Preface

LEGAL JUDGMENT AS INFORMATION INTEGRATION

Legal judgments and decisions require valuation and integration of stimulus information. Such information processing is a province of psychological science and many psychologists have taken up legal issues to seek social usefulness.

Some issues in legal psychology obey the same mathematical laws of information integration established in other areas of human psychology. This is not surprising; the same cognitive processes operate in all these areas. Person cognition and social attitudes, in particular, are basic in legal psychology. So of course is judgment–decision theory.

Some writers disagree. They argue that legal information, such as testimony of witnesses and arguments of prosecution and defense attorneys, is too complicated and too subject to contextual effects to be amenable to simple mathematical analysis. Their argument is nullified by the successes of the mathematical laws—*Cognitive Unitization* of these laws allows exact analysis of complex context effects.

Cooperative use of field observation and laboratory experiments is needed to make legal psychology socially useful. Laboratory experiments can establish validity of cognitive processes, as with the averaging law and generally with functional measurement analysis of multiple coacting variables. Social applications, however, require understanding knowledge systems that operate in social reality. The landmark experimental–field studies of Ebbesen and Konečni and well-designed work by Kaplan and by Hommers provide models for future investigators. This direction of inquiry can help develop a more moral and more humane society.

Chapter 4

LEGAL JUDGMENT
AS INFORMATION INTEGRATION

Legal judgment–decision, as is universally recognized, rests squarely on integration of multiple items of evidence. Testimony of successive witnesses in a jury trial is a classic example. One approach to this integration problem is shown in the Integration Diagram on the next page, repeated here from Chapter 1. Three basic processing stages are shown: valuation, integration, and action.

Valuation is first and most important. Each juror must process testimony of witness A (here denoted S_A) to construct its value, ψ_A—in relation to operative GOALS. In criminal trials, the final goal would be judgment of guilty–not guilty. Supplementary goals may also be important, as in judging reliability of individual witnesses.

Integration is the second operation in the diagram. The values constructed for the separate witnesses must be integrated to obtain a unitary judgment, denoted ρ. Finally, this internal ρ must be externalized by the *action* operation, which constructs the observable response, R.

The Integration Diagram of Figure 4.1 applies generally, not just to witness testimony. Similar processing is required for the arguments of the prosecution and defense attorneys. Similar processing is also required during juror deliberation, discussed in a later experiment. Bail recommendations by prosecution and defense attorneys and fines and sentences by the judge also require valuation–integration–action.

That fines, sentences, and other blame/punishment should be proportionate to (negative) deserving is generally accepted. Present legal systems, however, rest on crude, makeshift analyses of such proportionality. The laws of information integration are analytic tools for deserving theory that can help develop a more just society.

ALGEBRAIC LAWS OF LEGAL JUDGMENT

An effective base for studying the three processing operations of the Integration Diagram was found with the algebraic laws of information integration. This base was illustrated in Chapter 2 with positive deserving and in Chapter 3 with the negative deserving of blame, which underlies much legal judgment. This chapter applies these laws to legal issues.

The effectiveness of the integration laws was indicated with the parallelism theorem given in Chapter 1. Observed parallelism in an integration graph supports an adding-type law by benefit 1 of the theorem. By benefit 2, the overt response, R, is a true measure of the underlying feeling, ρ. Finally, the functional values of the stimulus informers constructed by the valuation operation are available from the integration graph (benefit 3).
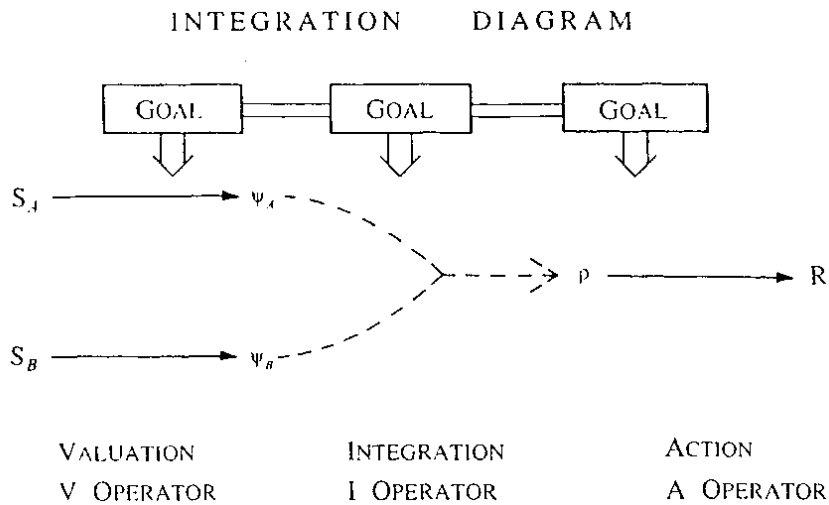

Figure 4.1. Information integration diagram. Chain of three operators, **V – I – A,** leads from observable stimulus field {S} to observable response, R.
Valuation operator, **V**, transmutes stimuli S into subjective representations, ψ.
Integration operator, **I**, transforms subjective field {ψ} into internal response, ρ.
Action operator, **A**, transforms internal response, ρ, into observable response, R.
(After N. H. Anderson, *Foundations of Information Integration Theory*, 1981a).

Jurors are seen as goal-directed information processors in the Integration Diagram. All three operations—valuation, integration, action—involve purposive construction processes. This constructionist character of the Integration Diagram contrasts with passivist views of juror

cognition. As Wrightsman, Greene, Nietzel, and Fortune (2002, p. 438) point out:

> "They [the courts] expect something different. They envision a juror who does not form hunches or fill in the blanks but instead passively processes all incoming information without immediate interpretation until finally instructed by the judge to decide.

A similar passivist view was an "article of faith of the classical attitude theorists" in social psychology (Crano, 1977, p. 94). In this classical view, attitudinal judgments are based directly on whatever of the original stimulus materials remain in memory at the time of judgment.

Clear evidence against this "article of faith" was discovered by Anderson and Hubert (1963)—a dissociation between memory and attitudinal judgment: what was best remembered had least effect on the attitudinal judgment based on that very material (Figure 8.2, Chapter 8).

The need to view jurors as active information processors has been recognized by many writers. Such concepts as schemas (Medin & Ross, 1992), themes (Lingle & Ostrom, 1981), and stories (Pennington & Hastie, 1981) are similar in spirit to the present conception of knowledge systems. These concepts recognized important complexities of cognition and pointed to important problems. But they were little help with analysis. Indeed, the main specific claim of schema theory was found false, slot and default value, with work on Information Integration Theory (Anderson, 1991a, p. 82; see also Schema Analysis in Anderson, 1982, pp. 341ff). The psychological integration laws have provided tools to analyze dynamic information processing.

