

# **Domain Differences in Expertise**

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## **Abstract**

Why is it that experts in different fields seem to have such different levels of competence? Weather forecasters, for instance, are often reported to make highly competent decisions. Clinical psychologists, on the other hand, are frequently reported to be poor decision makers. Such differences in competence have led observers to divergent views about the decision making ability of experts. It is argued in this chapter that this divergence arises from a lack of appreciation of domain differences. That is, there are predictable differences between fields in the expected level of expert competence.

The purposes of this chapter are: (1) to review evidence on differing levels of competence for experts across fields, (2) to outline a commonly-accepted conceptualization that raises questions about the general ability of experts because of these performance differences, (3) to look at evidence of domain differences in the performance of experts, (4) to suggest an alternate conceptualization of expertise that incorporates domain differences, (5) to offer implications and suggestions for future research on domain differences.

## Domain Differences in Expertise

Analysts often seem perplexed when they observe sizable and persistent differences between the performance of experts in different domains. As shown by the following quotations, this leads to often cynical definitions of “expert.”

“A man who has made all the mistakes which can be made in a very narrow field” (Niels Bohr)

“One who predicts the job will take the longest and cost the most” (Arthur Bloch)

“A damn fool a long way away from home” (Carl Sandberg)

“A man who has stopped thinking” (Frank Lloyd Wright)

“One who can take something you already know and make it sound confusing” (Anonymous)

The position taken here is that competence differences between experts are not only predictable, but are closely tied to particular domains of expertise.

The purpose of this chapter is to explore the connection the extent levels of competence of experts and their area of specialty. The chapter is organized into five sections:

First, there is a review of the literature on competence of experts in different fields. Second, a commonly held view that experts must agree or be considered incompetent is discussed. Third, evidence on the relationship between domain and competence is considered. Fourth, an alternate perspective is offered that posits that competence in experts is a function of domain. Finally, the chapter concludes with implications and suggestions for future research on expertise.

## Background

Since the start of systematic analyses of decision making in the 1950’s, investigators have expressed surprise and dismay at the extent to which experts vary in level of competence. For example, if we ask two financial experts to evaluate a given investment, the expectation is that they should both give

sound, identical recommendations. If they arrive at different conclusions, then we wonder whether they are as skilled as they claim.

In a seminal paper, Einhorn (1974) argued that *consensus* or between-expert reliability is necessary for competence in experts. He found, however, significant differences in diagnoses by three expert medical pathologists. The average between-expert correlation ( $r$ ) was .55 (where .0 is chance and 1.0 is perfect). This led Einhorn to question the competence of these medical experts.

In comparison, weather forecasters have been widely reported to have high consensus values,  $r = .95$ , for short-term predictions. Thus, there is considerable agreement between different weather forecasters. This has been interpreted as indicating a high level of competence (Stewart, Roebber, & Bosart, 1997).

Einhorn (1974) also argued that within-expert reliability or *internal consistency* is necessary for competence. That is, an individual expert should say the same thing in similar situations. For pathologists, Einhorn (1974) reported a within-expert consistency  $r$  of .50. This suggests a low level of competence

For weather forecasters, on the other hand, the internal consistency is near perfect,  $r = .98$  (Stewart, Roebber, & Bosart, 1997). This implies highly competent performance.

Several studies have explored whether competence increases with experience. For instance, Ettenson, Shanteau, and Krogstad (1987) found that mean between-auditor correlations increased from .66 to .76 to .83, for students, (mid-level) audit seniors, and full partners, respectively. Similar patterns were observed for internal consistency. Thus, experience does appear to lead to greater competence.

These results suggest three conclusions: First, competence does appear to vary systematically across domains (as reflected by between-expert consensus correlations). Second, within-expert consistency

correlations also suggest systematic variation in competence. Third, for a specific domain, there is evidence of increasing competence as experience increases.

