



Do Interactive Theories Really Explain Public Sector Managerial Decision-Making?

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Abstract

"The facility to predict decision-making performance of individual managers is of significance, not only for executives and scientists, but for society itself" (Streufert & Swezey, 1986). Some managers make good decisions in complex environments, others do not. Recent criticisms of public sector managers suggest that their capacity to make decisions may be impeded by an increasingly complex working environment, a product of public sector reform.

Despite decades of research in this area, behavioural prescriptions for success or failure in decision-making have provided inconsistent results, especially when attempting to transfer those prescriptions from one context to another. If so, it may be that individual decision-making depends upon a specific context. However, it may not be the objective nature of the environment in which decisions are made. It may be that individual decision-making performance is more influenced by the individual manager's subjective interpretation of the environment. That subjective interpretation may in turn depend upon the individual's integrative complexity (information processing characteristics) and other self-regulatory mechanisms.

Keywords: Decision making, Cognition, Public sector, Middle managers

1. Introduction

This introduction briefly charts theories, developed over more than three decades, about relationships amongst influences on managerial decision-making within environments of varying complexity. Whilst doing so, the main issues are identified and summarised for later review.

If some managers make good decisions in working environments of varying complexity, yet others do not, examining the underlying reasons for these differences may provide significant benefits to organisations and their stakeholders. The focus of this study is to examine cognitive characteristics and decision-making effectiveness of public sector managers within differentially complex environments, because the stakeholders of the public sector include the country's population and its subsequent generations.

Criticisms in the press during the last decade (Breusch, 2000; Hepworth, 1999) suggest that the capacity of public sector managers to make decisions may be impeded by their increasingly complex working environments. Breusch (2000) argues that the complexity of their working situations and their cognitive capabilities may not be well matched. This increasing workplace complexity is reported to be a product of public sector reform (Wood, 1997; Clark, 1997). These reforms have included stringent economic rationalism; mandates that demand customer orientation; and the decentralisation of traditional managerial authority. This era of public sector reform has also included a reassessment of problems and their frames of reference; a revision of operating procedures; and sometimes a radical reformulation of organisational objectives.

Public sector environments are differentiated from others by:

The political environment of the public sector which structures the role of public sector management;

Community related programmes rather than profit motives;

Recognition of interaction between different public sector activities;

Definitions of efficiency, effectiveness and productivity that are exclusively related to the equity and accountability of public sector activities (Savas, 1990).

Anecdotal evidence suggests that public sector organisations have different cultures from those in the private sector (Weller et al., 1993; O'Malley, 1995). If so, any transfer of research conclusions about decision-making from the private sector to the public sector, with those environmental contextual differences, may be invalid, (Hogarth, 1981; Rowe, 1989; Hickson et al, 1986; Cook, 1990).

There are conflicting issues here. Although historically, public organisations had high vertical, horizontal and spatial complexity, people working within them had highly formalised jobs and limited decision-making scope (Weller et al, 1993; Savas, 1990).

Because organisational outcomes are achieved through the concerted efforts of others, managerial decisions are concerned with how to use human talent and how to guide and motivate human effort. But, the reductions in hierarchical status in the Public Sector means that managers do not enjoy traditional unquestioning structural authority but need to adopt alternative and more complex social strategies to achieve work performance through their employee teams. Crowe (1997) cites that one in four managers reports suffering stress because of excessive information load at work, the very definition of environmental complexity. In an era of government outsourcing, where, according to Breusch, (2000), government officers are asked to undertake functions well beyond their experience, qualifications and skills. This results in problems for decision-makers being frequently perceived as ambiguous and complex. "The lessons of these disasters are most likely to be ignored until enough of them occur to awaken political interest in public sector competency" (Breusch, 2000, p17).

To understand how managers make good decisions, researchers have examined what successful executives do, what decisions they make or do not make, and what they do differently compared with managers and organisations that fail. These studies of managerial decision-making have centred on the content of managerial thought (Peters & Waterman, 1982), rather than the processes by which the content came about (Streufert & Swezey, 1986). But if the performance of individual decision-making depends upon its specific context, it may not be the objective nature of the environment that contributes to differences in individual decision-making. It may be the individual manager's subjective interpretation of the environment. This is an argument for research into the processes by which decisions come about.

