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Theory and Configurality in Expert and Layperson Judgment

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The author examined configurality in expert and layperson multiattribute judgments in the domain of child abuse. Important differences were found in the configural rules used by the two groups. Laypersons were disjunctive in both assessing risk of abuse and recommending intervention, but their disjunctivity in recommending intervention may have been entirely mediated by prior risk judgments. Experts were less disjunctive in assessing risk and were conjunctive in recommending intervention. These differences are explained in terms of dissimilarities in the underlying theories that experts and laypersons hold about the relationships between attributes and appropriate judgment.

There are two possible sources for differences between the judgments of experts and those of laypersons. One is differences in information processing. For example, experts have better representations of tasks within their area of expertise (Chi, Feltovich, & Glaser, 1982), they encode new information more efficiently (Chase & Simon, 1973; Johnson & Russo, 1984; Voss, Vesonder, & Spilich, 1980), their search for information is more task contingent (Bouman, 1980; Elstein, Shulman, & Sprafka, 1978), and they tend to assemble and use less information prior to judgment (Bedard, 1989; Bettman & Park, 1980; Kleinmuntz, 1968).

Another source of differences between laypersons' and experts' judgments is that in integrating information, the two groups rely on different theories of the relationship between attributes and appropriate judgment. Experts and laypersons can be viewed as belonging to two different cultures that differ in ideology, or belief-structure (Beyer, 1981). These differences may arise either from different educational backgrounds or from coercive, mimetic, and normative processes (DiMaggio & Powell, 1983) that may cause the expert group to develop a collective rationality (Hannan & Freeman, 1977) in its subject of expertise, which is distinct from laypersons' intuition about the subject.

Experts, Laypersons, and the Causes of Configurality in Judgment

In particular, the integration rules that guide experts' judgments may differ from those of laypersons in the degree to which they are linear or configural. Linear (or compensatory) rules are rules in which overall judgment is a weighted average of the attributes' values, with the weight of each attribute directly reflecting the attribute's subjective importance. Configural rules are rules in which the impact (weight) of a given attribute on judgment depends on the level of other attributes (Meehl, 1954). Two types of configural rules are especially important when the judgment task is such that an unequivocal monotonic relationship exists between attributes and judgment: disjunctive rules and conjunctive rules. *Disjunctive rules* lead to judgments that are based primarily on the attribute(s) whose value(s) is (are) high. *Conjunctive rules* lead to judgments that are based primarily on the attribute(s) whose value(s) is (are) low. Note that the terms *high* and *low* do not necessarily reflect any 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 has been 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. (Obviously, this is possible only when an unequivocal monotonic relationship exists between attribute values and judgment.) Note also that these representations of conjunctive and disjunctive rules do not use the concepts of the logical *inclusive or* and logical *and*, which are commonly used in defining disjunctive and conjunctive choice strategies. The reason is that these concepts are somewhat problematic in the context of judgment, because they imply that in a conjunctive [disjunctive] strategy, an increase [decrease] in attribute value above [below] a certain cutoff value does not influence judgment at all. My description of conjunctive and disjunctive strategies allows for changes in attribute values to influence judgment across the entire range of possible values, while still retaining the essence of what is meant by conjunction [disjunction] in choice, because it suggests that the attributes with low [high] values play a major role in the decision. In choice, this is due to the existence of a cutoff value, and in judgment it is due to the dominance of the attribute(s) with the lowest [highest] value(s) (see Ganzach, 1994a).

As an example, consider the case of two equally important attributes. In this case, disjunctive and conjunctive strategies can be represented, respectively, as

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3\max(X_1, X_2), \quad \text{and}$$

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3\min(X_1, X_2),$$

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where Y is the judgment and X_1 and X_2 are the attributes' values. (As a matter of fact, only one equation is necessary to represent both strategies. For example, the first equation represents a disjunctive strategy if $\beta_3 > 0$ and a conjunctive strategy if $\beta_3 < 0$.) The similarity between my description of disjunctive/conjunctive judgment strategies and the standard definition of disjunctive/conjunctive choice strategies becomes apparent when $\beta_1 = \beta_2 = 0$ in these two equations.

It is possible that experts rely on configural rules more than laypersons do. Indications of this can be found primarily in process-tracing studies (Einhorn, Kleinmuntz, & Kleinmuntz, 1979; Johnson, 1988; Kleinmuntz, 1963) and in qualitative, informal reporting about expert decision making (e.g., Meehl, 1954). Some indications that experts rely on configural rules can also be found in research based on actual judgments (for the distinction between process-tracing research and research that is based on actual judgments, see Camerer & Johnson, 1991). For example, Slovic (1969) found configurality in judgments of security analysts (see also Einhorn, 1972), and Camerer (1981; see also Einhorn, 1974; Johnson, 1980) found a positive correlation between the residuals (from a linear model) of expert judgments and the criterion, which suggests a valid use of configural rules. However, none of the studies that were based on actual judgments addressed the question of whether experts and laypersons differ in their use of configural strategies, because these specific groups were not directly compared.