### **Experts-Are-No-Damn-Good Hypothesis**

The less-than-impressive reliability correlations in many studies of expertise led most analysts to question the competence of experts in general. Following Einhorn' s logic, these investigators assume that reliability is a necessary condition for expertise. The lack of reliability, therefore, suggests “experts are no damn good” (Gettys, personal communication, 1980). This analysis and interpretation is derived from an implicit five-part argument about experts:

- (1) For tasks performed by most experts, there is assumed to be a “gold standard” or unique “ground truth.” If this truth is readily accessible, of course, anyone could access it directly. For tasks performed by experts, however, the truth is outside the realm of common knowledge. Thus, unique correct answers exist, at least in theory, but they are difficult to obtain.
- (2) Because of their special skills and experience, experts should be able to tell us about the “ground truth.” That is, experts can access answers that are unavailable to the rest of us.
- (3) Since by definition there can be only one “ground truth,” all experts should agree on a single correct answer. The special ability of experts should allow them to obtain the correct answer.
- (4) If experts disagree, then someone is wrong. Some or all of them are not as competent as they claim to be. Thus, disagreement is a reflection of incompetence.
- (5) Since non-experts do not know which of the so-called “experts” are correct, the only safe course of action is to assume that they are all incompetent. That is, disagreement between experts implies that we should be suspicious of any claimed special abilities.

This argument, of course, is not a formal chain of logic. Nevertheless, it is implicit in the way that many analysts reason about the implication of disagreements between domain experts.

## Domain Differences

In making this argument, decision analysts treat all types of experts alike. That is, the term “expert” is used generically. For instance, Kahneman (1991) concluded, “there is much evidence that experts are not immune to the cognitive illusions that affect other people.” Similarly,

This may be true in many domains. But, it is common knowledge that experts in some domains, such as weather forecasters, show little sign of biases or “cognitive illusions.” Thus, despite the generalizations drawn about experts, we know there are exceptions to the rule.

In an effort to account for these domain differences, I constructed Table 1 to differentiate between those domains where experts do well and those where experts do not. The table is based on a continuum from high to low competence (see Shanteau 1992a,b for earlier versions of this table). In the left column are those domains where experts make aided decisions using Decision Support Systems (DSS) or other computerized tools, e.g., in weather forecasting. The next column contains domains where experts make skilled, but largely unaided decisions, e.g., livestock judges. The third column lists domains where experts show limited competence, e.g., clinical psychologists. The behavior of experts in the last column is close to random, e.g., stockbrokers.

It should be noted that assignment of domains within the table was based on a review of the literature. That is, the level of competence is drawn from assessments of researchers who study each domain. In addition, three domains –nurses, physicians, and auditors – appear in several columns. That is because the literature in these fields provides mixed evidence of the level of competence.

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*Insert Table 1 About Here*  
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There are many ways to describe the differences in this table (see Shanteau, 1992a,b). For present purposes, it is sufficient to observe that domains to the left side involve more stable (*static*) properties. That is, the stimuli and the problem “hold still” for experts to evaluate. The domains to the right side, however, involve more changeable (*dynamic*) properties. Thus, the stimuli and problem are less stable, harder to specify, and more like “moving targets.”

Another way to view this distinction is to note that most domains to the left side of the table involve physical or natural properties, whereas the domains to right involve human behavior. This may reflect the fact that scientific advances have a longer history of development in the left-side domains. In contrast, the domains to the right have relatively young scientific histories. Given this difference, it makes sense that expert competence will be higher on the left side and lower on the right side.

The question remains whether this distinction between domains is predictive of different levels of agreement. To examine this proposition, Table 2 shows consensus values for a variety of domains. Two specialties are listed under each category, with the between-expert agreement (consensus) given as average correlations. As can be seen, the mean consensus  $r$  value for weather forecasters is .95, whereas the average value for livestock judges is .50. The consensus values for clinical psychologists, and stock forecasters are .40, and .32, respectively. Comparable results for other domains appear in the second line. The trend supports the prediction outlined above – better-structured natural-science domains lead to high consensus and less structured social-science domains lead to less consensus.

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*Insert Table 2 About Here*

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For comparison, the average within-expert reliability (consistency) correlations for these same domains are listed in Table 3. The trends are similar, with better-structured domains leading to higher internal consistency. As expected, the consistency values (except for pathologists) are higher than the

corresponding consensus values in Table 2. In two domains (livestock judges and polygraphers), there are notable discrepancies between consensus and consistency correlations. These apparently reflect the existence of different ‘schools of thought’ about how experts should do their jobs in these fields.

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*Insert Table 3 About Here*  
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### **Decision Analysts’ View of Experts**

Investigators in artificial intelligence, expert system design, cognitive science, systems analysis, and computer science have all concluded that experts are superior decision makers. That is why knowledge engineers build computer simulations around what experts know. Similarly, most domain-specific researchers (such as in medicine and weather forecasting) view experts as possessing unique information essential for making good decisions. In short, investigators in these disciplines see human expertise as something to be emulated.

