

**The 3 C's of Expert Audit Judgment:  
Creativity, Confidence, and Communication**

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## Introduction

Based on research in agriculture and management as well as auditing, Shanteau (1987) identified 14 psychological characteristics of expert decision makers. These characteristics range from perceptual skill and ability to simplify complexities to adaptiveness and high content knowledge; summary descriptions of the characteristics appear in Table 1. This paper is intended to extend prior work in three directions.

First, the characteristics originally were intended as a generic description for experts of all types. It is clear, however, that some characteristics apply more to one profession than another. Three characteristics – creativity, confidence, and communication – appear to have particular significance for auditing and accounting. The primary purpose of this paper is to explore implications and consequences of these three characteristics.

Second, the characteristics were derived from a combination of formal studies of experts and informal observations made during these studies. There have not been, however, any empirical analyses of how laypeople view these characteristics. Therefore, the second purpose of this paper is to report how subjects rank the importance of the characteristics for various professions. Of particular interest are the rankings of creativity, communication, and creativity for accountants.

Third, there has been considerable interest recently in the development of expert systems and artificial intelligence. Although the potential applications of such systems have been widely discussed, the problems and limitations have received less attention. A final purpose of this paper is to explore the implications of creativity, confidence, and communication for the development and

implementation of expert systems in auditing.

## The 3 C's

In research on accountants and auditors (Ettenson, Shanteau, & Krogstad, 1987; Harrison & Shanteau, 1989; Krogstad, Ettenson, & Shanteau, 1984; Krogstad, Streit, Ettenson, & Shanteau, 1986; Shanteau, 1987, in press; Shanteau & Harrison, 1988), several psychological characteristics of experts have emerged consistently. Three of these characteristics – creativity, confidence, and communication – are particularly important.

**Creativity.** Mayer (1983) defines creativity as a "cognitive activity that results in novel solutions for a problem ... (i.e.) generating new ideas for a given situation." It is important to emphasize that creativity is not the same as intelligence (Getzels & Jackson, 1963). Creativity can be increased through mental exercises and training (Adams, 1986), for example, whereas intelligence is viewed as a more-or-less fixed individual difference (Mayer, 1983).

Experts are capable of being more creative in modifying old decision strategies or in finding new strategies. When presented with atypical stimuli or novel situations, experts are better able to generate appropriate decision-making rules. Audit partners, for instance, show considerable flexibility in adjusting their decision strategies to specific situations (Ettenson, 1984). Novices, on the other hand, tend to be inflexible and uncreative. A well-regarded instructor of accounting observed that one of his greatest difficulties in teaching students arises from their "rigidity in applying the same solutions to all problems."

Often, experts are able to suggest scenarios or frameworks for reinterpreting difficult decisions in unexpected ways. One experienced auditor pointed out, when confronted

with an apparent error, that he helped to establish the standards in cases like that and that the standards may need to be changed. In comparison, novices know what they know, but seem unable to think much beyond that.

**Confidence.** A common characteristic observed in experts is that they show strong outward confidence in their decision making ability. When presented with evidence of inconsistent decisions, experts will usually identify the shortcoming as lying outside of themselves. Although this might be viewed as intellectual arrogance, it generally comes across as a highly-developed faith in one's own abilities. Experts believe in themselves and their capacity to solve most any problem in their area.

Many observers have commented that self-confident experts appear to be egotistical and self-important. Despite the negative tone of this description, such traits can serve two important purposes. First, these traits may help experts handle the responsibility of making major decisions; without strong self-confidence, it would be difficult for anyone to continue making effective decisions after a bad outcome, such as the loss of a patient. Second, it is also true that without the outward signs that go with extreme self-confidence, clients may be less willing to hire or listen to the expert; of course, an expert without clients cannot function.

At the same time, some novice decision makers exhibit an unwarranted false confidence (Cox, 1988). Since they want to be seen as decisive, many novices aggressively take on all decision problems with an impulsive impatience.<sup>1</sup> At the other extreme, there are novices who are so fearful of making a mistake that they avoid taking a stand on any decision (Dino, 1984). Experts generally fall in between these two extremes by knowing what problems to tackle and what not to, and

by approaching decision making in a positive fashion (Corcoran, 1988a).

**Communication.** In a previous paper at this conference (Shanteau, 1986), an experience that occurred in a meeting with auditors at a big-eight accounting firm was described: "When the managing partner entered the room, everyone knew it. There was a kind of aura which surrounded him." Top experts do come across as different from non-experts in ways that are not well understood – a mystique, which goes along with being an expert.

