey (1985) concluded, after reviewing the relevant literature, that "in the clinical context, what the clinicians expect to observe is pathology. This expectancy may . . . introduce systematic biases in the direction of overestimating psychopathology and underestimating more positive features" (p. 24). However, whereas the studies reviewed by Turk and Salovey suggest that clinical experience may lead to overweighing of pathological information, they do not represent a direct demonstration of the effect of experience on clinical judgment, because they did not vary experience. The only direct demonstration of this effect was provided by Faust et al. (1988), who showed a greater tendency among more experienced clinicians to misdiagnose normal cases as abnormal.

One type of overweighing of pathological information is reliance on a configural (disjunctive) rule in which the more pathological a cue is relative to the other cues, the higher its weight in the judgment of pathology. Consider, for example, the judgment of pathology based on two scales of the MMPI, and assume that the scale of the judgment, as well as the scales of the MMPI, is such that the higher the value, the more severe the pathology. A disjunctive judgment strategy is a strategy in which each MMPI scale has a higher weight when its value is higher than the value of the other scale than when its value is lower than the value of the other scale.

In summary, I expect the diagnostic judgment of expert clinical psychologists, like the intervention judgment of expert social workers, to be configural. However, whereas the intervention judgment of social workers has been found to be conjunctive, the diagnostic judgments of clinical psychologists are expected to be disjunctive. Furthermore, whereas the intervention judgments of expert social workers have been found to be more conjunctive than those of nonexperts, the diagnostic judgments of expert clinical psychologists are expected to be more disjunctive than the diagnostic judgments of nonexperts.

Method

The data used here were collected in the mid-1950s by Paul Meehl. They included clinical judgments of 29 clinicians, 13 staff psychologists, and 16 trainees. The clinicians in the study came from different mental health settings (Goldberg, 1965), and their schooling represented a number of approaches to clinical psychology at the time Meehl's experiment took place (P. Meehl, personal communication).

Each clinician judged the same 861 MMPI profiles on an 11-step forced normal distribution scale ranging from *least psychotic* (1) to *most psychotic* (11). The profiles included the three validity scales and the eight most commonly used clinical scales of the MMPI, where scale values were expressed as standard test scores (T scores). The profiles were of psychiatric patients, about half of whom were diagnosed as psychotics and half as neurotics. The profiles consisted of a number of samples obtained at various clinics and psychiatric institutes (see Meehl, 1959, for a detailed description of the data). The information given to the judges was that "the patients were males under psychiatric care, all having received a neurotic or psychotic diagnosis. [The judges] did not know which samples were inpatient or outpatient, VA or non VA, nor did they know the actual incidence of psychosis in any sample nor over all the cases." The judges were also instructed that the patients could be either psychotics or neurotics.

In the subsequent analysis, I use the scatter model to detect

configurality in judgment. This model represents judgment of multiattribute profiles by two elements: the *elevation* of each profile (a weighted average of the attribute values) and the *scatter* of the profile (the standard deviation of the standardized attribute values around the profile mean; see Cronbach & Gleser, 1953, for a treatment of the concepts of elevation and scatter). The influence of the profile scatter on judgment is indicative of reliance on disjunctive or conjunctive rules. If a disjunctive rule is used, scatter will be positively related to judgment, while if a conjunctive rule is used, it will be negatively related to judgment.

To illustrate the underlying reasoning for the scatter model, consider the evaluation of the severity of the disorder of two mental patients on the basis of two "equally important" test scores. The two patients have the same mean score; however, one has two moderate scores, whereas the other has one high score (a score indicative of severe pathology) and one low score. If decisions follow a linear compensatory strategy, the evaluations of the two patients will be about the same. If decisions follow a disjunctive strategy, the patient with the higher scatter will receive a higher (more severe) evaluation. If decisions follow a conjunctive strategy, the patient with the higher scatter will receive a lower evaluation.

Mathematically, the scatter model is expressed as follows:

$$Y = a + \sum_{i=1}^{k} b_i X_i + b_{k+1} [\sum_{i=1}^{k} (Z_i - \bar{Z})^2]^{1/2} + e, \quad (1)$$

where Y is the judgment, the X_is are the attributes (scaled so that higher values of X_i imply higher judgment), the Z_is are the standardized values of the attributes (across profiles), $\bar{Z}$ is the mean within-profile Z_i ($\bar{z} = \sum_{i=i}^{n} z_i/n$), a is the intercept, and e is an error. The last term of the equation is a measure of the profile scatter. The value of b_{k+1} indicates whether conjunctive or disjunctive rules are being used. A positive value of b_{k-1} is indicative of disjunctive rules, whereas a negative value is indicative of conjunctive rules.