On the other hand, it is possible that laypersons rely on configural rules more than experts do. It is well documented that when the difficulty in processing relevant information increases (e.g., the number of dimensions increases or the time pressure increases), judges tend to rely more on configural rules in making judgments (Billings & Marcus, 1983; Payne, 1982). This finding, together with the research indicating that experts process information more efficiently, suggests that comparable judgment tasks will lead to more configurality in the judgments of laypersons than in the judgments of experts.

The following example illustrates the opposing predictions that can be derived with regard to experts' and laypersons' reliance on conjunctive and disjunctive rules. One way to simplify judgment is to base it primarily on the lowest [highest] attribute value or values, that is, to use a conjunctive [disjunctive] rule. This rule is easier to use than a compensatory rule, which requires taking the weights and values of all attributes into account. Thus, laypersons, in attempting to simplify the judgment task, may use configural rules more than experts. On the other hand, experts may use similar configural rules because of their reliance on intricate configural theories. Specifically, their use of a conjunctive [disjunctive] rule may be the result of a complex theory suggesting that the weight of an attribute varies as a function of the values of the other attributes; the lower [the higher] the attribute value in comparison with the values of the other attributes, the higher [the lower] the attribute weight.

Integration Strategies and Disjunctive Versus Conjunctive Strategies: Judgment of Risk and Intervention in Child Abuse

Another hypothesis, suggested by the assumption that experts' theories are more complex than those of laypersons, is that experts are more discriminative in their judgments. That is, experts are more likely than laypersons to use different judgment strategies in different judgment tasks.

Because discrimination may be an important feature of expert judgment, it is interesting to study differences between experts and laypersons in tasks that involve more than one judgment. The experiment reported herein did indeed involve two judgment tasks: assessing the risk that children in unfavorable home environments are subjected to abuse and recommending appropriate intervention.

In the following discussion, I analyze how experts and laypersons are likely to judge risk and intervention. In this discussion, it is assumed (a) that risk judgment is elicited on a scale in which the higher the risk, the higher (less favorable) the judgment; (b) that intervention judgment is elicited on a scale in which the higher the degree of intrusiveness of the intervention, the higher (less favorable) the judgment; (c) that the attribute numerical values are such that the higher the value, the more unfavorable the home environment; and (d) that the subjective attribute scales are linear.

In judging risk, both experts and laypersons are likely to use a disjunctive rule, because risk perception is strongly associated with the unfavorable aspects of the input information (March & Shapira, 1992). For example, in judging the risk of abuse for a child whose father's attitude toward him or her is adequate and whose mother's attitude is poor, people are likely to assign relatively greater weight to the latter element of the input information. Thus, it may be expected that expert social workers—who are not familiar with the task of judging risk—as well as laypersons will rely on a disjunctive rule in judging risk.

On the other hand, the information integration strategy used by expert social workers in recommending the degree of intrusiveness of the intervention (e.g., contacting the teacher vs. removing the child from his or her home) is likely to be quite different. In social work training and practice, there is a strong emphasis on considering the client's personal strengths and potential family resources in arriving at an intervention decision (e.g., Dingwall, 1983; Duncan, Solvey, & Rusk, 1992; Gambrill, 1983; Parton, 1979; Taylor, Lacey, & Bracken, 1980). For example, in her classic social work textbook, *Casework*, Gambrill (1983) devoted a full chapter ("Finding Resources") to identifying the client's strengths and resources, and, more recently, Duncan et al. (1992) titled a section of their book in which they expressed similar ideas "Dependence on the Client Resources." In summarizing this issue, Gambrill wrote,

> taking advantage of personal and environmental resources is an important aspect of offering effective services. This allows you to take advantage of existent capabilities; encourages you to view people in terms of their resources rather than their deficiencies. A variety of methods are available to discover resources. . . . Examination of the individual's social network may reveal resources that can be effectively used to attain outcomes. Facilitating contexts should be sought as well as both formal and informal resources that are available or that could be created. (p. 221)

The emphasis on strengths and resources in intervention decisions is characteristic of experts, but it is not characteristic of laypersons. Therefore, it may be expected that a small number of favorable attributes, or even one favorable attribute, would lead professional social workers, but not laypersons, to recommend minimal intervention, even if the other attributes are rather unfavorable. That is, professional social workers may be expected to be *conjunctive* in their intervention judgment. For instance, using the two-attribute example described earlier, a favorable attitude in even one of the parents may constitute the basis for a relatively moderate intervention recommendation.