Regardless of how good a decision maker actually is, their livelihood depends on the ability to convince others of their expertise. As one manager put it, "an expert is someone who can persuade others that he (she) is an expert" (Dino & Shanteau, 1984). In fact, managers who are unable to communicate their expertise often are viewed as inferior decision makers. This can be self-fulfilling, of course, in that poor communicators are not given the chance to make decisions and so are unable to show their skills.

One common difficulty with communication, according to Corcoran (1988b), is that frequently we think we are better communicators than we are. As anyone who has been an instructor knows, what students learn often is not what is intended. Nonetheless, experts must be effective in communicating not only their own expertise, but also their advice about problem solutions.

### **Importance of Characteristics**

Previous discussions of expert characteristics (Shanteau, 1984, 1987, 1988) have been based on observations, interviews, and conjectures from studies originally conducted for other purposes. However, there has not been any experimental research of how laypeople or professionals view these character-

istics. This led Peters and Shanteau (1989) to ask undergraduates to rank the importance of the characteristics for various professions, and Shanteau and Harrison (1989) to run a parallel study with accounting students as subjects.

**Research Studies.** Peters and Shanteau had 63 undergraduates evaluate six types of experts: Accountant, Auto Mechanic, Doctor, Personnel Manager, Nurse, and Truck Driver. For each occupation, subjects were given a brief descriptions of the duties and responsibilities of a skilled expert.<sup>2</sup> They were then asked to evaluate the importance of 13 expert characteristics plus 7 distracters / fillers listed in Table 1. The 20 characteristics were presented alphabetically.

Shanteau and Harrison conducted a similar study with 11 accounting students as subjects. Because of time considerations, only the occupations of Accountant, Nurse, and Doctor were evaluated.

A categorical ranking procedure was used (modified from Guilford, 1954). Subjects assigned a value of 1 to the four most important characteristics, 2 to the next four, and so on, with a value of 5 given to the four least important. This simplified the ranking procedure and prevented subjects from saying that everything was equally important (see Brien, Haverfield, & Shanteau, 1983).

**Results: Undergraduates:** The findings for the undergraduates are given in Table 2. The characteristics are listed in the left column, the mean importance values for Accountant are in the next column, with the Nurse and Doctor results listed on the right; the ranks appear in parentheses.

The highest ranked characteristics provide the following picture of an Accountant: a knowledgeable, experienced, methodical perfectionist who knows what is relevant.

The lowest rankings imply that appearance, warmth, making exceptions, and being energetic / inquisitive are not important for Accountants. Interestingly, creativity and confidence are both ranked in the bottom six.

Experience was most important for Nurse and Doctor, with current knowledge, assuming responsibility, and stress tolerance also highly ranked. Least important were appearance, creativity, being inquisitive and making exceptions. Self-confidence was highly ranked for Doctor, while being warm and friendly was highly ranked for Nurse.

Comparing Accountant with the medical professions produced several notable contrasts. Being a perfectionist and methodical are highly ranked for Accountant, but not for Doctor/Nurse. In contrast, assuming responsibility and decisiveness were important for Doctor/Nurse, but not for Accountant.

**Results: Accountants.** The results for rankings by accounting students appear in Table 3. The top characteristics for an Accountant are current knowledge, knowing what' s relevant, assuming responsibility, and being a perfectionist. The lowest rankings are for creativity, making exceptions, physical appearance, and being warm and friendly.

The accounting subjects' data for Nurses and Doctor show that knowledge, experience, and responsibility are viewed as important. In contrast, physical characteristics, creativity, ability to simplify, and making exceptions were given low rankings.

A comparison of rankings by undergraduates and accountants produced several differences. For Accountants, being perceptive and assuming responsibility was seen as more important by accounting students; being methodical, problem selection, and experience were seen as less important. With a few exceptions, the rankings for Nurses /

Doctors by accounting students were similar to those of undergraduates.

**Discussion.** Four findings deserve emphasis. First, both undergraduates and accounting students ranked knowledge, assuming responsibility, and experience as important for all three professions. Although not surprising, this does suggest that what an expert knows is seen as essential. It also implies that accounting and the medical professions are seen as requiring similar characteristics.

Second, the findings show that laypeople view accountants as methodical perfectionist who are knowledgeable and experienced decision makers: in a phrase, "competent, but dull." The perception by accounting subjects, on the other hand, is that accountants are knowledgeable, responsible, and able decision maker who are perceptive and adaptable, i.e., "skilled and capable."