The scatter model was previously used to examine the difference between judgment and choice (Ganzach, 1995a) and to examine for configurality in performance evaluation (Brannick & Brannick, 1989; Ganzach, 1993, 1995c). This is also the model used in studying the differences in configurality between expert social workers and laypersons (Ganzach, 1994). It has two advantages over earlier methods of estimating disjunctive and conjunctive strategies (i.e., examination of Einhorn's, 1970, hyperbolic and parabolic models against the linear model). First, it treats judgment strategies as located on a continuum ranging from conjunctive through linear to disjunctive. This facilitates aggregation of individual strategies for the purpose of examining hypotheses about groups by calculating the average b_{k+1} (computed for each participant individually) over participants. Second, this model produces a better fit than Einhorn's models when strategies are "purely" disjunctive or conjunctive (Ganzach, 1995b; Ganzach & Czaczkes, 1995).

Results

The scatter model was estimated for each of the 29 judges, where the X_is are the values of the 11 MMPI scales and Y is the judgment of the likelihood of psychosis. Before calculation of the scatter, two transformations were performed. First, the 11 scales were standardized. Second, the correlations between each scale and each dependent variable were computed, and the scales whose correlations were negative were rescaled by multiplying them by -1 before calculation of the scatter.

The average scatter coefficient of the 16 novices was .105 (SE = .009), and the average scatter coefficient of the 13 experts was .162 (SE = .012). The distribution of the scatter coefficients of each of the two groups is given in Figure 1. Of the 29 judges, 25 had a significant scatter coefficient ($p < .0001$). The other 4 judges were all in the novice group.

There are two important features of these results. First, both experts and novices were disjunctive in their diagnostic judgments. Both the average scatter coefficient of the experts and the average scatter coefficient of the novices were significantly positive ($p < .0001$). Second, the experts were more disjunctive than the novices; the difference between the average scatter coefficient of the two groups was significant, $t(27) = 3.9$, $p < .001$. This difference is quite large, explaining 36% of the variance in the scatter coefficients.

A natural question to ask is, "Who is right?" Because Meehl's data include the hospital diagnosis (psychosis vs. neurosis), it is possible to estimate a logistic regression of this binary criterion using Equation 1, in which Y is the logarithm of the odds of a diagnosis of psychosis. The results of this analysis yielded a nonsignificant (positive) coefficient for the scatter term, $\chi^2(1) = 2.5$, $p > .1$.

On the basis of this result, it could be argued that both experts' and novices' judgments are biased in that they assign excessively heavier weight to more pathological information and that this bias is stronger among experts

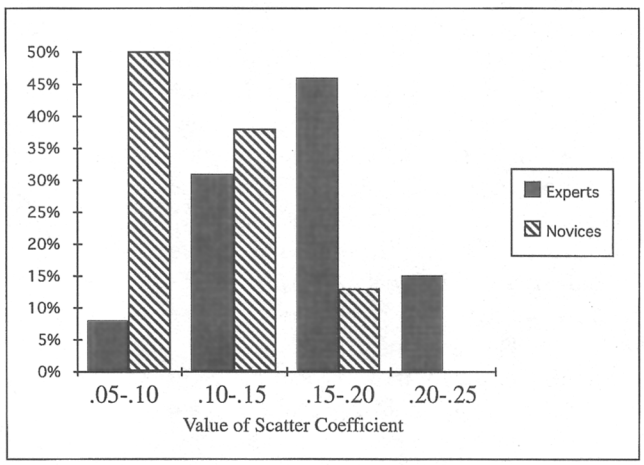

Figure 1. Distribution of the scatter coefficients of the expert and novice groups.

than among novices. However, the failure to reject the null hypothesis regarding the scatter coefficient of the criterion model may be due to the large error variance in this model. The R^2 value of the criterion model was .21, the incremental R^2 of the scatter term was .002, and therefore the power of detecting an effect for the scatter term was less than 10%. In comparison, the power of detecting such an effect in the judgment was very high; the average R^2 value of the individual judges was .58, the average incremental R^2 of the scatter term in these models was .01, and the average power was about 99%.

Finally, there are two aspects of the judgment in which experts and novices did not differ. First, there were very small differences between the experts and the novices in the linear weights of the MMPI scales (i.e., the attribute weights in a model that included only the 11 MMPI scales).[1] This result is consistent with Ganzach's (1994) finding that whereas experts and nonexperts differ considerably with regard to configural weighing of attributes, there are only small differences with regard to linear weighing.