This analysis suggests that the strategies that guide expert social workers' risk judgments may be quite different from, and even contradictory to, those that guide their intervention judgments. Whereas the strategy that guides their judgment of risk is likely to be disjunctive, the strategy that guides their judgment of which intervention to use is likely to be conjunctive. (This contradiction is especially interesting because one would expect judgments of risk and intervention to be highly correlated: the higher the perceived risk, the more radical the recommended intervention.) In contrast, laypersons are not likely to be guided by different strategies in making the two types of judgments. Whereas laypersons' risk judgments may be expected to be disjunctive, their intervention judgments are not likely to be conjunctive. Thus, the tendency to rely on a disjunctive strategy to judge risk is likely to be shared by experts and laypersons, but the tendency to rely on a conjunctive strategy to determine intervention is typical only of experts.

Estimating Configurality in Judgment

In the following analyses, 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. (For a discussion of the concepts of elevation and scatter, see Cronbach & Gleser, 1953.) 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; if a conjunctive rule is used, scatter will be negatively related to judgment. In the case of two profiles with the same elevation, if a disjunctive rule is being used, the profile with the larger scatter will receive a higher judgment, whereas if a conjunctive rule is used, the profile with the larger scatter will receive a lower judgment.

To understand the reasoning underlying the scatter model, consider an overall evaluation of the risk associated with two environments on the basis of two scores on two equally important attributes associated with risk (the higher the attribute score, the higher the risk). The mean of the two environments is the same, but whereas one environment has two moderate scores, the other has one high (i.e., unfavorable) score and one low (i.e., favorable) score. If judgments follow a linear compensatory rule, the evaluations of the two environments will be about the same. If judgments follow a rule in which the low attribute receives heavier weight (a conjunctive rule), the environment with the higher scatter will receive a lower (i.e., more favorable) evaluation; however, if judgments follow a rule in which the high attribute receives heavier weight (a disjunctive rule), the environment with the higher scatter will receive a higher (i.e., less favorable) evaluation.

The scatter model is expressed mathematically as follows:

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

where Y is the judgment, X_i is the attribute (scaled so that higher values of x_i imply higher judgment), z_i is the standardized value of the attribute (across profiles), $\bar{Z}$ is the mean Z_i within profile ($\bar{Z} = \sum_{i=i}^{n} Z_i/n$), 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 used. A positive value is indicative of disjunctive rules, and a negative value is indicative of conjunctive rules. (Note that the scatter term is the square route of the internal sum of squares of the standardized attribute values, and not the values themselves, to control for differences in attributes' scales. If attributes' scales are similar, standardization is not necessary.)

The scatter model was used by Brannick and Brannick (1989) to examine conjunctivity in judgments and by Ganzach (1993a) to analyze both disjunctivity and conjunctivity. It has two advantages over earlier methods of estimating disjunctive and conjunctive strategies, that is, 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 subject individually) over subjects. Second, this model produces a better fit than Einhorn's models when strategies are "purely" disjunctive or conjunctive (see Brannick & Brannick, 1989; Ganzach & Czaczkes, in press).

Method

Overview

Subjects were presented with 120 multiattribute descriptions of children from unfavorable home environments. For each child, they were required to make two judgments. First, they were to assess the risk of physical or psychological harm for the child, and then they were to choose an intervention from among five possible options, ordered according to degree of intrusiveness.

Subjects

The experts were 30 social workers employed in the social welfare departments of four local councils in the Jerusalem area, all of whom were familiar with the task of evaluating children's needs for intervention. Eighty-nine percent of them had at least 2 years of experience in social work with families and children, and 68% possessed academic degrees.

The lay group was composed of 30 first-year business administration students at the Hebrew University of Jerusalem.

Construction of the Multiattribute Descriptions

Fifty authentic reports about children were scanned, and 10 variables characterizing children and their environments were identified (see Table 1).

A 120 × 10 array of numerical stimuli was constructed, with each row corresponding to a description of one target child. Attribute values were selected randomly, with the constraint that the interattribute correlations would not be significantly negative and would not exceed .4

Table 1
Correlations Between Attributes in Descriptions of the Target Child

Attribute	1	2	3	4	5	6	7	8	9	10
1. Interparental relationship	—	.03	.10	.07	.23	.06	.31	.13	.22	.17
2. Mother's coping		—	.42	−.04	.19	.08	.04	.14	.18	.09
3. Mother's attitude			—	.03	.22	.32	.32	.12	.30	.18
4. Father's functioning				—	.05	.02	.20	.07	.24	.09
5. Father's attitude					—	.17	.04	.02	.19	.13
6. Sibling's situation						—	.01	.10	−.08	.10
7. Physical development							—	.02	.03	.12
8. Socioemotional development								—	−.05	−.03
9. Signs of abuse									—	.11
10. Parental cooperation										—

(Veldman, 1967; Wherry, James, Naylor, & Fallis, 1965). The correlations are presented in Table 1. Attributes 3 and 5 had four levels, Attribute 6 had two levels, and the rest of the variable attributes had three levels.