Third, the picture of medical professionals, for both undergraduates and accounting students, is that they are knowledgeable and responsible decision makers who are experienced, adaptive, and decisive. In short, they are seen as "take charge" experts.

Fourth, the 3 C' s generally received middle to low rankings. Without exception, creativity was at or near the bottom of the list. Self-confidence and communication skills were intermediate in importance. Some of the distracter characteristics, such as decisiveness, were higher ranked than the 3 C' s. This suggests that there may be considerable disparity between the naive or novice view of experts and our view of experts.<sup>3</sup> An interesting question remains of how experts view the characteristics of other experts.

### Implications for Expert Systems

Using techniques from artificial intelligence, expert systems are increasingly

being proposed to aid or even replace skilled decision makers. According to Kolodner (1984), the goal is to build systems which "contain all or most of the compiled knowledge an expert has." Some argue that eventually expert systems will be a "replacement for humans" (Cebzynski, 1987).

**Expert Systems vs. the Experts.** Getting experts to interact with these systems often has proved difficult (Michie, 1982). There are several potentially valuable expert systems, such as MYCIN, which are either unused or misused by the people the systems were designed to help (Ham, 1984). A recent example involves the downing of the Iranian airline by USS Vincennes; combat personnel apparently failed to make proper use of the advanced radar systems (Black, 1988; Slovic, 1988). Other examples involve extended efforts to develop expert systems, which have been abandoned later, in part because of questions about the cooperativeness of experts (Rose, 1988).

At the same time, there has been debate whether computer systems can mimic experts successfully (e.g., Graubard, 1988). Most investigators see tremendous potential for expert systems (Barrett & Beerel, 1988; Slatter, 1987), although others question whether that potential can be realized (Dreyfus & Dreyfus, 1986; Haugeland, 1985).

**Necessary vs. Sufficient Conditions.** The present analyses of experts may contribute to a greater understanding of when and where expert systems are likely to be useful. Domain knowledge and experience are clearly a necessary condition for expertise; knowing the facts and having relevant experience are essential for any expert (Naylor, 1987). Moreover as Peters and Shanteau (1989) demonstrate, knowledge and experience are viewed by laypeople as the most important characteristics of experts.

Nonetheless, knowledge is not sufficient for establishing expertise. There is more, something that the writer Tom Wolfe (1979) described as the "Right Stuff." According to Wolfe, "the idea was to prove...that you might be able to join the special few at the very top, that elite who had the capacity to bring tears to men' s eyes, the very Brotherhood of the Right Stuff itself."

What is the "Right Stuff?" Chuck Yeager (1985) says: "The question annoys me because it implies that a guy who has ' the right stuff' was born that way....All I know is I worked my tail off to learn how to fly, and worked at it all the way." In the end, both Wolfe and Yeager leave the question of defining "Right Stuff" unanswered.

**The 3 C' s in Expert Systems** We believe that the 3 C' s of creativity, confidence, and communication are major components of the "right stuff" in accounting. Our contention is that without the 3 C' s, an auditor (or a pilot) could not function and would not be recognized as an expert. Others have arrived at similar conclusions from different perspectives (Dreyfus & Dreyfus, 1986).

Unfortunately, prior analyses of expertise by cognitive psychologists have failed to recognize the importance of the 3 C' s (Anderson, 1981; Chi, Glaser, & Farr, 1988). By concentrating on knowledge and experience (or association networks), other aspects of expertise have been overlooked. It is worth noting that psychologists have focused on the same characteristics (knowledge and experience) emphasized by the lay public in Table 2.

Can an expert system be built that incorporates the 3 C' s? Not enough is known now to answer this question. But the following, at least, would be necessary to construct a 3-C expert system. First, expertise must be looked at from the perspective of the ex-

perts, not as something to be defined within the constraints of available hardware and software.<sup>4</sup> Second, experts cannot be expected to explain everything they do; thus, verbal protocols may be inefficient (Hoffman, 1987) and even misleading in tapping expertise. Third, more emphasis should be placed on the psychology of experts when constructing expert systems; creativity, confidence, and communication must be incorporated into these systems, not removed from them.

**Concluding Comments.** In an insightful book, Golde (1970) states that "we seem to expect too much and the wrong things of our experts." We expect that experts will "know just what' s wrong and exactly what to do about it," i.e., that experts can find the right answers. The power of professionals, according to Golde, is "much less than we believe....miracles are rare and difficult problems cannot be made simply to disappear." Although "an expert does sometimes make decisions, his role is usually much more that of an advisor." A more realistic view of what an expert can do is the following:

He' ll attempt to uncover the real problem, which is probably different and more complex than I imagined. He ought to develop some alternative courses of action and outline their relative merits or risks. He won' t be able to do everything himself, but he' ll let me know the kinds of decisions or actions I must take. (Golde, 1970).