In contrast, decision analysts have concluded that experts are flawed and prone to making simple errors (e.g., Kahneman, 1991). Moreover, experts and novices are viewed as sharing the same shortcomings. For instance, Tversky (quoted in Gardner, 1985, p. 360) stated, “whenever there is a simple error that most laymen fall for, there is always a slightly more sophisticated version of the same problem that experts fall for.”

Investigators have apparently overlooked the fact that there are important domain differences between areas of expertise. For instance, both weather forecasters and livestock judges are skilled professionals. Yet, there is a major difference for these two fields in the level of disagreement between experts. The former is based on a well-developed science, whereas the latter is based more on ‘informed

judgment.” It should not be surprising, therefore, to find livestock experts disagreeing more about their judgments than weather forecasters.

## **The Importance of Domains**

The position taken here is that previous analysts have unknowingly adopted an *experts-must-agree* view of expertise. According to this view, disagreement between experts is a sign that something is wrong. This leads to the conclusion that experts are not as skilled or as competent as they claim to be. In this section, I will propose an alternative perspective based on the influence that domains have on experts. This perspective is based on a five-part argument:

(1) The primary job of an expert is not to make decisions but to help clients reach a broadly defined target state. For example, the goal of the client may be to design a better land-management strategy or to increase profit potential of a farmer. These goals do not involve single answers, but instead require something more elaborate from the expert, such as a strategic plan.

(2) To reach the client' s goal state requires dealing with multiple, constantly changing, dynamic factors. As noted by Klein, et al (1993), the situations faced by experts are different and more complex than the simplified situations studied in research laboratories. Thus, experts work on problems that are considerable more complex than those studied in idealized settings.

(3) Using their knowledge and experience, the role of the expert is to recognize patterns and find consistencies in a dynamic problem space. The expert' s job is to clarify the issues for the client. In other words, the challenge for an expert is “to make sense out of chaos.”

(4) Based on their experience and insights into the nature of problems, experts try to help clients clarify their thinking. Typically, an expert will often identify several alternate paths to the desired goal states. The expert' s role is to lay out the options and the consequences in a clear and comprehensible fashion for the client.

(5) In the end, it is the client, not the expert, who actually makes most decisions. The expert offers insights and observations, but the client makes and implements the final choice(s). Thus, the final responsibility for the decision rests on the client, not the expert.

The view is nicely summarized by the management consultant Golde (1970): “We seem to expect too much and the wrong things of our experts.” Thus, experts generally act more like knowledgeable consultants. Rarely do they function as the “all-knowing, single-answer decision makers” envisioned by many analysts. Instead, experts help clients by giving them the insights and information needed to make their own decisions.

When experts disagree, therefore, it is because they see alternative paths to the client’s goal state. In turn, savvy clients may seek out the views of various experts precisely because they want different perspectives on their problems. Thus, disagreements between experts are not only expected, but may actually be useful to consumers.

## **Implications for Research**

By relying on a false belief in consensus, decision investigators have unknowingly adopted a distorted view that leads them to expect that experts should always agree. The next section looks further at the research implications arising from this distortion.

### *Economic/Statistical Thinking*

By drawing a parallel to economic/statistical theory, decision analysts have adopted a “single correct answer” approach to assessing expertise. That is, in most quantitative assessments, we expect to find one and only answer to a question. When an expert (or anyone else) gives an answer different from the “correct answer,” he/she is said to have a “bias” (Tversky & Kahneman, 1974). Moreover, when two or more experts give different answers, the claim of experts to special competence is questioned (Einhorn, 1974).

The position here is that these analysts have relied on an inappropriate view of how experts function. For instance, the environment in which experts work is much different from that reflected in the idealized world seen by these analysts. The complex, changeable environment that experts operate in is considerably more complicated. In reality, problems rarely are simple enough to lead to single correct answers. Instead, there are multiple answers (or at least multiple routes to answers). If so, it should not be surprising to find that experts, especially in domains involving human behavior, often take different approaches to finding answers.

The underlying problem is that analysts misunderstand what experts do and what is expected of them. These investigators seem to think that experts see the world as they do – with simplifying assumptions and single-answer solutions. However, experts generally have a different worldview – with many complexities and contingencies, but few optimal solutions. In addition, experts have a flexible approach to adaptation and are better at managing uncertainty (Shanteau, 1992a).

From the present perspective, disagreements between experts are to be expected. Although analysts view disagreements as evidence of incompetence, experts see disagreements as a more-or-less inevitable part of their job.