The stimulus array was used to create 120 verbal descriptions of children. This was accomplished by replacing the numbers in the stimuli array with appropriate sentences. Thus, each variable had various sentences associated with the numbers in the stimulus array, so that sentences corresponding to higher numbers implied higher risk and more radical intervention. For example, the sentences describing the mother's attitude toward the child were as follows: (a) "The mother's relationship with her children is positive and warm." (b) "The mother is not interested in her children." (c) "The mother's attitude toward her children is negative." (d) "The mother exhibits hostility and rejection toward her children." In addition, some small changes were made in each of the sentences to create a variety of equivalent sentences. For example, the sentence "The mother exhibits hostility and rejection towards her children" was considered equivalent to the sentence "The mother exhibits hostility and physical violence towards her children."

In illustration, the following is an example of a full multiattribute stimulus:

> There are frequent fights between the parents. The mother is mentally unstable, which prevents her from coping. Her relationship with the children is warm and positive. The father is known to be a drug user. He shows no interest in the children. The development and functioning of the older siblings are satisfactory. The psychological reports assess the child's physical and mental development as normal for his age. With regard to his emotional and social development, the child is assessed as underdeveloped for his age. No outstanding signs of violence or neglect are observable in the treatment of the child. The parents were uncooperative in previous treatment interventions.

Procedure

Each subject received 120 multiattribute stimuli. Each stimulus was preceded by an introduction in which the subject was asked to assume that he or she is a family worker in the welfare department who receives a telephone call from a nursery school teacher about a child in her school. The teacher asks for a review of the child, because she suspects that the child suffers from abuse and/or neglect. She reports that the child, who is 5 years old, misses school without any apparent reason and appears frightened when he encounters strangers. She also reports that whereas she has a good rapport with the child, it is very difficult to communicate with the mother and the father never appears at school.

After the introduction, the subjects received the description of the case (i.e., the multiattribute stimulus), which represented the results of the review. Each case appeared on a separate sheet of paper. For each case, the subject was first asked to mark his or her assessment of risk to the child on a 7-point scale from *no risk at all* (1) to *very high risk* (7). Afterward, subjects were asked to choose an intervention from among five possible options. The options were numbered according to the degree of intrusiveness: No intervention (1); Intervention through the teacher, without direct contact with the family (2); Direct therapeutic intervention with the family, without removing the child from the home (3); Direct therapeutic intervention with the family and removal of the child from home during the day (4); Removing the child from home for a long period of time (5).

The experiment was conducted in three sessions individually for each subject. A research assistant was present at all sessions. The social workers completed the experiment in their offices, and the students, in a small university room. Subjects did not have a time limit; they averaged about 40 min to complete each session.

Results

Most of the analyses were carried out after all variables had been standardized. The only exceptions were the analyses of judgment levels and judgment dispersion, which were performed on the raw data. The analyses included 30 laypersons and 29 social workers, because one social worker did not complete the task. (In addition, the social workers tended to have more missing values in their responses.)

Preliminary Analysis: A Linear Model

In this section I compare the linear models of the two groups, in regard to both squared multiple correlation and beta weights.

There were very small between-groups differences in the judgments' variance which is explained by a linear model—a model that includes only the 10 main effects. For risk, the mean squared multiple correlation across subjects was .576 (SD = .088) for laypersons and .582 (SD = .112) for experts. For intervention, the means were .549 (SD = .102) and .584 (SD = .073), respectively. Tests for a null hypothesis of no differences were not significant, $t(57) = 0.2, p > .8$, and $t(57) = 1.6, p > .1$, for risk and intervention, respectively.

The average beta weights of the linear model, by group and type of judgment, are presented in Table 2. These weights were analyzed by a 2 × 10 (Group × Attribute) mixed analysis of variance with repeated measures on the second factor. For intervention judgments, the analysis revealed that the main effect of group was not significant ($F < 1$), but the main effect of at-

Table 2
Mean Weights of the Linear Model

	Intervention				Risk			
	Laypersons		Experts		Laypersons		Experts	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Interparental relationship	.054	.107	.040	.070	.078	.074	.055	.052
Mother's coping	.056	.067	.114	.088	.066	.062	.086	.056
Mother's attitude	.206	.091	.263	.130	.210	.107	.227	.096
Father's functioning	.082	.096	.036	.074	.093	.079	.043	.065
Father's attitude	.205	.066	.157	.075	.252	.081	.180	.079
Sibling's situation	.076	.082	.075	.075	.078	.089	.070	.067
Physical development	.130	.101	.128	.078	.185	.138	.199	.086
Socioemotional development	.151	.102	.162	.077	.201	.123	.243	.122
Signs of abuse	.233	.112	.195	.091	.194	.123	.255	.112
Parental cooperation	.211	.156	.265	.139	.112	.073	.106	.084

tribute and the interaction between group and attribute were: $F(9, 513) = 31.4$, $p < .0001$, and $F(9, 513) = 2.5$, $p < .05$, respectively. Similar effects were obtained for the risk judgments: $F < 1$, $F(8, 513) = 34.7$, $p < .0001$, and $F(9, 513) = 2.8$, $p < .05$, respectively.