AVERAGING THEORY

Substantial support for averaging theory has been found in experiments on legal judgment. This evidence agrees with the extensive work on the averaging law in person cognition and social attitudes, both of which pervade legal cognition. Some pertinent studies are reviewed here.

INFORMATION LEARNING

To a juror, jury service is a learning situation. Each successive witness or other evidence constitutes an information learning "trial." Jurors valuate each successive piece of evidence and integrate this value into their cumulating judgment of guilty–not guilty. The graph of these provisional judgments as a function of trials is an information learning curve.

Averaging Model for Information Learning. The following experiment explored the applicability of an averaging model for juror learning:

$$\rho_n = \omega_n \psi_n + (1 - \omega_n) \rho_{n-1}. \tag{1}$$

Here ρ_n and ρ_{n-1} are the cumulative juror judgments on trials n and $n - 1$, ψ_n is the functional value of the evidence given on trial n as constructed by that juror, and ω_n is its importance weight. This equation represents a serial curve of information learning (Anderson, 1959).

This averaging model may be rewritten in the following form as a proportional change:

$$\rho_n - \rho_{n-1} = \omega_n(\psi_n - \rho_{n-1}). \tag{2}$$

In words, the amount of change on the left side of this equation is proportional to the possible change, $(\psi_n - \rho_{n-1})$, on the right side. The proportional change parameter, ω_n, represents the importance weight constructed for the stimulus informer on the given trial.

Bigamy Trial of Thomas Hoag. The bigamy trial of Thomas Hoag in 1802, a legal classic, seemed ideal to study juror information learning because the prosecution and defense witnesses disagreed totally in total confidence. All six witnesses for the prosecution were totally certain that the defendant in the courtroom was Thomas Hoag, who had bigamously married Catherine Secor in Rockland, New York. Secor herself was called to the stand as a witness for the prosecution, declaring:

> Catherine Conklin (formerly Catherine Secor) testified, that she became acquainted with prisoner in the beginning of September, 1800, when he came to Rockland; he then passed by the name of Thomas Hoag; that witness saw him constantly; that prisoner, shortly after their acquaintance, paid his addresses to her and finally, on the 25th of December, married her; that he lived with her till the latter end of March, 1801, when he left her; that she did not see him again until two years after; that on the morning of his leaving her, he appeared desirous of communicating something to her of importance, but was dissuaded from it by a person who was with him and who passed for his brother; that Hoag, until his departure, was a kind, attentive and affectionate husband; that she was as well convinced as she could possibly be of anything in this world, that the prisoner at the bar was the person who married her by the name of Thomas Hoag; that she then thought him and still thinks him the handsomest man she ever saw.

And all six defense witnesses were equally certain that the defendant was Joseph Parker, a long-term resident of New York, who had never before been in Rockland (see *Batteries of Stimulus Materials*, Chapter 6).

Participants in the experiment were Yale undergraduates, who read summarized testimony of each successive witness and made provisional judgment of guilt–innocence. They were instructed to keep an open mind and not reach a definite judgment about guilt–innocence until they had received all the evidence. This instruction was reinforced by the sharp contradiction between prosecution and defense witnesses that occurred already on trial 3.

Juror Learning Curve. Juror learning curves were obtained by plotting provisional judgments as a trial-wise function of successive witnesses. Witness testimony was given in different orders to different participants. These learning curves were consistent with the learning model of Equation 1 (see Figure 4.3 below). These learning curves agree with evidence from actual juries cited by Wrightsman, et al. (p. 427): "jurors often form very definite opinions before the close of the trial."

Basal–surface structure was a serendipitous discovery of this jury trial experiment. Participants' attitudes had a labile surface component superposed on an enduring basal component. Discussion of basal–surface structure is deferred to detailed analysis of Figure 4.3 below.

Information Units: Two Criticisms of Information Learning Theory. A unique foundation for studying information units is provided by the Cognitive Unitization of the integration laws. The difficulty of this issue is illustrated in Catherine Conklin's testimony quoted above, which must be valuated by each juror. Is it meaningful to consider this complex stimulus field as a unit?

Information units can be established with integration laws. Conklin's testimony could be included in a prosecution witness × defense witness integration design. Parallelism in the integration graph would imply that jurors valuated her testimony and that of the other witnesses as cognitive units (*Cognitive Unitization*, benefit 5 of parallelism theorem).

Pennington and Hastie (1981) criticized mathematical models of juror decision-making on the argument that they fail to provide a psychological account of the information unit. They point to an important problem, but they provide no method even for determining what the units are, much less giving a psychological account of them. IIT had made good progress on both problems; an integration law can establish psychological reality of units—and measure their functional values.

Ellsworth and Mauro (1998, p. 697) second Pennington and Hastie. They assert that integration models are "much too elemental" and must fail because the meaning of each small element of information obviously varies with the context.

Their criticism does not apply to IIT. Quite the contrary. IIT is a contextual theory; it *insists* that values depend on content. Their criticism is invalidated by the success of the averaging model in many demanding experiments, some cited below. Their criticism fails to recognize that the integration laws have identified and validated functional units. Cognitive Unitization rests on empirical laws (*Analytic Context Theory*, Chapter 7).

Other approaches do lack capabilities for determining units. Introspective reports are subject to serious invalidity as shown by meaning invariance in person cognition (see *Meaning Invariance*, Chapter 1). Measures of evidence recall have uncertain value as shown by the cited dissociation of attitude memory and verbal recall (see Figure 8.2).

The importance of cognitive unitization can hardly be overstated. It gives a solid base for deeper analysis of processing of "each small element of information"—a basic problem in every field of psychology.

Necessity of Integration Models in Legal Psychology. The necessity, and utility, of integration models is nicely illustrated in the cited experiment. A jury trial is a dynamic learning process: multiple informers in temporal sequence must be valuated and integrated into the cumulating judgment.

The Integration Diagram of Figure 4.1 applies only to a single "trial" in this learning situation. This same diagram, however, may be applied to each successive trial by including the previous judgment, ρ_{n-1}, as one element to be integrated with the present evidence, ψ_n. Such dynamic learning is incorporated in Equation 1.

BASIC BLAME LAW

The basic blame law of the previous chapter was supported in the three following investigations. Each illustrates one way in which laboratory experiments can contribute to legal theory.