These comments about the actual role of experts should be kept in mind in any discussion of experts and expert systems.

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## Footnotes

<sup>1</sup> This is not the same as what Lichtenstein (personal communication, 1987) has labeled "pseudo expertise." She was referring to the ability of "experts" in areas such as astrology or palm reading to take on the behavior and appearance of real experts. It remains an in-

teresting question of how a consumer can tell a pseudo expert from a real one.

<sup>2</sup> The specific duties were C.P.A. Tax Specialist for Accountant, Diagnostic Specialist for Auto Mechanic, Trauma Care Specialist for Doctor, Human Resource Specialist for Personnel Manager, Post-Surgery Specialist for R.N., and Long Distance Freight Specialist for Truck Driver.

<sup>3</sup> The distracters originally were intended as irrelevant filler characteristics. Several of the distracters, however, turned out to be surprisingly important. This indicates either that the lay perception of expertise is quite

different than our view, or that some distracters may describe previously unappreciated characteristics of experts.

<sup>4</sup> The issue is parallel to the debate over the development of mathematical models of behavior. Often models are constrained by what is feasible mathematically, rather than by what is reasonable psychologically. In the same way, the technology of computer design apparently has set limits for what aspects of expertise can be incorporated into an expert system.

**Table 1a****Psychological Characteristics of Expert Decision Makers\*****Cognitive / Knowledge Characteristics**


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(1)	<u>Current Knowledge</u>	Experts have an extensive knowledge base. They make a special effort to keep up with the current facts, trends, and developments.
(2)	<u>Creativity</u>	Experts can find novel or unique solutions to difficult problems. They are capable of generating new approaches to established problems as necessary.
(3)	<u>Perceptive</u>	Experts are able to extract information from a problem that others cannot see. Their decision-making ability is enhanced by insightful recognition and evaluation of confusing situations.
(4)	<u>Knows What Is Relevant</u>	Experts, based on experience, can readily distinguish relevant from irrelevant information in a problem. They utilize only what is relevant; they ignore what is not.
(5)	<u>Simplification</u>	Experts know how to use a divide-and-conquer approach with complex problems. They work on parts to get a better understanding of a complex problem.
(6)	<u>Makes Exceptions</u>	Experts know when to follow established decision strategies and when not to. They don' t have just one way to solve problems.

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(A)	<u>Inquisitive</u>	Experts exhibit a high degree of inquisitiveness in problem solving situations. They have a tendency to work on problems just out of curiosity.
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**Table 1b****Psychological Characteristics of Expert Decision Makers (Continued)\*****Personality / Individual-Difference Characteristics**


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(7)	<u>Self-Confidence</u>	Experts have a strong belief in their ability to make good decisions. They are calm and self-assured while making decisions.
(8)	<u>Adaptability</u>	Experts adjust their decision-making strategies to fit the current situation. They are responsive to changes in conditions of the on-going problem situation.
(9)	<u>Experience</u>	Experts use past experience to make decisions more-or-less automatically. Their background and experience produces decisions without obvious effort.
(10)	<u>Stress Tolerance</u>	Experts are able to make decisions under high stress situations. They continue to be effective problem solvers even as conditions progressively worsen because of high levels of pressure.

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(B)	<u>Methodical</u>	Experts approach each new problem situation very systematically with one thought-out plan of attack. They use a set way to examine problems and carefully proceed step-by-step to make a decision.
(C)	<u>Perfectionist</u>	Experts attempt to achieve high levels of decision making by seeking the best of all possible strategies. They keep working to find the absolute best solution for the problem.
(D)	<u>Decisiveness</u>	Experts make decisions quickly, clearly, and emphatically. They do <u>not</u> bother with a detailed analysis of the problem situation.

**Table 1c****Psychological Characteristics of Expert Decision Makers (Continued)\*****Presentation / Image Characteristics**


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(11)	<u>Communicates</u> <u>Expertise</u>	Experts can convince others that they have specialized knowledge. They can effectively communicate their ability to make decisions to others.
(12)	<u>Problem</u> <u>Selectivity</u>	Experts use foresight and planning in selecting which problems to work on and which not. They tackle those problems that they can effectively handle or resolve.
(13)	<u>Assumes</u> <u>Responsibility</u>	Experts accept responsibility for the outcomes of decisions, successful or unsuccessful. They are willing to stand behind their decisions.