The lack of main effects for group and the highly significant main effects for attribute are hardly surprising (the former because the R^2s of the two groups were very similar, and the latter because theories about child abuse are determined not only by professional affiliation, but also by general cultural experience). More interesting is the interaction, which suggests a systematic difference in the weights each group assigned to the various attributes. Inspection of Table 2 reveals that this interaction was due primarily to the fact that the experts tended to give more weight than laypersons did to variables associated with the mother, whereas laypersons tended to give more weight than experts did to variables associated with the father.

Configurality in Risk and Intervention Judgment: A "Black Box" Approach

Although the risk and the intervention judgments differ in that the former precede the latter both conceptually and experimentally, in this section the two types of judgments are analyzed similarly. That is, I take a "black box" approach in modeling intervention judgments. I analyze the relationship between input (attribute values) and output (intervention judgments), disregarding the possibility that the subjects' process of making intervention judgments might have been influenced by prior risk judgments.

Risk judgment. The scatter model was estimated for each of the subjects with risk judgment as the dependent variable. Twenty-eight of the 30 subjects in the lay group had a positive scatter coefficient. The mean scatter coefficient for this group was .139 (SD = .081), which differed from zero at the .0001 level, $t(29) = 9.3$. Sixteen of the 29 subjects in the expert group had a positive scatter coefficient. The mean scatter coefficient for this group was .040 (SD = .091), which differed from zero at the .05 level, $t(28) = 2.4$. Note that the average incremental squared multiple correlation of the scatter term was .025 for the lay group and .009 for the expert group (the standard errors were .004 for both groups). However, these measures should be viewed with caution, because a small, incremental, nonlinear squared multiple correlation does not necessarily mean that there was little reliance on configural strategy: Linear models give quite good approximation for configural strategies (e.g., Dawes & Corrigan, 1974).

The foregoing mean scatter coefficients suggest that risk judgments were disjunctive both for experts and laypersons: The larger the scatter, the higher the perceived risk. These findings were consistent with our predictions. However, although risk judgments were disjunctive for both groups, they were more disjunctive for laypersons—the mean scatter coefficient for the lay group was significantly more positive than that of the expert group, $t(57) = 4.4$, $p < .0001$. This is not surprising, considering that it is likely that the same integration strategies that guide experts' intervention judgments (which, as discussed earlier, are likely to be conjunctive) also influence, to some extent, their risk judgments. Note also that there was no significant difference between the two groups in the standard deviations around the mean scatter slopes, $F(28, 29) = 1.1$, $p > .9$. This suggests that the smaller mean slope of the expert group was not due to the fact that its members were more diverse with regard to the configural rules they used (i.e., it was not due to a small number of highly conjunctive subjects in this group).

Intervention judgment. Equation 1 was estimated for each subject with intervention judgment as the dependent variable. Twenty-six of the 30 subjects in the lay group had a positive scatter coefficient. The mean scatter coefficient for this group was .062 (SD = .073), which differed from zero at the .0001 level, $t(29) = 4.7$. Only 5 of the 29 subjects in the expert group had a positive scatter coefficient. The mean scatter coefficient for this group was $-.70$ (SD = .079), which differed from zero at the .0001 level, $t(28) = 4.7$. (The average incremental squared multiple correlation of the scatter term was .011 for the expert group and .009 for the layperson group; the standard errors were .003 and .002, respectively.) Again, there was no significant difference between the two groups in the standard deviation around the mean scatter coefficients, $F(28, 29) = 1.3$, $p > .5$.

In summary, in intervention judgments, different types of configurality were found for laypersons and experts. Consistent with predictions, these judgments tended to be disjunctive for laypersons and conjunctive for experts.

Comparison of risk and intervention judgments. The preceding data suggest that the experts tended to resort to opposite integration strategies in making risk and intervention judgments. Whereas the former were disjunctive, the latter were conjunctive. However, even the laypersons, who exhibited disjunctivity both in risk judgments and in intervention judgments, were less disjunctive in the latter than in the former. The difference between the mean scatter coefficients in the risk and the intervention models was significant, $t(29) = 5.8, p < .0001$.