### **Implications for Agriculture**

As reviewed by Shanteau (in press), there has been a long history of interaction between agriculture and psychology. Although often unappreciated, these interactions go back over a century. For instance, Hughes (1917) conducted one of the first studies of experts in any domain. His analysis of crop judges showed that corn rated highest by experts did not produce the highest yield. Wallace (1923) (later vice-president under F. Roosevelt) reanalyzed Hughes' data using path analysis. He found (1) corn judges agreed fairly well with each other, but (2) their ratings correlated only slightly with crop yields.

Trumbo, Adams, Milner, and Schipper (1962) asked licensed grain inspectors to judge samples of wheat. Their analyses revealed that nearly one-third of the samples were misgraded. When graded a second time (a check of consistency), over one-third were given a different grade. Also, increased years of experience made judges more confident, but not necessarily more accurate. In fact, more experienced judges tended to overgrade the wheat samples (perhaps the original form of ‘grade inflation’).

One explanation for these errors in agricultural judgment was offered by Gaeth and Shanteau (1984). They noted that irrelevant materials (e.g., excessive moisture) significantly impacted the decisions of soil judges. They also found that some forms of training were successful in compensating for the presence of these irrelevant materials. Another approach to improving expert judgment as observed in weather forecasting. Murphy and Winkler (1977) found that precipitation forecasts could be improved using a feedback system based on Brier scores (a quadratic loss function). Since the introduction of Brier scores, the accuracy of weather forecasts has increased dramatically (Stewart, et al., 1997).

These earlier results largely parallel the conclusions in this chapter. That is, agricultural experts perform reasonably well, although there is clearly room for improvement, e.g., they do not always agree with each other. Moreover, there are sizable domain differences, i.e., there is greater agreement between experts in some areas than others. Experts working in domains with better-defined properties, such as weather forecasting, show sizable agreement. In contrast, experts in domains with more subjective standards, such as grain judging, perform less well.

Dawes (personal communication, 1987) offered an insightful observation about an earlier version of Table 1. The performance standards expected by clients are different for the left and right sides. Weather forecasters are allowed to make occasional mistakes. However, managers and stockbrokers are expected to be correct almost all the time. That is, in the less predictable (right-side) domains, experts are held to higher standards of performance.

This is important for agriculture, since with increased mechanization and computerization, there has been a shift in skills needed on farms. Traditionally, a farmer needed to be a jack-of-all-trades, with general skills many areas. Now, instead of many general skills, modern agribusiness places more demand on cognitive (thinking) abilities. For example, with the trend away from family farms to large corporate entities, there is a greater need for farmers with management abilities. Yet, these are precisely the psychological skills associated with right side of the table (as opposed to the more technical skills on the left side). Whether farmers make such management decisions themselves or rely on expert consultants, the present tables suggest that these judgments will be lacking in competence and between-expert agreement.

## **Final Comments**

As argued here, disagreement between is a natural product of the various domains that experts work in. If disagreement between experts is not a focal issue, then what should be? Let me suggest three useful goals for future research on expertise. First, various investigators have found that the superiority of experts depends on their ability to distinguish between relevant and irrelevant information (Ettenson, Shanteau, & Krogstad, 1987; Jacavone & Dostal, 1992; Mosier, 1997; Schwartz & Griffin, 1986; Shanteau, 1992b). One goal in future research should be to learn how experts make these discriminations and to find ways to enhance the process, especially for right-side domains.

A second goal should be to understand the kinds of intellectual and physical tools used by experts to enhance their judgments. Experts seldom, if ever, make unaided judgments of the sort emphasized in laboratory research. In fact, analysts make use of the very tools denied their subjects. “The experimenters themselves, using tools and expertise, are able to perform (laboratory) tasks rather well” (Edwards, 1983, p. 511). The type of tools used by experts needs to be better understood. Perhaps it will be possible to borrow some of the tools used by left-side experts to help those on the right side.

The final goal should be to develop insights into domain differences. As argued by Edwards (1983, p. 512), “we have no choice but to develop a taxonomy of intellectual tasks themselves. Only with the aid of such a taxonomy can we think with reasonable sophistication about how to identify among the myriad types of experts and the myriad types of tasks . . . just exactly what kinds of people and tasks deserve our attention.” The analyses in Tables 1, 2, and 3 offer an initial start in building a taxonomy.

Research on such goals will help us broaden our understanding of expertise. In contrast, concern about the supposed incompetence of experts based on disagreements offers little opportunity for enhancing our understanding of expertise. Instead, the future of research on experts lies in other directions. Specifically, we should focus our efforts on analyses of relevance/irrelevance, tool usage, and domain differences.