Judges and Students Both Follow the Basic Blame Law. Circuit court judges and college students showed similar blame schemas in Howe (1991) and Howe and Loftus (1992). The latter study used a scenario based on a fight between two angry men in a parking lot by a tavern in which one man suddenly pulled out a small revolver and shot the other. Four degrees of intent (deliberate, reckless, negligent, accidental) and two degrees of harm (serious injury, death) were used in this integration design. Participants made a graphic rating of blameworthiness.

Overall data for both judges and students followed the basic blame law, Blame = Intent + Harm. This rule was supported by parallelism in

the integration graphs. Individual analyses were interpreted to imply that almost half of both groups ignored harm and followed an intent-only rule. However, these single-person analyses had low power with only 9 df for error. Moreover, the two levels of harm were both quite serious and showed small difference across all participants.

The blame schema was extended to include the third variable of justification for the harmful act by Howe (1991). Two scenarios were used: a passerby coming to the aid of a woman being assaulted in a parking lot; and a man coming home to surprise a burglar. Justification was manipulated as two levels of threat by the harmdoer to the protagonist. The basic blame schema, Blame = Intent + Harm, was supported in both groups, judges and students (Note 1).

But whereas students integrated justification in parallel with intent and harm, judges exhibited configural valuation; they assigned far less blame for low harm under high justification. The overall justification effect, moreover, was about four times larger for judges than students. These results show how integration graphs can help study configural processes that do not follow a simple integration law.

This replication of the basic blame law for judges as well as students supports its generality. At the same time, the group difference in effects of justification indicates the need—and capability—to take account of judges' knowledge systems and values, especially concerning variables familiar from professional experience.

Howe's individual analyses are a model for future work. Group data, whether psychological or sociological, are useful for some questions. But development of legal psychology depends heavily on capability to work within individual knowledge systems.

Averaging Versus Adding. The mock juror study of Moore and Gump (1995) included the opposite effects test that distinguishes averaging from adding. They used robbery cases on file with the District Attorney's office to construct three strengths of evidence that implicated the defendant as the midnight robber of a convenience store, together with three levels of the store clerk's eye-witness confidence in identifying the defendant as the robber. A fourth level of no information about confidence was also included to obtain a 3×4 integration design. Two separate experiments were done, the second being an exact replication of the first to assess reliability. Both yielded very similar results.

Judgments of probability of guilt from Experiment 1 are shown in Figure 4.2 as a function of evidence strength (horizontal axis) and eye-witness confidence (curve parameter). The near-parallelism of the three

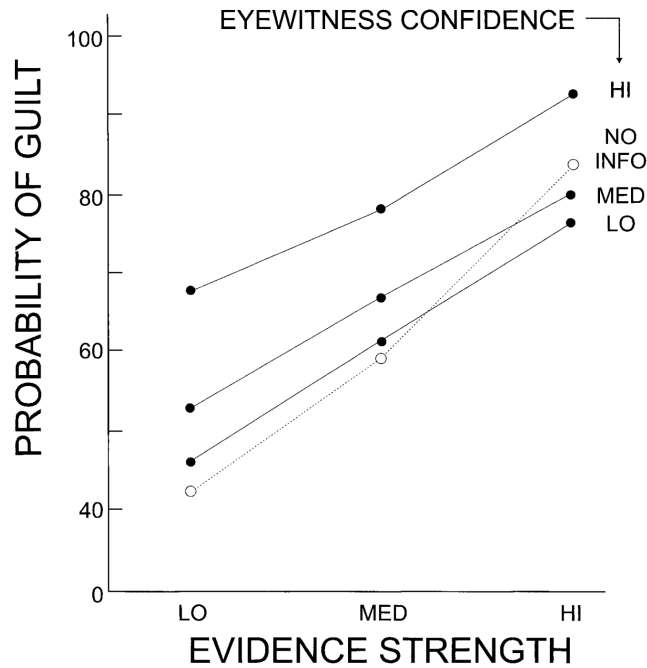solid lines implies that these two variables are integrated by an adding-type rule—either adding or averaging.

Figure 4.2. Judgments of probability of guilt as a function of evidence strength (horizontal axis) and eyewitness confidence (curve parameter). Averaging law diagnosed by parallelism of the three solid curves and crossover of the dashed curve for no information about confidence. (After Moore & Gump, 1995.)

The dashed line gives the opposite effects test that can distinguish between adding and averaging. Adding requires that the dashed line (no information about eye-witness confidence) parallel the solid lines. This line is clearly nonparallel, contrary to adding.

Averaging theory accounts for this nonparallelism. To see this, note that the dashed curve crosses over the two lower solid curves. Thus, low and medium eyewitness confidence increase guilt when added to low or medium evidence strength but decrease guilt when added to high evidence strength.

Averaging has practical importance. If you have strong information, you may weaken your case if you add weak information. If you have weak information, more may be better.

Age Limits for Competence. Understanding of right–wrong, considered prerequisite for competence to stand trial, is presumed present by age 7 in American common law and German civil law. This assumption developed from observation of children of different ages involved in various misdeeds. Hommers' (1992) integration study of this 7–year-age standard is a fine illustration of one way experimental analysis can contribute to legal practice (see also Hommers, 1997, on 14–year age standard for criminal law).

An arson scenario was used inasmuch as suits for large damages can result from fires set by children. One main variable was intent (inadvertent, malicious) of the scenario child in setting the fire. The other main variable was apology (yes, no) of the child. Participants across four age levels rated the scenario child on a graphic, good–bad scale. Effects of both main variables are considered to demonstrate adequate understanding of right–wrong in German civil law.

Hommers' experimental results supported the 7–year-age limit, that German children have adequate understanding of right–wrong at least by age 7 years. Apology had large effects already for the 5-6–year-olds. Intent (inadvertent, malicious) had slight effects at 6 years but moderately substantial effects at older ages.

Of special interest, IQ, which had been strongly advanced as a criterion for understanding of right–wrong, had near-zero diagnosticity. This underscores need for experimental analysis of legal standards.

Legal Relevance. Hommers' study illustrates how experimental analysis can contribute to legal systems in society. His judgment task could be developed into a diagnostic test for individual children with uniform meaning across different jurisdictions, avoiding idiosyncratic subjectivity of clinical assessment (see also *Simpler Designs* in Chapter 6).

Extensive replication is of course needed to influence the legal system. Other misdeeds besides arson need study, especially those more common among young children. Reliable individual assessment requires development of more than a single scenario. Childrens' ratings of goodness and badness of deeds and misdeeds, perhaps with the child role-playing parent, may help with scenario development.

Howe's work showed that judges and students both followed the basic blame law. Notable differences were found, however, with the variable of justification. Howe's studies show how integration graphs can

help understand cognition of judges and other professionals in the legal system. Indeed, his work shows that integration graphs may be essential.