Configurality in Intervention Judgment: A Process Model

In this section, the present model of intervention judgment takes into consideration the fact that subjects made risk judgments prior to making intervention judgments. (Indeed, the two judgments were highly correlated. The average correlation was .66 for the expert group and .74 for the layperson group. The standard deviations were .13 and .10, respectively.) The model that serves as the basis for this analysis is depicted in Figure 1. The dependent variable in the model is intervention judgment, and it includes two exogenous variables—profile elevation and profile scatter—and one mediating variable—risk judgment. The coefficient of elevation represents the linear effect of the cues on judgment (the linear use of cues), whereas the coefficient of scatter represents their configural effect (the configural use of cues). Note that scatter and elevation are structurally orthogonal (Ganzach & Czaczkes, in press).

According to the model, risk judgment influences intervention judgment. The profile scatter influences both risk judgment and intervention judgment. Its influence on intervention judgment is both indirect (through its influence on risk judgment) and direct. In addition, elevation influences both risk and intervention judgments.

To examine for differences between experts and laypersons, I calculated path coefficients for each subject on the basis of his or her 120 responses. (Note that because scatter and elevation are orthogonal, the path coefficient between elevation and risk was simply the multiple correlation among the 10 attribute values and risk judgment and the path coefficient between scatter and risk judgment was simply the correlation between the two.) I then averaged the coefficients for each group separately. In Figure 1, the average path coefficients and their standard deviations are shown above the arrows for laypersons and below the arrows for experts.

The paths representing the effects of elevation and scatter on risk are simply another illustration of the previously presented finding that whereas there was no difference between the two groups in the effect of elevation on risk, there was a large difference in the effect of scatter on risk. (The results of the tests of these effects exactly equal those reported in the previous section and are not repeated here.) However, the other three path coefficients, representing the direct effects of elevation, scatter, and risk on intervention, supply new information about the differences between the way the experts and laypersons arrived at intervention judgments.

First, note that the direct effect of elevation on intervention was stronger for experts than for laypersons. A comparison between the mean path coefficients revealed a significant difference, $t(57) = 2.6, p < .05$. On the other hand, the direct effect of risk on intervention was stronger for laypersons than for experts, $t(57) = 2.2, p < .05$. These findings suggest that the experts discriminated between risk and intervention more than the laypersons did. When making the intervention judgment, the experts tended to rely less on prior risk judgment and more on aspects of the original attribute information, which, in their view, were relevant to intervention but not to risk. The laypersons, on the other hand, tended to rely on their risk judgments in arriving at their intervention judgments.

Second, the data indicate that for the laypersons, the direct effect of scatter on intervention was negligible. The mean path coefficient did not differ significantly from zero, $t(29) = .4, p > .7$. On the other hand, for the experts, there was a clear effect of

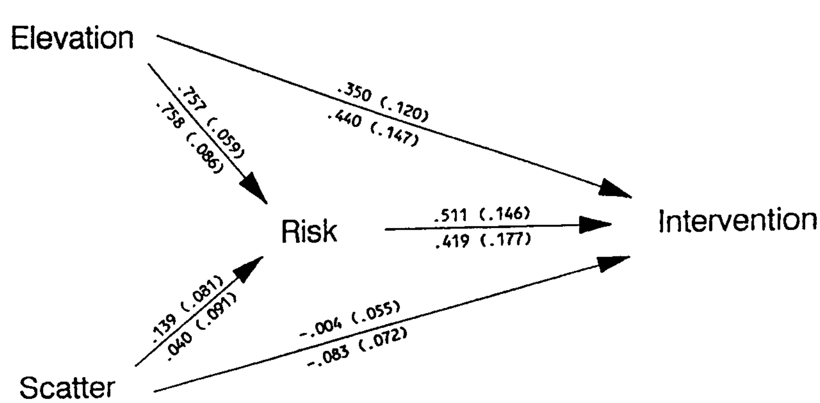

Figure 1. A path model for the relationships among profile elevation, profile scatter, risk judgment, and intervention judgment. The numbers above the arrows are the means (and standard deviations) of the path coefficients for the layperson group, and the numbers below the arrows are the means (and standard deviations) for the expert group.

scatter on intervention judgment, $t(28) = 6.2$, $p < .0001$. The difference between the two mean path coefficients was also highly significant, $t(57) = 4.7$, $p < .0001$.

The direct effects of scatter on intervention judgment are especially interesting when they are compared with the effects of scatter on risk judgment. For the laypersons, there was a positive effect of scatter on risk judgment and a negligible effect of scatter on intervention judgment. For experts, there was a small (but significant) positive effect of scatter on risk judgment and a stronger (and highly significant) negative effect of scatter on intervention judgment.

These differences illustrate the role of configurality in expert and layperson intervention judgments. Although there is configurality in the intervention judgments of both experts and laypersons, the source of this configurality differs. For the layperson, this configurality results from having relied on a disjunctive strategy in prior risk judgment. For the expert, it results from reliance on a conjunctive strategy that is not associated with prior risk judgment. As a matter of fact, although some configurality did exist in the experts' risk judgment, this configurality led to a decrease, rather than an increase, in the overall configurality observed in their intervention judgments, because these latter judgments were conjunctive, whereas the former were disjunctive.