## References

- Ashton, R. H. (1974). An experimental study of internal control judgments. *Journal of Accounting Research, 12*, 143-157.
- Boring, E. G. (1927). *A history of experimental psychology*. NY: Appleton-Century-Crofts.
- Edwards, W. (1983). Human cognitive capacities, representativeness, and ground rules for research. In Humphreys, P., Svenson, O., & Vari, A. (Eds.), *Analyzing and aiding decision processes*. Budapest: Akademiai Kiado.
- Einhorn, J. (1974). Expert judgment: Some necessary conditions and an example. *Journal of Applied Psychology, 59*, 562-571.
- Ettenson, R., Shanteau, J., & Krogstad, J. (1987). Expert judgment: Is more information better? *Psychological Reports, 60*, 227-238.
- Gaeth, G. J., & Shanteau, J. (1984). Reducing the influence of irrelevant information on experienced decision makers. *Organizational Behavior and Human Performance, 33*, 263-282.
- Goldberg, L. R., & Werts, C. E. (1966). The reliability of clinicians' judgments: A multitrait-multimethod approach. *Journal of Clinical Psychology, 30*, 199-206.
- Gardner, H. (1985). *The mind's new science: The history of the cognitive revolution*. NY: Basic Books.
- Gigerenzer, G. (1993). The superego, the ego, and the id in statistical reasoning, in Keren, G. & Lewis, C. (Eds.), *A handbook for data analysis in the behavioral sciences: Methodological issues*. Hillsdale, NJ: Erlbaum.
- Golde, R. A. (1969). *Can you be sure of your experts?* NY: Award Books.

Hamilton, R. E., & Wright, W. F. (1982). Internal control judgments and effects of experience: Replications and extensions. *Journal of Accounting Research*, 20, 756-765.

Hoffman, P., Slovic, P., & Rorer, L. (1968). An analysis of variance model for the assessment of configural cue utilization in clinical judgment. *Psychological Bulletin*, 69, 338-349.

Hughes, H. D. (1917). An interesting corn seed experiment. *The Iowa Agriculturalist*, 17, 424-425.

Jacavone, J., & Dostal, M. (1992). A descriptive study of nursing judgment in assessment and management of cardiac pain. *Advances in Nursing Science*, 15, 54-63.

Kahneman, D. (1991). Judgment and decision making: A personal view. *Psychological Science*, 2, 142-145.

Kida, T. (1980). An investigation into auditors' continuity and related qualification judgments. *Journal of Accounting Research*, 8, 506-523.

Klein, G. A., Orasanu, J., Calderwood, R., & Zsombok, C. E. (1993). *Decision making in action: Models and methods*. Norwood, NJ: Ablex Publishing Corp.

Lykken, D. T. (1979). The detection of deception. *Psychological Bulletin*, 80, 47-53.

Messier, W. F. (1983). The effect of experience and firm type on materiality/disclosure judgments. *Journal of Accounting Research*, 21, 611-618.

Mosier, K. L. (1997). Myths of expert decision making and automated decision aids. In C. Zsombok & G. Klein (Eds.), *Naturalistic decision making*. Hillsdale, NJ: Erlbaum.

Murphy, A. H., & Winkler, R. L. (1977). Can weather forecasters formulate reliable forecasts of precipitation and temperature? *National Weather Digest*, 2, 2-9.

Phelps, R. H. (1977). *Expert livestock judgment: A descriptive analysis of the development of expertise*. Unpublished doctoral dissertation. Manhattan: Kansas State University.

Phelps, R. H., & Shanteau, J. (1978). Livestock judges: How much information can an expert use? *Organizational Behavior and Human Performance*, *21*, 209-219.

Raskin, D. C., & Podlesny, J. A. (1979). Truth and deception: A reply to Lykken. *Psychological Bulletin*, *86*, 54-59.

Shanteau, J. (1989). Cognitive heuristics and biases in behavioral auditing: Review, comments, and observations. *Accounting, Organizations, and Society*, *14*, 165-177.

Shanteau, J. (1992a). Competence in experts: The role of task characteristics. *Organizational Behavior and Human Decision Processes*, *53*, 252-266.

Shanteau, J. (1992b). How much information does an expert use? Is it relevant? *Acta Psychologica*, *81*, 75-86.