From an extensive range of alternatives, an emerging trend in the literature includes theories that individual information processing is primarily based on two main cognitive functions, differentiation and integration (Stabell, 1978; Streufert, 1986; Tetlock & Suedfield, 1988; Mandel, Axelrod & Lehman, 1993; Walker & Watson, 1994; Guttieri, Wallace & Suedfield, 1995; Streufert & Satish, 1997). Differentiation reflects the degree to which people recognise different aspects of an idea or problem. Undifferentiated thought, reflecting cognitive simplicity, relies on simple evaluative rules. Integration involves drawing conceptual connections between differentiated aspects of an issue so they can be segregated into categories. An integratively complex thinker might, for example, in addition to identifying a number of potential aspects of a problem, describe how such factors have interacted over time to produce the problem.

This approach, focussing on mutual influences between person and environment, suggests that for optimal productivity, individuals should be compatible with their environments. For example, early researchers in this field, Streufert & Schroder (1965), concluded that decision-making performance reaches an optimal level when an individual's cognitive capability matches the complexity of their environment. More than two decades later, Jaques' (1989) stratified systems theory also argues that for optimal productivity, organisations should be designed in terms of person-environment fit based on individual cognitive capacity at every level of the organisation. These "Person-fit" researchers (Jaques, 1989; Meijer, 1996; Meijer, Muijtens & van der Vleuten, 1999) argue that individual decision-making performance reaches an optimal level when the decision-maker's cognitive complexity matches the complexity of the decision environment.

A contrasting school of cognitive capability theories argue that that more cognitively complex managers have a repertoire of styles and are able to make more effective decisions, compared with less complex managers, within all levels of environmental complexity up to the limit of their cognitive capacity (Streufert & Satish, 1997).

If individual information processing characteristics are a determinant of decision-making performance, different managers may then exhibit similar decision-making performance within differentially complex environments. It also follows that a manager with high information processing capacity (integrative complexity) and another with low information processing capacity may demonstrate similar decision-making performance within an environment of low complexity because neither is overly challenged by the information load.

However, individual managers may exhibit different optimal decision-making performance within environments of different complexity. For example, if the same two managers, one of high and one of low information processing capacity are making decisions within a highly complex environment, the manager with high information processing capacity (integrative complexity) is expected to outperform the manager with low information processing capacity. The latter may be overwhelmed by excessive information load and not have the capacity to cope, whereas the more highly

integratively complex manager would be making decisions with a more comfortable environment, one that was compatible with their information processing capacity.

Unfortunately, the mechanisms and outcomes of managerial decision-making do not lend themselves readily to experimental analysis in real organisational settings. There are usually too many interacting factors that are difficult to identify and over which it is even more difficult to exercise experimental control (Wood & Bandura, 1989). This study addresses these weaknesses by a novel design that compares measures of individual cognition with decision-making performance within a computerised workplace simulation and varying levels of organisational complexity.

Review of the literature suggests that integrative complexity may best be measured through self-elicited constructs, preferably related to elements of a relevant environment (Hinkle, 1965; Landfield, 1980; Chambers, 1985a). These self-elicited constructs are seen as a reflection of the individual decision-maker's perception of the environment, including the available resources that may impact upon decision-making. This study includes self-elicited constructs as an integral part of the main experiment.

In this experiment, the decision-making performance of public sector managers within a computerised workplace simulation is examined in relation to the previously discussed interactive theories, "person-fit" and cognitive capability.

1.1 Research Question

Do public sector managers whose integrative complexity levels are more closely matched to the complexity of their work environments make more effective decisions than managers whose integrative complexity levels are less closely matched to the complexity of their working environments?

This question focuses on an intuitively comfortable notion that individuals of higher order cognitive structure and processes will make better decisions within more complex situations (Streufert and Swezey, 1986).

1.2 Research approach

In order to examine relationships between information processing and decision-making performance within environments of varying complexity, consistent and manipulable measures of environmental complexity are required. Advances in this complex field have been achieved by experimental analyses of decision-making in simulated and often computerised organisational environments that allow systematic variation of theoretically relevant factors whilst controlling for naturalistic influences (Wood & Bandura, 1989).