Second, experts and novices did not differ in terms of accuracy. The average correlations between the judgment and the criterion were .285 for the experts and .281 for the novices ($p > .9$ for the null hypothesis of no difference). Note that this similarity in accuracy is not inconsistent with the difference in judgment strategies; the reason is that when the relationship between the criterion and the cues on which the judgment is based is weak (as is the case in the present data), judgment strategies have only a weak impact on accuracy.

Discussion

The diagnostic judgments of clinical psychologists examined in this article are disjunctive. In diagnosing psychosis from neurosis, clinicians tend to assign heavier weight to the more pathological cues. This tendency increases with expertise; it is stronger among expert psychologists than among novices. These findings are consistent with the notion that clinical expertise is associated with overweighing of pathological information.

The heavier weighing of pathological information could be viewed as an instance of confirmatory judgment strategy. It could be argued that in processing clinical information, psychologists attempt to confirm the hypothesis that the patient is highly pathological and that the excessive weight of pathological information is associated with the excessive attention generally given to confirming, rather than disconfirming, information (e.g., Fischhoff & Beyth Marom, 1983; Klayman & Ha, 1987).

Although confirmatory strategies are usually discussed in the context of information search (e.g., Snyder & Campbell, 1980; Wason, 1960), a number of studies have demonstrated confirmatory judgment strategies. Birnbaum and Stegner (1979) studied the effect of buyers' and sellers' "point of view" in judgments of fair price and showed that, with regard to sellers, the more favorable the product information, the higher its weight, whereas with regard to buyers, the more favorable the information, the lower its weight. Ganzach (1993) showed that when participants' goals of being lenient (strict) in their judgment increase, so does the weight of positive (negative) attributes. Other examples of confirmatory judgment strategies are Tversky's (1977) demonstration that the weight of common features is relatively high in similarity judgments, whereas the weight of distinctive features is relatively high in dissimilarity judgments, and Shafir's (1993) demonstration that the weight of positive features is relatively high in accept decisions, whereas the weight of negative information is relatively high in reject decisions.

However, it is important to note that a confirmatory judgment strategy does not give a complete account of the data. It does not explain why the confirmatory hypothesis is associated with severe pathology (psychosis) and not with mild pathology (neurosis), and it does not explain why experts are more likely than novices to assign heavier weight to the pathological information. To explain this, a framework that identifies the confirmatory hypothesis is necessary. I suggest that dominant professional theories, along with the professional socialization processes that lead to adoption of these theories, provide such a framework.

An alternative explanation for the data is that the relationship between scatter and judgment is not the result of reliance on disjunctive strategy but the result of curvilinearity in the (subjective) attribute scales. Such an explanation would suggest that the subjective attribute scales of experts are more convex vis-à-vis judgment than the subjective attribute scale of novices. This issue was discussed in detail in Ganzach (1994), in which it was suggested that, on the basis of parsimony, a configurality explanation should be favored over a curvilinearity explanation. In particular, it was argued, based on Birnbaum's work (Birnbaum, 1974; Birnbaum & Sutton, 1992), that

> when considering rival theories proposed to describe different empirical phenomena involving the same theoretical

[1] This result is unlikely to be due to high standard errors of the parameter estimates resulting from multicollinearity between the predictors (the intercorrelations between the predictors ranged from −.36 to .81, with a mean of .24), because the differences in linear weights were very small as well in a model in which the independent variables were the unit weight means of the three factors that emerged from a factor analysis of the 11 subscales (see Ganzach, 1995c, for a description of the factors) and in a model in which the independent variables were the factor scores of the three factors.

> constructs, preference should be given to coherent theoretical systems (in which the same measurement scales can be used to account for a variety of empirical phenomena) as opposed to theoretical systems that require different measurements for each new situation. (Birnbaum & Sutton, 1992, p. 184)

Are the results of this study, which was conducted 40 years ago, generalizable to current clinical judgments? Faust et al.'s (1988; see also Faust & Guilmetter, 1990) study, which showed an association between expertise and overdiagnosis of pathology, is one indication that, in contemporary clinical psychology, expertise is associated with increased weighing of pathological information. Note also that the results of the current study are in agreement with two sets of ubiquitous findings in the literature: (a) that there is a general tendency among clinicians to overdiagnose pathology (Steadman, 1973; Turk & Salovey, 1985), and (b) that experts, more than nonexperts, rely on configural judgment strategies (Camerer & Johnson, 1991).