JUROR COGNITION

Jurors and juries have been the most popular issues in legal psychology. The following sections are mainly limited to contributions of investigators who have applied Information Integration Theory.

JUROR PERSONALITY

Juror personality was studied by Martin Kaplan within his functional analysis of personality in terms of information integration. His systematic program of work was well rewarded (see review of his early work in Anderson, 1981a, pp. 257-271). A brief survey is given here.

General Personality. People have prior dispositions to view others as more or less likable. Kaplan's thesis was that this disposition could be represented as the initial impression (prior belief) of IIT. Prior belief was thus considered an internal item of information, to be averaged with information derived from external sources, such as behavior of the person or comments from acquaintances. Participants were selected as Positive or Negative disposition on Kaplan's Trait Adjective Checklist.

Kaplan's theory makes two predictions. First, disposition effects should decrease as more external information is included. This prediction is contrary to the attractive hypothesis that prior disposition acts to influence values of stimulus informers (see below). Second, disposition effects should be less when the external information has greater reliability. Both predictions were exactly verified.

In another experiment, participants judged likableness of persons described by personality adjectives of four values from high to low. Kaplan's theory predicts that the two personality groups will exhibit parallel curves in the integration graph, which they did (see Anderson, 1981a, Figure 4.9, p. 260). Kaplan obtained similar results in an experiment with sociableness instead of likableness.

Of special interest, the state variable of temporary mood was shown to have similar effects. Abele and Petzold (1994) also reported that mood was integrated into the overall judgment but not into the values of the individual informers.

Information Integration Theory vs. Reinforcement–Affect Theory. Information Integration Theory was compared with the reinforcement–

affect learning theory of interpersonal attraction of Byrne (1969) and Clore and Byrne (1974). In this comparison, Kaplan and Major (1973) used the Byrne–Clore paradigm of judging attractiveness of hypothetical persons described by 3 or 6 of their attitudes on social issues. Each description had 1/3 or 2/3 attitudes similar to those of the participant.

Kaplan's data disagreed with Byrne-Clore theory but supported averaging theory (see Anderson, 1981a, Figure 4.13, p. 266). These data thus negated the attempt by Byrne and Clore to set interpersonal attraction within their framework of classical conditioning (see detailed comparisons in Kaplan & Anderson, 1973a,b).

Clore and Byrne (1974; see also Byrne, et al., 1973a,b) strenuously defended their theory. They asserted that "reinforcement–affect" was qualitatively different from "information" (their Figure 1). Later, however, Clore (e.g., 1992) silently adopted Kaplan's view that mood and affect are information (see *Affect Is Information*, Chapter 7).

Juror Personality. Juror judgment was studied by Kaplan within his general approach to personality already outlined. Personality traits would thus function as predispositions or knowledge systems—goal-relevant internal information.

Jurors differ in predisposition along a leniency–severity dimension toward defendants as a class. The traditional tack has been to relate this specific trait to more general traits, such as authoritarian personality, following the trait-typological framework of personality theory.

The functional approach to personality pursued by Kaplan is very different. Kaplan focuses on how traits *function* in juror judgment (e.g., Kaplan, 1975a,b; Kaplan & Miller, 1978; Kaplan & Schersching, 1980). This functional approach was successfully applied in a number of studies of juror predisposition in much the same way as predispositions toward likableness noted in the second previous subsection.

Of special interest, Kaplan's formulation applies not only to general personality dispositions, but also to temporary mood states created experimentally and treated as information (Kaplan & Miller, 1978). The main concern of this program of work, however, was juror deliberation, discussed next.

JURY DELIBERATION

Juror deliberation is part of reaching a joint verdict. Kaplan extended his studies of juror personality to this issue. Two theoretical predictions were tested (see further, Kaplan, 2010).

1. Deliberation should reduce effect of personality disposition.
2. Deliberation should make jurors' opinions more extreme.

Both predictions were well satisfied, most impressively in a realistic mock jury study conducted in the Lewis School of Law, in which law students acted as judge, prosecuting and defense attorneys, and court personnel (Kaplan & Miller, 1978).

Deliberation should reduce disposition effects because the interchange of opinion exposes each juror to the opinions of the others. Averaging theory implies that integration of others' opinions will reduce the effect of each juror's prior disposition.

The polarization prediction, that deliberation makes the mean opinion more extreme, may seem counterintuitive. However, it is a direct implication of averaging theory. The theoretical rationale is straightforward. Each juror begins the deliberation with an opinion that represents an average of his/her prior disposition, assumed to be nonextreme, and trial evidence, assumed to be more extreme. In the deliberation, other jurors make half-forgotten evidence more salient, increasing its salience weight. Since this evidence is more extreme, averaging it in makes the juror's opinion more extreme (Kaplan & Miller, 1979).

Juror polarization is a special case of the general phenomenon of polarizing effects of group discussion, even in absence of pressure to reach agreement. Group polarization seemed mysterious when first recognized; many explanations, such as conformity pressures, were advanced. The foregoing integration-theoretical analysis, with experimental support, was given by Kaplan (1977; Myers & Kaplan, 1976). Further discussion is given in *Group Dynamics*, Chapter 8 in Anderson (2008).

JUROR "BIAS"

"Bias" is a favorite term not only in legal psychology, but throughout social–personality. As usually used, however, "bias" represents serious misconception of human cognition (e.g., Anderson, 1974b, p. 75, Note 3; 2008, pp. 157-160; see also "*Bias*" in Chapter 6).

Individual differences are inherent in personality and hence also in juror judgment. Valuation of evidence, the primary process in juror judgment, depends on each juror's personal knowledge systems. Knowledge systems embody previous experience and naturally differ for different persons. Evidence value is not in the evidence per se; it must be constructed separately by each separate person. Different jurors will construct different judgments from the same evidence.

"Bias" is typically used pejoratively, as though it represents error or fault. Rightly, of course, *bias* properly refers to deviation from some correct standard of accuracy. But human judgment often does not admit correct standards, especially with social attitudes and moral judgment. To treat personality in terms of "bias" often rests on implicit premise that everyone should have the same values as the investigator.

The need to allow for individual differences is recognized in the jury system. It is designed to minimize extreme views, for example, of jurors adamantly opposed to the death penalty. Prosecution and defense attorneys have opportunity to disqualify jurors with strong prior opinions that could influence their verdict. And the traditional jury of 12 members helps moderate extreme individuals.

Two "Bias" Modes: A Theoretical Pitfall. One theoretical pitfall with "bias" arises because prior opinion may operate in two different modes. In one mode, prior opinion may be integrated directly into the verdict, as with an implicit belief that an accused person probably has reason to be accused. In the other mode, prior opinion may influence valuation of single items of evidence (see "*Bias*" in Chapter 6).