Simulations or research "games" can provide a compromise balance of realism for the subject and control for the researcher (Wood & Bailey, 1985). Part of this compromise, though, is that games typically fail to provide many of the responses that an individual decision-maker experiences from choices at work. To address these arguments, organisational simulations have been developed with complexity levels more closely matching those of naturalistic environments (Jin et al, 1995; Vakilzadian, 1995; Barton & Schruben, 1994). This study replicates the conditions of a 1999 version of "The Furniture Factory" (Wood & Bailey, 1985) within three different levels of environmental complexity of a simulated decision-making exercise. Subjects' decision-making performance is provided as a continual feedback over twelve (simulated one-day) trials and is automatically recorded as a percentage of 100% benchmarked target. In this study, a "game" simulates a novel and complex decision-making organisational environment within three pre-programmed levels of complexity.

The simulation addresses both quantitative and qualitative aspects of decision-making including the opportunity to evaluate and refine situational options like choice of employees, motivation tools, feedback to employees, and goals to set individual employees. The experimental design reduces the effects of presenting problem situations in different ways by standardising the information environment and its mode of presentation.

2. Results

The integrative complexity levels of the sample of public sector managers was $\bar{x} = 8.84$, (S.D.2.13, n=203) compared with $\bar{x} = 11.79$, (S.D = 2.13, n=34) by Chambers & Grice (1986), in a comparable, though statistically not significant, study of 6x6 matrix implications grid design. A t-test shows that the mean integrative complexity level of the subject group was significantly lower than in Chambers & Grice's (1986) study ($t = 19.7$, $df1, 202$, $p < .001$, 2-tailed).

Table 1 (attached on page 20). tabulates the raw measures from the decision making simulation.

The distribution of decision-making performance across all levels of environmental complexity of this sample was lower than expected. Although no directly comparable studies are available from the literature, the decision-making performance of this sample overall was $\bar{x} = 80.5\%$, (S.D.=5.0, n = 203), significantly less than Wood & Bailey's (1985) 100% decision-making standard within the computer simulated organisation ($t = -55.7$, $df1/202$, $p < .001$, 2-tailed). Repeated measures t-tests also showed that the decision-making performance of all subjects (n=203) within each of the three levels of the environmental complexity conditions of the simulation was significantly lower than Wood & Bailey's

(1985) decision-making standard. (In Low EC, $t=-27.1$, in Medium EC, $t=-26.7$, in High EC $t=-50.5$. All df 1,202, $p<.001$ 2-tailed).

This result provides significant support that integrative complexity is positively related to decision-making performance overall, that is, across all levels of environmental complexity. This initial result shows that more highly cognitively complex subjects outperformed those of lesser complexity regardless of the level of environmental complexity. This initial result is consistent with Streufert & Satish's (1997) cognitive capability theory where more cognitively complex managers outperform those less cognitively complex managers, by virtue of a repertoire of adaptive styles to suit all levels of environmental complexity.

Although relationships between integrative complexity and the decision-making performance of this sample of subject managers within unrestricted situational complexity provides an answer to the research question, the results may mask differences in relationships between different levels of subjects' integrative complexity and their decision-making performance. Dividing subjects into three arithmetically equal groups of rank ordered high, medium, and low integrative complexity scores provides increased insight into relationships between individual levels of integrative complexity and their decision-making performance within unrestricted situational complexity.

2.1 Performance of High IC managers overall

The group of high integratively complex managers with integrative complexity (IC) scores of $\bar{x} = 11.2$, (S.D. = 1.07, $n=68$) recorded decision-making performance at $\bar{x} = 83.44\%$ (S.D. = 3.5, $n=68$). A Pearson correlation of $r = .243$ ($n=68$, $p = .023$, 1-tailed) showed a weak yet significant correlation between subjects' IC scores and their decision-making performance when the level of environmental complexity is ignored. This performance was significantly higher ($t = 22.6$, $df1, 67$, $p<.001$, 2-tailed) than the mean score for all subjects within unrestricted environmental complexity at $\bar{x} = 80.5\%$, (S.D = 4.98, $n=203$).

2.2 Performance of Medium IC managers overall

The medium integrative complexity group recorded integrative scores (IC) of $\bar{x} = 8.7$, (S.D. = 0.61, $n=68$). A Pearson correlation of $r = 0.280$ ($n=68$, $p<.01$, 1-tailed) provides modest support for the hypothesis, that within a group of medium integrative complexity subjects, their IC relates positively to decision-making performance when there is no restriction on environmental complexity. Decision-making performance achieved by this medium integrative complexity group was $\bar{x} = 80.2\%$, (S.D. = 4.52, $n=68$), similar to $\bar{x} = 80.5\%$, (S.D. = 4.98, $n=203$) for all subjects within unrestricted environmental complexity.