The comparison between experts and novices was a central research question in previous analyses of Meehl's data, but none of the studies based on these data succeeded in identifying any systematic differences between the two groups (e.g., Wiggins & Hoffman, 1968). Furthermore, a number of studies based on other sets of data failed to find differences between the outcomes of experts' and novices' judgments.[2] In my view, most of these studies failed to find such differences because they focused on "noisy" parameters, particularly accuracy (e.g., Goldberg, 1969; Hiler & Nesvig, 1965; Levy & Ulman, 1967; Oskamp, 1962, 1967; Walters, White, & Green, 1988; see Faust & Ziskin, 1988, for a recent review). Other reasons are the lack of a good theoretical framework for expert–novice differences in clinical judgment, which led to focusing on parameters of the judgment not associated with "true" differences between experts and novices (e.g., focusing on linear, rather than configural, weights), and the reliance on configural models lacking in terms of power (e.g., the quadratic and sign models; see Wiggins & Hoffman, 1968).

An interesting comparison could be made between the results of the current study, which examined configurality in judgments of clinical psychologists, and the results of Ganzach's (1994) study, which examined configurality in judgments of social workers. Whereas expertise led social workers to be more conjunctive than nonexperts (i.e., to assign heavier weight to the less pathological cues), it led clinical psychologists to be more disjunctive than nonexperts (to assign heavier weight to the more pathological cues). I suggest that the difference in the results of the two studies is due to the difference between the professional socialization processes of social workers and clinical psychologists. In social work, the emphasis is on the importance of clients' personal strengths and potential family resources; in clinical psychology (at least in the dominant clinical theories at the time the study took place), there is an emphasis on the importance of the pathological elements of the mind.

Another factor that may have contributed to the discrepancy between the results of the two experiments is that the social workers made intervention judgments, whereas the psychologists made diagnostic judgments. In diagnostic judgments, the cost of false negatives (i.e., diagnosing a mild pathology when the true pathology is severe) may be perceived to be higher than the cost of false positives. This may lead to a disjunctive judgment strategy. On the other hand, in intervention judgments, the cost of false positives (i.e., recommending an intervention when it is really not necessary) may be perceived to be higher than the cost of false negatives. This may lead to a conjunctive judgment strategy (Birnbaum, Coffey, Mellers, & Weiss, 1992; Einhorn, 1971). However, this explanation is not consistent with the finding that for social workers, not only intervention judgment, but also risk judgment (i.e., judging that a child is at risk of abuse) is more conjunctive than the judgments of laypersons. The reason is that with regard to the cost of false positives and false negatives, risk judgments are similar to diagnostic judgments (Ganzach, 1994).[3]

Another interesting comparison between the current study and Ganzach's (1994) study concerns attributes' linear weights. In both studies, the large differences in configural weights between experts and nonexperts were accompanied by small differences in linear weights. This may appear somewhat surprising because, in both studies, the linear effects explained much more variance in judgment than the configural effects. However, in my view, the reason for this difference between linear and configural weights is that there is more to learn with regard to reliance on configural weights than with regard to reliance on linear weights. This explanation is consistent with one of Meehl's ideas mentioned in the introduction: the idea that the essence of expertise is reliance on configural—but not on linear—weighing.

Finally, an important question that cannot be conclusively answered is whether the clinical judgments analyzed in this article are biased and whether this bias is

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[2] This is not to say that process tracing studies (studies in which the dependent variables are related to the process of the judgment rather than to its outcome) did not find differences between the judgments of experts and nonexperts (see the introduction for examples).

[3] Note that it was also argued that the perception that false-negative outcomes are more costly than false-positive outcomes should not necessarily lead to a disjunctive strategy (Ganzach, 1993, in press).

stronger among experts than among novices. One problem with a bias theory is that, to accept it, one needs to accept the null hypothesis that the scatter coefficient in the criterion model is equal to or smaller than zero. This is clearly a problem, particularly given the low power of rejecting the null hypothesis in the criterion model. Furthermore, to convincingly demonstrate that the judgment strategy of one group (experts) exhibits a greater bias than the judgment strategy of another group (novices), it is necessary to show that differences in judgment strategies are associated with differences in accuracy. The current data do not indicate such a relationship, because there were no differences between expert and novice accuracy.

On the other hand, it could be argued that the low power of rejecting the null hypothesis in the criterion model is not a problem for the bias theory; if sophisticated statistical techniques cannot detect disjunctive relationships between the cues and the criterion using a large sample of 861 cases, it is inconceivable that clinicians will detect such a relationship on the basis of their experience, via feedback. Thus, there is no justification for using such strategies. Note also that the spirit of the literature is that configurality in judgment, particularly clinical judgment, is unjustified, because linear models give a very good fit to the relationship between behavioral criteria and their predictors (Dawes & Corrigan, 1974; Ganzach, in press; Goldberg, 1965). Finally, the possibility that the disjunctive strategy detected in the current analyses represents a bias associated with overweighing of pathological information is supported by recent results suggesting that in the judgment, but not in the criterion, the linear weight of pathological information is higher than that of nonpathological information (Ganzach, 1997).

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