The distinction between these two "bias" modes is important, practically as well as theoretically. If prior opinion is integrated in parallel with other evidence, its effective weight will decrease as more information is added. This mode is often taken for granted. Bayesian decision theorists, in particular, make much of the claim that the effect of subjective prior belief will be washed out as more evidence accrues. This claim, however, rests on the dubious, implicit assumption that evidence value is not affected by prior knowledge.

But value is not in the evidence itself; value must be constructed by each individual. Increasing the amount of evidence may actually cause divergence of their opinions, exactly contrary to Bayesian theory. This seems not unlikely with, for example, liberals versus conservatives, as in the current squabbling over health care and the federal deficit.

The distinction between these two "bias" modes can be understood with averaging theory. Indeed, both modes can be quantified with the averaging law as shown next.

Measurement Theory for Juror "Bias." An ingenious application of the averaging law was developed to measure juror prior opinion by Ostrom, Werner, and Saks (1978). Legal instruction to presume innocence corresponds to a prior belief of $\psi_0 = 0$ in the averaging law. This instruction may be hard to follow; the mere fact of being accused raises some presumption of guilt. Perhaps, Ostrom, et al. say, it would be more

appropriate for jurors to set the importance weight, ω_0, of their prior opinion equal to 0.

Their results indicated that ψ_0 was near zero and that ω_0 was greater than zero. This pair of results demonstrates the first mode of prior opinion: the presumption of innocence was itself integrated into the juror's judgment.

Evidence for the second mode was also obtained: prior opinion influenced valuation of specific items of evidence. Prior opinion was assessed with questions such as "Most people brought to trial are guilty as charged." Participants were divided into pro and anti defendant groups by a median split on this questionnaire score.

Functional measurement analysis showed that the anti group placed higher guilt ratings on less incriminating evidence and higher weight on each item of evidence. Both effects lead to higher probability of guilt judgments. Both groups had about the same ψ_0, however, and both placed nearly equal value on the more incriminating evidence (although this might be a ceiling effect; their Figure 4). Similar results were obtained with two independent replications with college students and with a heterogeneous sample of adults with recent jury experience.

Supportive results were claimed by Kassin and Wrightsman (1983), who showed that a similar pro–anti questionnaire had substantial correlation with guilty verdicts. But such correlation analysis is ambiguous about the locus of this effect; prior opinion might operate in either of the two cited modes (see *Halo Pit* below). Ostrom, et al. (1978) had shown how to resolve this ambiguity. They also showed that averaging theory can yield more informative results.

Generality of their results was a concern of Ostrom, Werner, and Saks (1978), as shown by their three independent replications. Further assessment of generality is certainly desirable with other kinds of issues that come to trial. Judges' opinions might be studied similarly (Note 2).

"Inevitability of Juror Bias." This quoted assertion from Wrightsman, et al. (2002, p. 432) follows from IIT. "Bias" is inevitable because the functional weight/value of any item of evidence must be constructed separately by each individual, using knowledge systems of that individual. Different individuals, having different knowledge systems, will inevitably construct different weight/value for the same stimulus information. The averaging law can analyze this process, as shown by Ostrom, et al. in the previous subsection.

Calling this "bias," however, can be conceptually misleading. One reason, already noted, is that "bias" assumes some correct standard of

accuracy. No less important is that many "bias" frameworks fall into the deadly halo pit discussed next (see further "*Bias*," Chapter 6).

Halo Pit. An attractive way to assess influence of specific informer stimuli on an overall judgment is to ask for direct judgment of influence after the overall judgment has been formed. Unfortunately, this simple method suffers a halo artifact uncovered in early work on person cognition (see *Foundations of Person Cognition*, Chapter 3 in Anderson, 2008). The overall judgment acts as a halo on subsequent judgment of the specific informer—which is thus invalid (*Halo Theory*, Chapter 1).

This halo pit is important enough to deserve a specific legal example. The main claim of Goodman-Delhunty, Green, and Hsiao (1998) was that jurors' prior opinions influence their valuation of specific items of evidence. They used a realistic mock juror situation that began with a questionnaire about attitudes toward the death penalty and then presented a videotape of an actual store robbery in which a clerk was killed, together with videotapes of the closing arguments of the prosecution and defense attorneys. Each mock juror then made an individual judgment of guilty–not guilty and of sentence.

After this, the main data were obtained—judgments about the individual items of evidence that had been presented. The main result was a correlation between juror prior opinion and judgments about incriminating value of evidence. Mock jurors less favorable to death sentences made lower judgments about incriminating value of items of evidence. This result was taken at face value to mean that prior attitude had influenced valuation of the evidence (Wrightsman, et al., 2002, p. 501).

But this correlation contains a likely halo artifact. Since evidence value was judged *after* overall judgment of guilt/innocence, this overall judgment will influence subsequent judgments about the items of evidence. The authors' claim may well be true, but this experiment cannot separate out the halo artifact. Averaging theory can, as illustrated by Ostrom, Werner, and Saks (1978) in the second previous section.

OTHER LEGAL VARIABLES

Much concern has been expressed about variables that influence legal judgment. Some aspects of this issue are considered in the following subsections.

Basal–Surface Structure of Attitudes. The primacy–recency issue has long been of interest in psychology of law as well as in general theory of judgment–decision. Is it better to present your case first, hoping to

crystallize opinions in your favor? Or second, hoping not only to undo the first arguments but also to leave your arguments fresher in the recipient's minds?

The foregoing jury experiment on information learning (Anderson, 1959) was designed to provide evidence on primacy–recency. This could be measured at three points, after 4, 8, or 12 witnesses.

The two curves in the top panel of Figure 4.3 represent the same 4 witnesses over trials 1–4: closed circles for prosecution–defense order, open circles for the opposite, defense–prosecution order. The crossover at trial 4 shows *recency*; the same information has greater effect when presented second. This recency, however, represents *surface attitude*: it disappears over the next two trials (see figure legend).

A very different picture appears with the recency crossover at trial 8 in the middle panel of Figure 4.3. This recency remains substantial until the end of the bigamy trial as shown by the continued separation of the two curves. This enduring effect represents *basal attitude,* a sharp contrast with the rapid decay of surface component in the top panel.

Important additional information on basal–surface structure appears in the bottom panel of Figure 4.3. After 12 witnesses, substantial recency was again observed. But this immediately reversed to primacy on the next trial, on which all participants received the same evidence. This recency at trial 12 was thus a labile surface component that masked a basal primacy that remained until the end of the trial.