Configurality or Curvilinearity?

A possible explanation for the results of the experiment is that they were due to curvilinearities in the (subjective) attribute scales, rather than to configurality in information integration. In particular, if the attribute scales were convex (positively accelerated), scatter would be positively related to judgment, whereas if the attribute scales were concave (negatively accelerated), scatter would be negatively related to judgment. (Note that the distinction between these two alternative explanations for deviations from linear compensatory strategies is often ignored. For example, Einhorn, 1970, equated disjunction and conjunction in information integration with scale nonlinearity, that is, with parabolic and hyperbolic subjective scales, respectively.)

A curvilinearity explanation would suggest that the observed differences in the effect of scatter on judgments were caused by context-dependent differences in scales that were due to (a) the attribute scale's being more convex for the experts than for the laypersons, (b) the attribute scale's being more concave in risk judgment than in intervention judgment, and (c) the attribute scale's being concave in risk judgment and convex in intervention judgment for the experts and concave for both types of judgments (or perhaps concave for risk judgment and linear for intervention judgment) for the laypersons.

A rivalry between configurality and curvilinearity explanations also exists in other domains of behavioral decision making. For example, it could be asked whether the difference between the framing of multiattribute judgment and the framing of multiattribute choice is due to nonlinearities of the attribute scales or to configurality in the decision (Ganzach, in press). Or it could be asked whether people are averse to risk because utility is a nonlinear (i.e., concave) function of money or because the weight of the less favorable outcome is higher than the weight of the more favorable outcome (Birnbaum, Coffey, Mellers, & Weiss, 1992). An example that is directly related to the present research is an experiment by Birnbaum and Sutton (1992) that demonstrated systematic differences in the estimations of buying and selling prices of lotteries. The authors noted that these differences could be explained in two ways. One explanation is that in estimating the buying price, people put more weight on the less favorable outcome than they do when estimating the selling price. Another explanation is that the utility function of the buyer is different (more concave) than the utility function of the seller.

Because the data of the present experiment are consistent with both a configurality explanation and a curvilinearity explanation, an interesting question is which of the two better describes the mental processes that underlie judgment. One way this question can be approached is through process-tracing techniques. A recent experiment in which process data were obtained (Ganzach, 1994) gives some support for the configurality explanation over the curvilinearity explanation. In the experiment, subjects learned a disjunctive relationship between cues and criterion (in a multiple-cue-probability-learning paradigm) in one part of the experiment and a conjunctive relationship in the other part. (For half of the subjects the order was reversed.) At the end of the experiment, subjects were asked about the strategy they had used in each of the two parts. Many of them reported strategies that were based on value-dependent weights (i.e., configural strategies), but none (!) mentioned curvilinearities in the scales as the basis for the strategy they had used.

Birnbaum and Sutton (1992) approached the issue of configurality versus curvilinearity from another perspective. They suggested the use of the principle of scale convergence in deciding between these rival explanations.

> The principle of scale convergence states that when considering rival theories proposed to describe different empirical phenomena involving the same theoretical 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, p. 184)

Thus, the principle of scale convergence suggests that in the absence of direct evidence of the process underlying deviation from linearity in judgment, configurality should be favored over curvilinearity because it is a more parsimonious explanation.

Characteristics of the Judgment Distribution

Differences in expert and layperson theories are likely to lead to differences in not only the configural aspects of the judgment, but also to differences in other aspects of the judgment. In this section, I compare the two groups in terms of two characteristics of judgment distribution: the level of judgment and the dispersion of judgment.

Level of judgment. The mean risk judgment for the expert group was 5.59, and its standard deviation (calculated by first averaging over all members of the group and then calculating the standard deviation of these averages) was 0.56. For the lay group, the mean was 5.32 ($SD = 0.48$). The difference between these means was significant, $t(57) = 2.0, p < .05$. For the intervention judgment, the mean was 3.81 ($SD = 0.31$) for the experts and 3.68 ($SD = 0.30$) for the laypersons. This difference was marginally significant, $t(57) = 1.7, p < .1$.

One explanation for these differences is that the experts were more confident of their ability to make accurate judgments and were therefore more severe in their judgments. This explanation is consistent with previous findings (Ganzach & Krantz, 1991; Guilford, 1954; Kahneman & Tversky, 1973) of a similar phenomenon in the prediction of human performance: The less the uncertainty associated with the prediction, the more severe the prediction.