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(E)	<u>Physical</u> <u>Characteristics</u>	Experts present the outward image of someone who is good at solving problems. They have the style and physical appearance of someone who makes good decisions.
(F)	<u>Energetic</u>	Experts are capable of investing large amounts of energy into problem solving. They give the appearance of going the extra mile when making decisions.
(G)	<u>Warm and</u> <u>Friendly</u>	They get along well with people, even in difficult decision-making tasks. They use personality to smooth things over and appear more convincing when making decisions.

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\* These descriptions were adapted from Shanteau (1987) by Peters and Shanteau (1988). The characteristics identified by letters were intended as fillers / distracters.

**Table 2****Importance Rankings of Expert Characteristics by Undergraduates**

<b>Expert</b>	<b>Accountant</b>		<b>Nurse</b>		<b>Doctor</b>	
<b>Characteristic</b>	<b>Mean Rank</b>		<b>Mean Rank</b>		<b>Mean Rank</b>	
Current Knowledge	1.70	(1)	1.95	(3)	1.87	(2)
Experience	1.84	(2)	1.62	(1)	1.43	(1)
Perfectionist*	2.06	(3)	3.98	(16)	2.97	(11)
Knows What is Relevant	2.21	(4)	2.67	(9)	2.52	(8)
Methodical*	2.32	(5)	3.59	(13)	3.54	(14)
Assumes Responsibility	2.33	(6)	1.86	(2)	1.92	(3)
Communicates Expertise	2.60	(7)	2.76	(10)	2.68	(9)
Stress Tolerance	2.76	(8)	2.33	(5)	1.94	(4)
Adaptability	2.81	(9)	2.33	(6)	2.49	(6)
Simplification	2.98	(10)	4.14	(18)	3.90	(15)
Decisiveness*	2.03	(11)	2.64	(7)	2.03	(5)
Problem Selection	3.10	(12)	3.87	(15)	3.44	(13)
Perceptive	3.14	(13)	2.56	(7)	2.75	(10)
Inquisitive*	3.27	(14)	4.10	(17)	4.05	(17)
Self-Confident	3.29	(15)	2.68	(11)	2.49	(6)
Energetic*	3.63	(16)	2.68	(12)	3.35	(12)
Makes Exceptions	3.91	(17)	3.73	(14)	3.91	(16)
Creativity	4.03	(18)	4.27	(19)	4.35	(19)
Warm and Friendly*	4.29	(19)	2.01	(4)	4.25	(18)
Physical Characteristics*	4.75	(20)	4.48	(20)	4.71	(20)

\* Distracter / filler characteristics

**Table 3****Importance Rankings of Expert Characteristics by Accountants**

<b>Expert</b>	<b>Accountant</b>		<b>Nurse</b>		<b>Doctor</b>	
<b>Characteristic</b>	<b>Mean Rank</b>		<b>Mean Rank</b>		<b>Mean Rank</b>	
Current Knowledge	1.00	(1)	1.91	(4)	1.46	(1)
Knows What is Relevant	1.64	(2)	2.91	(11)	2.73	(8)
Assumes Responsibility	1.82	(3)	1.73	(2)	2.18	(6)
Perfectionist*	1.91	(4)	4.02	(17)	3.82	(15)
Experience	2.18	(5)	1.91	(4)	1.55	(3)
Perceptive	2.55	(6)	2.18	(6)	2.36	(7)
Adaptability	2.55	(7)	1.46	(1)	1.82	(5)
Decisiveness*	2.64	(8)	2.36	(8)	1.46	(1)
Communicates Expertise	2.73	(9)	3.36	(12)	3.55	(12)
Stress Tolerance	2.91	(10)	2.45	(9)	1.73	(4)
Inquisitive*	3.00	(11)	3.73	(13)	4.09	(18)
Methodical*	3.09	(12)	4.00	(15)	3.73	(14)
Self-Confident	3.45	(13)	2.27	(7)	2.82	(9)
Energetic*	3.73	(14)	2.73	(10)	3.27	(11)
Simplification	3.73	(15)	4.18	(18)	4.00	(16)
Problem Selection	3.82	(16)	4.00	(15)	3.00	(10)
Warm and Friendly*	4.00	(17)	1.82	(3)	3.55	(12)
Physical Characteristics*	4.09	(18)	4.18	(18)	4.46	(20)
Makes Exceptions	4.36	(19)	3.91	(14)	4.00	(16)
Creativity	4.46	(20)	4.18	(18)	4.27	(19)

\* Distracter / filler characteristics