2.3 Performance of Low IC managers overall

The group of subjects with lowest integrative complexity (IC) scores, $\bar{x} = 6.58$, (S.D. = 1.20, $n=68$), achieved a decision-making performance of $\bar{x} = 76.9\%$ (S.D. = 4.7, $n=68$). The low integrative complexity group's decision-making performance was significantly lower than for all subjects, $\bar{x} = 80.5\%$ (S.D. = 4.98, $n=203$) ($t = -6.25$, $df1, 67$, $p<.001$, 2-tailed).

A Pearson correlation of $r = 0.481$ ($n = 68$, $p, 0.01$, 1-tailed) provides support that within a group of low integrative complexity subjects, IC relates positively to their decision-making performance within environments of unrestricted complexity.

Amongst subjects categorised in the main experiment as relatively high, medium or low in integrative complexity, results are less clear about differences in relationships between subjects' integrative complexity and their decision-making performance. For managers of medium and high integrative complexity, their cognitive capabilities related weakly with their decision-making performance. For subjects of low integrative complexity, their cognitive capabilities related moderately with their decision-making performance, albeit their absolute performance was marginally lower than their more cognitively complex colleagues.

However, this study is concerned with examining relationships between managers' integrative complexity and their decision-making performance within different levels of environmental complexity rather than just overall. To examine these situational effects, relationships between integrative complexity and decision-making performance were analysed within three levels of environmental complexity, pre-set at three arithmetic means from the range of Wood & Bailey's (1985) computer simulation, i.e. (high environmental complexity, $\bar{x} = 46$, medium $\bar{x} = 28$, and low $\bar{x} = 9$).

Table 2 (page 21) displays decision-making performance overall, i.e. across all levels of environmental complexity, and within three levels of environmental complexity (EC) by three subject groups, divided arithmetically according to their ranked integrative complexity (IC) scores.

The mean decision-making performance of all subjects within high environmental complexity ($\bar{x} = 72.05$) was significantly lower than their decision-making performance overall, ($\bar{x} = 80.52$), ($t = -15.27$, $df1, 202$, $p<.001$, 2-tailed). Worthy of note here is that subjects' decision-making performance was significantly better in medium environmental complexity ($\bar{x} = 85.77$), than their performance overall ($\bar{x} = 80.52$), ($t = 9.88$, $df1, 202$, $p<.001$,

2-tailed). Subjects' performance within low environmental complexity ($\bar{x} = 83.75$) was also significantly better than their decision-making performance overall ($\bar{x} = 80.52$), ($t = 5.41$, $df1, 202$, $p < .001$, 2-tailed).

These results, where performance was better within medium environmental complexity than low, high or overall environmental complexity may be a result of the relative difficulty of the three levels of environmental complexity in the simulation and is worthy of further examination. These results are graphically illustrated by Figure 1. (page 22)

A two-way ANOVA confirms very significant differences in the decision-making performance of subject groups by integrative complexity, within low environmental complexity, $F(2,200) = 164.23$, $p < .001$. No significant differences were shown in the decision-making performance of subjects grouped by integrative complexity within medium environmental complexity, $F(2,200) = 0.388$, $p = .252$. Within high environmental complexity, small but significant differences were apparent, $F(2,200) = 5.45$, $p = .005$. As previously, subjects were divided into three arithmetically equal groups of high, medium, and low integrative complexity to provide further insight into relationships between integrative complexity and decision-making performance within discrete levels of environmental complexity.

2.4 Decision-making performance within high environmental complexity by IC grouping

The decision-making performance of the group of high integrative complexity managers within high environmental complexity was $\bar{x} = 73.66\%$, ($s = 6.5$, $n = 68$) only marginally more effective than for all subjects $\bar{x} = 72.05\%$ ($S.D = 7.89$, $n = 203$). For the group of high integratively complex managers (IC: $\bar{x} = 11.2$, $S.D. = 1.07$, $n = 68$), a non-significant Pearson correlation between subjects' integrative complexity and their decision-making performance, $r = 0.055$ ($n = 68$, $p = .327$, 1-tailed) showed no support for the hypothesis.