Figure 4.3. Basal–surface memory structure. Judgments of guilt–innocence in Thomas Hoag bigamy trial. In top panel, two prosecution and two defense witnesses are given in prosecution–defense P–D order to half the subjects and in the opposite D–P order to the other half. Crossover at witness 4 shows that more recent witnesses have greater effect but this recency lasts only 2 trials. The P–D subjects are now split into two subgroups: half get next four witnesses in the P–D order, half in opposite D–P order; the same split is made for D–P subjects. Curves in the top panel are averaged over these two subgroups, however, so they show no systematic effect of witnesses. Instead, the middle panel shows judgments of these bifurcated subgroups over the next four witnesses. These two curves are much like those already seen, for they represent similar sequences of witnesses. At witness 8, these two curves cross over, showing recency. Over the next four witnesses, each subgroup is again bifurcated into P–D and D–P subgroups in the same manner. Curves in the middle panel are averaged over these subgroups, as before, and so show no systematic effect of witnesses. Instead, judgments of these subgroups are shown in the bottom panel. Although the judgment at witness 12 shows recency, the curves uncross at the very next witness to reveal hidden primacy. This primacy was statsig and appeared uniformly for all four pairs of subgroups with different sequences of information. The last four trials were the same for everyone: testimony from two prosecution witnesses followed by a denouement in the form of two pieces of courtroom demonstration that ended the trial. (After Anderson, 1959.)
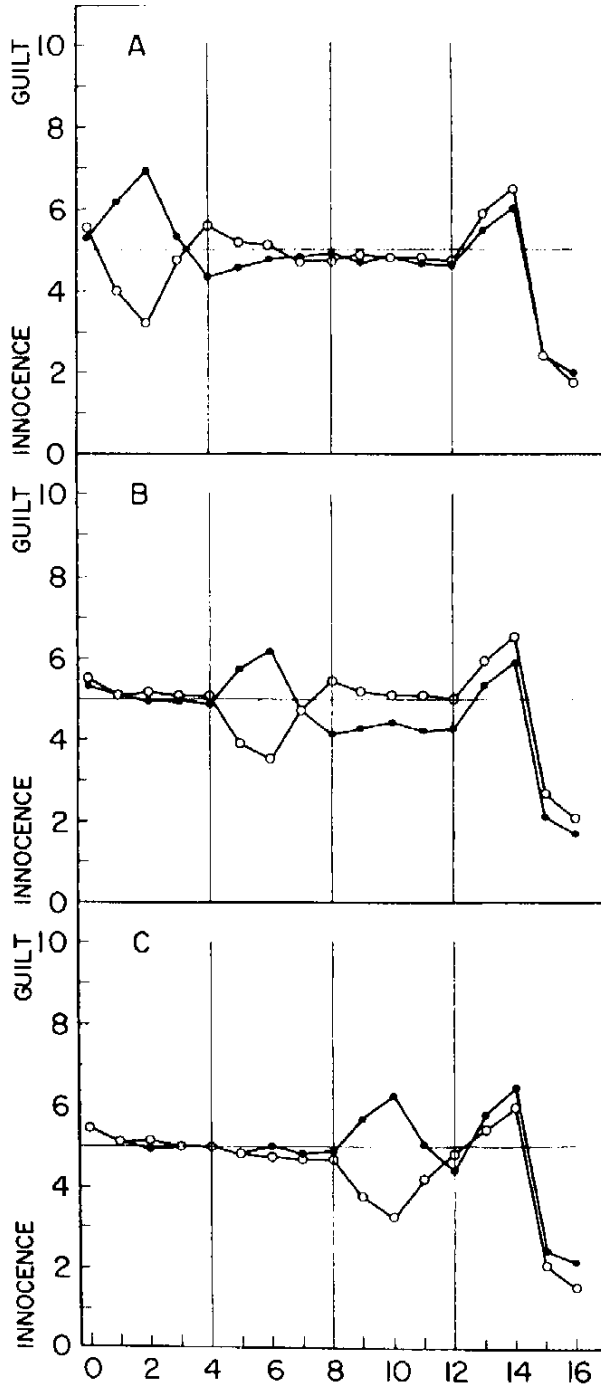
No general rule of primacy–recency should be expected, as this mixed pattern of results showed. In practice, recency has been far more common. Primacy is obtained in a few situations but the frequent belief in potency of first impressions is a myth (Note 3).

Basal–surface structure was the most important outcome of this experiment. Attitudes may have two components: an enduring *basal* component and a labile *surface* component (see *Basal–Surface Theory*, pp. 94-97 in Anderson, 2008; Note 4 below).

This 1959 study may be the first definite demonstration of basal and surface components of attitude. Rapid decay of initial impact of some communication has been demonstrated, but that could merely be normal decay, not a distinct component.

Basal–surface theory has been little studied, although it seems fundamental throughout attitude theory. Some support, however, may be seen in Pyszsczynski and Wrightsman (1981), who used a 2 × 2, weak × strong design for opening statements by prosecution and defense attorneys (given in the legally prescribed prosecution–defense order). Following this, all four conditions received the same sequence of 11 items of evidence. Probability of guilt was judged after each of the 13 trials.

Their Figure 1 shows the juror learning curves for each of the four conditions. The pattern was striking: weak prosecution followed by strong defense opening statements on trials 1 and 2 yielded a persistent attitude that changed little over the following 11 items of evidence. The other three conditions all yielded much higher guilty judgments and were essentially the same from trial 5 on. These data suggest that the strong defense opening statement created a strong basal component.

Basal–Surface Theory. Basal–surface structure has fundamental importance for general theory of attitudes. Much attitude change reported in the literature may be merely surface component that quickly vanishes.

This basal–surface problem has been ignored in attitude research. Even the important question whether ending with an uninformative, neutral message will wash out surface component seems unanswered.

The evidence for basal attitude in the experiment of Figure 4.3 was a serendipitous consequence of the primacy–recency structure of this trialwise design in which basal component formed mainly over trials 7-10. Systematic analysis is now possible based on later developments with the averaging law (see e.g., Anderson, 2008, Figure 4.4, p. 95; see further *Functional Theory of Learning*, Figure 8.3, Chapter 8).

Legally Inadmissible Evidence. Functional memory theory explains the findings that instructions to jurors to disregard inadmissible evidence

that may intrude in the testimony (prior criminal record, for example) are relatively ineffective. As goal-oriented information processors, jurors valuate such evidence as it is given and integrate it into their developing, case-specific knowledge systems.