Dispersion of judgments. The mean standard deviation in the risk judgments for the expert group (calculated by first computing the standard deviation for each subject and then averaging over subjects) was 1.15 ($SD = 0.30$). For the lay group, this mean was 1.26 ($SD = 0.19$). This difference was marginally significant, $t(57) = 1.8, p < .1$. For the intervention judgment, the mean standard deviation was 0.745 ($SD = 0.126$) for the experts and 0.888 ($SD = 0.101$) for the laypersons. This difference was highly significant, $t(57) = 4.8, p < .0001$.

The between-groups difference in the standard deviation of risk judgment was probably due to a ceiling effect encountered by the experts, their risk judgments being higher than those of the laypersons. When mean risk judgment was covaried, the between-groups difference in risk standard deviation was not significant, $F(1, 56) < 1$. On the other hand, the between-groups difference in the standard deviation of intervention cannot be explained away by a ceiling effect. When mean intervention judgment was covaried, the between-groups difference in intervention standard deviations remained highly significant, $F(1, 56) = 7.2, p < .0001$. (The adjusted means were .761 and .873 for the experts and laypersons, respectively.)

Differences in judgments' standard deviations reflect differences in the extremity of judgment. To date, there has been little research regarding the extremity of judgment (but see Zalesny, 1990). On the other hand, there have been many studies of the extremity of intuitive prediction. This research generally indicates that predictions are excessively extreme (Ganzach, 1993b; Kahneman & Tversky, 1973) but that training and experience tend to reduce this extremity (Ganzach & Krantz, 1990; Nisbett, Krantz, Jepson, & Kunda, 1983). Viewed from this perspective, it is more likely that laypersons' intervention judgments are excessively dispersed, rather than experts, judgments being excessively condensed.

A final question is why there was no between-groups difference in dispersion for risk judgment. One reason is that risk judgment is primarily a subjective evaluation of the input information; it involves a translation of a subjective impression to a numerical scale (Kahneman & Tversky, 1973). Such evaluation ought not induce moderation. In contrast, intervention judgment concerns a choice of an action and is therefore associated with uncertainty concerning the costs and benefits involved. Such judgment should induce moderation; that is, it should be regressive.

General Discussion

In the present experiment, I used a policy-capturing technique to study differences between the judgment processes of experts and laypersons. The results showed differences, but also some similarities, in the judgment strategies of these two groups. I suggest that the differences, as well as the similarities, are related to the integration strategies used by experts and laypersons. Risk judgments are more disjunctive than intervention judgments, because risk is associated primarily with unfavorable attributes of the information. Similarly, the judgments of expert social workers in general, and their intervention judgments in particular, are more conjunctive than those of laypersons, because, in combining information, social workers emphasize strengths and resources (i.e., favorable attributes) in making judgments concerning abused children.

The results suggest that experts tend to be discriminative in their configural strategies with regard to the type of judgment required. They tend to be disjunctive in judging risk and conjunctive in judging intervention. Laypersons are less discriminative. Both their risk judgments and their intervention judgments are disjunctive. Another aspect of this difference in discrimination among tasks is that laypersons, more than experts, tend to rely on their prior risk judgment in making an intervention judgment. Experts, on the other hand, tend to go back to the original attribute information and to be less influenced by prior risk judgment. Interestingly enough, social workers' tendency to be task specific in their judgment strategies (i.e., their tendency to be disjunctive in risk judgment and conjunctive in intervention judgment) may make them more vulnerable to framing effects. There has been concern in the social work literature about the lack of explicit criteria for intervention decision, and various questions have been raised about the process that social workers should use in making these decisions (Craft, Epley, & Clarkson, 1980; Meddin, 1985; Rosen & Proctor, 1981). One such question is whether assessment of risk should precede the intervention decision. The practice of assessing risk before making the intervention decision is not currently standard in case work, but some researchers have recommended that this procedure be adopted (e.g., Dalgleish, 1988). The present study suggests one effect that prior risk judgment may have on intervention judgment: It may decrease reliance on the client's strengths and resources (see the discussion of the risk-mediated indirect effect of scatter in the path analysis). Better evidence for such an effect could be obtained in a study in which the presence of risk judgment in the selection of intervention programs is directly manipulated.

The difference between expert and layperson judgments observed in the present experiment was not limited to reliance on configural strategies. Discrepancies were also found between the experts and laypersons in the weights they assigned to different attributes (the experts placed more emphasis on mother-related attributes, and laypersons placed more emphasis on father-related attributes); in the severity, or strictness, of the judgment (the experts were more severe); and in the extremity, or deviation from central tendency, of the judgment (the experts were more regressive when recommending an intervention). These discrepancies are related to differences in reliance on various heuristics, such as intuitive regressiveness (Ganzach & Krantz, 1990; Nisbett et al., 1983) and leniency (Ganzach & Krantz, 1991). Thus, the differences between experts' and laypersons' use of configural strategies appear to be part of more general differences in the judgment strategies used by the two groups.

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