Shanteau, J. (1999). Decision making by experts: The GNAHM effect. In Shanteau, J., Mellers, B., & Schum, D. (Eds.), *Decision science and technology: Reflections on the contributions of Ward Edwards*. Norwell, MA: Kluwer Academic Publishers.

Shanteau, J. (in press). Agricultural psychology. In W. E. Craighead & C. B. Nemeroff (Eds.), *Encyclopedia of Psychology and Neuroscience*. N.Y.: Wiley.

Slovic, P. (1969). Analyzing the expert judge: A descriptive study of a stockbroker's decision processes. *Journal of Applied Psychology*, *53*, 255-263.

Stewart, T. R., Roebber, P. J., & Bosart, L. F. (1997). The importance of the task in analyzing expert judgment. *Organizational Behavior and Human Decision Processes*, *69*, 205-219.

Trumbo, D., Adams, C., Milner, M., & Schipper, L. (1962). Reliability and accuracy in the inspection of hard red winter wheat. *Cereal Science Today*, *7*, 62-71.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*, 1124-1131.

Wallace, H. A. (1923). What is in the corn judge's mind? *Journal of the American Society of Agronomy*, 15, 300-304.

Yates, J. F. (1990). *Judgment and decision making*. Englewood Cliffs, NJ: Prentice-Hall.

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**Table 1**

Progression of Domains from High to Low Performance

Highest Levels of Performance.....		.....Lowest Levels of Performance	
<i>Aided Decisions</i>	<i>Competent</i>	<i>Restricted</i>	<i>Random</i>
_____	_____	_____	_____
Weather Forecasters	Chess Masters	Clinical Psychologists	Polygraphers
Astronomers	Livestock Judges	Parole Officers	Managers
Test Pilots	Grain Inspectors	Psychiatrists	Stock Forecasters
Insurance Analysts	Photo Interpreters	Student Admissions	Parole Officers
Physicists	Soil Judges	Intelligence Analysts	Court Judges
Nurses	Nurses	Nurses	
Physicians	Physicians	Physicians	
Auditors	Auditors	Auditors	

*Note: The space in the table separates domains (top) where the competence of experts can be classified into one category from domains (bottom) where the evidence of competence is varied. For example, various studies have reported that the behavior of auditors ranges from moderately to extremely competent.*

**Table 2**Reliability (Consensus) Values for Experts

Highest Levels of Performance.....		.....Lowest Levels of Performance	
<i>Aided Decisions</i>	<i>Competent</i>	<i>Restricted</i>	<i>Random</i>
_____	_____	_____	_____
Weather Forecasters	Livestock Judges	Clinical Psychologists	Stockbrokers
$r = .95$	$r = .50$	$r = .40$	$r = .32$
Auditors	Grain Inspectors	Pathologists	Polygraphers
$r = .76$	$r = .60$	$r = .55$	$r = .33$

Note: The values cited in this table were drawn from the following studies (from left to right): Stewart, Roebber & Bosart (1997); Phelps & Shanteau (1978); Goldberg & Werts (1966); Slovic (1969); Kida (1980); Trumbo, Adams, Milner & Schipper (1962); Einhorn (1974); and Lykken (1979).

**Table 3**Reliability (Internal Consistency) Values

Highest Levels of Performance.....Lowest Levels of Performance

<i>Aided Decisions</i>	<i>Competent</i>	<i>Restricted</i>	<i>Random</i>
_____	_____	_____	_____
Weather Forecasters $r = .98$	Livestock Judges $r = .96$	Clinical Psychologists $r = .44$	Stockbrokers $r = <.40$
Auditors $r = .90$	Grain Inspectors $r = .62$	Pathologists $r = .50$	Polygraphers $r = .91$

*Note:* The values cited in this table were drawn from the following studies (from left to right): Stewart, Roebber & Bosart (1997); Phelps & Shanteau (1978); Goldberg & Werts (1966); Slovic (1969); Kida (1980); Trumbo, Adams, Milner & Schipper (1962); Einhorn (1974); and Raskin & Podlesny (1979).

## **Biographical Sketch**

James Shanteau is Professor of Psychology at Kansas State University, where he is Director of the Institute for Social and Behavioral Research. He has held visiting positions at the National Science Foundation, as well as the Universities of Michigan, Oregon, Colorado, and Cornell. He is Co-Founder and Past President of the Society for Research on Judgment and Decision Making. He is a Fellow of the American Psychological Association and the American Psychological Society. His research interests include decision making by domain experts, models of judgment and decision making, consumer health-care choices, and quantitative models of behavior.