The judge's instruction to disregard such evidence comes too late; this evidence has already been valuated and integrated. The judge's instruction reflects the legal conception of jurors as passive information processors indicated in the earlier quotation. But having been valuated/integrated into the juror's case-specific knowledge system, the original stimulus information may no longer have separate existence. Legal practice requires a dynamic, functional conception of memory (see *Functional Memory Theory*, Chapter 8).

Legally inadmissible evidence may have diagnostic value. Prior record is information about the defendant that bears on the present charge; persons convicted of one burglary are more likely to commit another than persons who have not.

Nondiagnostic Variables. A second class of extralegal variables includes those that presumably lack diagnostic value but may still influence legal judgment. Order of presentation of evidence is one, as with primacy/recency above.

Personal attractiveness has been claimed to be another. This was taken for granted by Zebrowitz and McDonald (1991) as the explanation for their finding that more attractive plaintiffs in small claims court were more likely to win their cases. But personal attractiveness may well be diagnostic in these field data. Plaintiffs who give more attention to personal appearance may give more attention to preparing their case. And they may have better cases. Valid interpretation of such correlational data presents empirico-statistical difficulties that can be very treacherous (see *Illusion of "Statistical Control,"* Chapter 6).

Even experimental studies of nondiagnostic variables may not be worth much. The much-studied issue of stereotypes illustrates the problem. Aiming to demonstrate some stereotype, investigators usually simplify by omitting other variables. But other variables are nearly always important in everyday life. The *strength* of the stereotype must be established, which usually requires comparison with effects of other variables. The common tactic of omitting other variables can reveal weak stereotypes with little social relevance (Anderson, 1981a, p. 248; see *Nonarbitrary Metrics With Information Integration Theory*, Chapter 6).

This need for an integrationist approach to stereotype theory is underscored by the work of Konečni and Ebbesen discussed below. Not

one popular stereotype, such as race, had a discernible effect on length of sentence imposed by judges in actual cases.

Halo Bias Explains Double Discounting. Halo process may bias cases of comparative negligence, in which jurors make two judgments. One judgment is of relative responsibilities of plaintiff and defendant, the other of the full amount of plaintiff's losses. The former judgment is used by the judge to reduce the full amount of plaintiff's losses in proportion to plaintiff's responsibility.

The evidence indicates "double discounting." Mock jurors discount plaintiff's losses in proportion to plaintiff's responsibility, contrary to what the law prescribes. The subsequent discount by the judge shortchanges the plaintiff (see references in Wrightsman, et al., 2002).

Halo theory explains double discounting. This follows the basic blame law, Blame = Responsibility + Consequences. Judgments of blame for plaintiff are higher for higher plaintiff responsibility. This blame judgment then exerts a halo effect on the juror's subsequent judgment of plaintiff's loss (see *Halo Pit* above). This halo effect may properly be called *bias* because there is a correct standard.

Another Halo Bias. A similar halo bias arose in social psychology with findings that judgments of responsibility for a harmful act are greater for greater harm. The cognitive analysis follows the basic blame law. Jurors form an overall judgment of blame and this exerts a halo effect on their judgments of relative responsibility.

The alternative hypothesis of defensive attribution (Shaver, 1975; Fiske & Taylor, 1991) disagrees with the basic blame law; this law shows meaning invariance for Responsibility. This illustrates the conceptual power of the integration laws (see *Psychodynamics of Everyday Life*, Chapter 6, pp. 260ff, in Anderson, 1991b).

FIELD STUDIES OF THE COURTS
CONJOINT EXPERIMENT AND OBSERVATION

Experimental analysis can help improve the legal system. This hope has been pursued by many investigators, as in the foregoing studies of juror information learning and juror cognition. Such studies can help understand cognitive processes of judges, prosecution and defense attorneys, police, and others in the legal system, criminals especially. Necessarily, however, the continuing evolution of laws and regulations relies mainly on observational data and so does their implementation. Conjoint exper-

imental–observational studies are needed. These are rare but two truly impressive programs of research are noted here.

SETTING JUST BAIL

What is just bail for a person charged with a crime? Bail is intended to help ensure that the accused person will appear to stand trial without having to spend the interim in detention. Posting bail is a hardship for the accused, especially for those who must use a bail bond agent at a cost of 10% of the bail. Setting bail addresses a conflict between the individual's right to liberty and the community's right to freedom from crimes or threats thereof.

Setting bail involves information integration. Several variables may be valuated and integrated: seriousness of crime; community ties (job, family); prior criminal record; and possibly character information from the arresting officer or other persons.

Pioneering work by Ebbesen and Konečni (1975) applied experimental analysis conjointly with field observation. They used a factorial integration design in single person experiments with Superior Court judges, together with regression analysis of actual bail settings in court sessions. The two levels of local ties in the integration experiment represented 93% of the actual robbery cases in the court sessions; levels of the other three variables were also chosen to be representative (Note 5).

Four issues raised by the work of Ebbesen and Konečni are discussed under the following four headings.

Question 1. What do judges consider just bail?

The experimental study found that judges considered community ties (e.g., job, family) by far the most important variable, as measured by the main effects in the integration design. This seems entirely reasonable; community ties has obvious claim as assurance that the accused will appear to stand trial. Prior record and recommendation of the district attorney also had reliable effects, although not the recommendation of the defense attorney.

An adding-type model for information integration was indicated by the near-complete absence of any interaction term in the Anova. Lack of statistical interaction supports the use of simpler designs that may be needed in field studies (Notes 5 and 6).

Question 2. Do judges' actual bail settings in court agree with their private judgments?

Evidence on this question was obtained by having observers unobtrusively code ongoing court cases on the same four variables used in the experiment. Multiple regression was applied to these data..

Community ties had virtually no effect in these field data. Community ties, by far the most important in judges' private judgments, had little or no effect in their actual bail settings. Instead, judges relied heavily on the recommendation of the district attorney.

Ebbesen and Konečni realized that a real effect of community ties in judges' bail settings could be masked by an effect in the district attorney's recommendation. However, regression analysis showed no effect of community ties in recommendations of the district attorneys. Judge's courtroom bail settings evidently differ sharply from their ideals of justice that they expressed in the integration experiment.

This work illustrates one way in which experimental analysis can help improve society. Replication of this work in other jurisdictions and with a similar study of district attorneys is certainly desirable. Their recommendations seem most important in practice, as Ebbesen and Konečni found, and in principle because the district attorney has detailed knowledge of each case.

Question 3. What *is* just bail?

The foregoing results raise serious doubt about justice of the bail system. Judges have some reason to rely so heavily on the recommendation of the district attorney, who has professional and personal interest in the details of the case, especially that the accused will appear for trial. But this interest will tend to produce unjustly high bail settings.

Experimental analysis of just bail could be straightforward. On a stratified sample of cases, reduce the set bail by, say, 20% for a random half of the cases. If this yields too low bail, an unacceptable fraction of this group will fail to reappear. Otherwise, prevailing levels of bail are unjustly high. Such experimental analysis must of course be done within the legal system, with cooperation of all concerned. This is one way that experimental analysis can help improve the legal system.

Question 4. How practicable are field experiments?

The lack of follow-up of the conjoint experimental–observational approach of Ebbesen and Konečni raises the question whether it is generally practicable. Both authors argue strongly that it is highly desirable and that its labor-intensive character is more than justified by its social importance (personal communications, 2008).

SENTENCING DECISIONS

The foregoing work on bail setting was extended by Konečni and Ebbesen (1982, 1986) in major research on sentencing. Sentencing is popularly considered a complex cognitive process in which the judge takes account of multiple determinants specific to each case and integrates them into a just decision. This view seemed strongly supported when judges were tested with integration experiments. Two studies of this kind, one with focused interviews of judges in their chambers, the other with judges' responses to a sociological questionnaire, both found substantial effects of pertinent case variables.

Here again, judges' ideals as represented in the experimental study differed sharply from their courtroom behavior. This was revealed by archival analysis of about 1200 court files. In the courtroom, judges rely mainly on the recommendation of the probation officer, who presents a detailed report of 8-15 pages to the judge on each case. Most sentencing hearings themselves took only about 5 minutes.

Konečni and Ebbesen point out that simple regression models could do as well, probably better, than the present system—at much less cost to taxpayers. They also point out that much else of the present legal system depends on opinions of the legal establishment that have unconcerned relation to scientific analysis.

Their argument agrees with similar studies of "expert" opinion in other areas. Simple mathematical models predict better than experts in many different fields (e.g., Swets, Dawes, & Monahan, 2000). Konečni and Ebbesen express doubt that the legal establishment will welcome their proposal, a doubt reinforced by persistent neglect of psychological science in clinical psychology (Grove & Meehl, 1996).

The enormous effort represented in the foregoing and related studies by Konečni and Ebbesen showed that a few primary predictors gave very good accounts of sentencing decisions. This supports their argument for providing each judge with a printout of relevant variables in each case. And perhaps also the judgment of their personal regression equation, including the weights obtained from their personal experiments.

A related contribution was the irrelevance of numerous factors such as race, gender, religion, and military record, that have been implicated by other investigators in laboratory experiments that ignore the field situation. Their work is a remarkable contribution to a legal system grounded in true field science—a new direction in legal science.

The arduous labors of these two pioneers is a twofold model for applications of psychological science to legal issues. They demonstrate

the usefulness, necessity, of conjoint experimental–field analysis. They also show how to attack problems of high social relevance that may be amenable to reform.

Psychological research has given much attention to jury trials, yet only a small proportion of legal cases come to trial. Much of this research, moreover, rests on mock simulations that have nominal relevance to either law or psychology. And that are unlikely to have any effect on the actual jury system.

Many legal issues offer more promise than jury trials for social practice as well as for psychological science. Among these are causes and correlates of crime (Wilson & Herrnstein, 1985), economics of the justice system (Phillips & Votey, 1981), police behavior (Skogan & Frydell, 2004), the exclusionary rule for evidence (Totten, Kossoridge, & Ebbesen, 1999), and diverse others dealing with child support, domestic violence, anger management, and parole/probation. Research on legal psychology could usefully begin with a survey of problems, their relative importance, and prospects for worthwhile results.

NOTES

Note 1. A valuable result is that Howe (1991) and Howe and Loftus (1992) both found similar integration rules using within design, in which each participant judged all stimulus combinations, and between design, in which each participant judged only a single combination. This supports the similar result of Konečni and Ebbesen (1982). Within design is much more efficient (Chapter 6).

Note 2. This finding of Ostrom, et al. (1978) that prior opinion influences valuation of specific items of evidence disagrees with cited results of Kaplan and of Abele and Petzold. This issue of functions of prior opinion has general importance.

Note 3. *Myth of Primacy.* Some writers treat primacy as a general phenomenon (e.g., Flanagan, 1991, p. 284; Nisbett & Ross, 1980). Indeed, the anchoring and adjustment heuristic of Kahneman and Tversky rested entirely on the assumption that primacy is general. In fact, recency is far more common (see *Heuristics*, Anderson, 1996a, p. 347).

This myth of first impressions was strongly proclaimed by Wrightsman, Greene, Nietzel, and Fortune (2002, pp. 413ff). Their claim disagrees with the jury experiment cited in the text (Anderson, 1959) and with nearly all work in judgment-decision theory. Scrutiny of Wells, Micke, and Wrightsman (1985), which they cite in support, shows little support. The critical comparison between the prosecution–defense and defense–prosecution orders failed of statistical significance despite an *N* of 201.

In everyday life, of course, first impressions may be potent simply because they rest on more information.

First impressions could have special significance if they influenced valuation of later information. This could be studied using the averaging law to measure weight/value but this has not yet been done.

Note 4. This jury trial experiment is perhaps the first definite evidence for dual learning components: an enduring *basal*, component and a *labile* surface component (Figure 4.3). Much published data on attitude change may be merely surface component that evaporates as the subject departs the experimental room.

Note 5. Field investigations are often concerned with main effects of certain variables, as just illustrated with effect of community ties in bail setting; the exact nature of the integration process often has secondary interest. Hence complete factorial designs, commonly used to diagnose integration processes in laboratory experiments, may not be needed. Smaller designs may be more useful (see *Simpler Designs*, Chapter 6).

Note 6. The lack of statistical interaction in the experimental study of bail setting by Ebbesen and Konečni also indicates that the dollar bail setting was a true measure of the judge's opinion (benefit 2 of parallelism theorem). This is a notable extension of functional measurement with ratings to a behavioral measure with societal significance.

Two companion studies by Konečni and Ebbesen (1982) deserve comment. Both found that rank orders of importance of sentencing variables, such as severity of crime and prior record, differed across judges, defense attorneys, and college students.

Such differences should be no surprise. Judges, defense attorneys, and college students have very different knowledge systems. Hence they place different values on the same stimulus information. Konečni and Ebbesen are certainly correct in concluding that much current laboratory research lacks *outcome* validity.

Process validity, however, is important for theory of legal cognition (see *Two Kinds of Validity: Process and Outcome*, Chapter 6). Their work suggests that the same integration models are used by judges and college students, also found by Howe (1991). These models allow true idiographic measurement of values, especially of judges' ideals, which could help improve the justice of our justice system.