For the group of medium integratively complex managers, (IC: $\bar{x} = 8.7$, $s = 0.61$, $n = 68$), a Pearson correlation of $r = 0.120$ ($n = 68$, $p = .166$, 1-tailed) between subjects' integrative complexity and their decision-making performance in high situational complexity, provides no support for the hypothesis.

For the group of subjects with lowest integrative complexity scores (IC: $\bar{x} = 6.58$, $s = 1.20$, $n = 67$), a Pearson correlation of $r = 0.331$ ($n = 67$, $p = .003$, 1-tailed) provides moderate support for the hypothesis that for subjects of low integrative complexity, their IC relates positively to their decision-making performance within high environmental complexity.

2.5 Summary of results in high complexity

Despite limited support for the hypothesis that subjects' integrative complexity relates positively to decision-making performance within high environmental complexity, a curvilinear relationship is in evidence. An examination of subjects categorised by levels of integrative complexity shows that relationships between subjects' IC scores and their decision-making performance within high environmental complexity were inconclusive.

This result appears inconsistent with main theories in this field, and may be a result of other effects to be discussed later. That discussion also requires analysis of relationships between managers' integrative complexity and their decision-making performance within situations of medium and low environmental complexity, which follows.

Results show a non-significant Pearson correlation of $r = -0.031$ ($n = 203$, $p = .664$, 1-tailed) between IC and decision-making performance, providing no support that subjects' integrative complexity relates positively to their decision-making performance within environments of medium complexity, although a strong curvilinear relationship was in evidence between managers' IC and their decision-making performance. Analysis of relationships between subjects' levels of high, medium, and low integrative complexity and their decision-making performance provide further insight.

2.6 Decision-making performance within medium environmental complexity by IC grouping

The group of high integratively complex managers achieved similar though marginally lower decision-making performance of $\bar{x} = 85.17\%$, ($s = 5.92$, $n = 68$) compared with $\bar{x} = 85.77\%$, ($s = 7.60$, $n = 203$) for all subjects within medium environmental complexity. A Pearson correlation of $r = -0.145$ ($n = 68$, $p = .238$, 1-tailed) provides no support for the hypothesis of a positive relationship between integratively complex managers and their decision-making performance within medium environmental complexity.

The group of medium integratively complex managers achieved decision-making performance of $\bar{x} = 87.10\%$ ($s = 8.00$, $n = 68$), however a non-significant Pearson correlation of $r = 0.071$ ($n = 68$, $p = .281$, 1-tailed) provides no support for the hypothesis of a positive relationship between IC and decision-making performance within medium environmental complexity.

The group comprising the lowest third of subjects by IC scores, achieved decision-making performance of $\bar{x} = 85.03\%$, ($s = 8.54$, $n = 68$), and a Pearson correlation of $r = 0.138$ ($n = 67$, $p = .133$, 1-tailed) provides no support for the hypothesis that IC relates positively to their decision-making performance within environments of medium complexity.

2.7 Summary of results in medium complexity

As the performance of all subjects by IC grouping was not significantly different, $F(2,200)=1.388$, $p=.252$, 2-tailed) within medium complexity environments, this result provides no support for the hypothesis.

These results provide no evidence for positive linear relations between integrative complexity and decision-making performance within medium complexity environments. However, a curvilinear relationship between integrative complexity and decision-making performance was evident. An analysis of these relationships within low complexity situations is required to address the remaining scope of the main hypothesis.

Results displayed evidence of a strong positive relationship between IC and decision-making performance. A Pearson correlation of $r=.877$ ($n=203$, $p<.01$, 1-tailed) provides marked evidence of a positive linear relationship between subjects' IC and their decision-making performance within environments of low complexity. Decision-making performance for the total sample within low complexity environments was $\bar{x}=83.75\%$ ($s=8.55$, $n=203$).

2.8 Decision-making performance within low environmental complexity by IC grouping

Subjects' scores were again divided into three groups of high, medium, and low integrative complexity for further analysis. The group of high integratively complex managers, the upper third of the total sample, achieved decision-making performance of $\bar{x}=92.45\%$ ($s=4.67$, $n=67$), higher than the performance of all subjects within low complexity environments, $\bar{x}=83.75\%$. A Pearson correlation of $r=0.63$ ($n=67$, $p<.01$, 1-tailed) provides strong support for the hypothesis that, within this group of subjects, IC relates positively to their decision-making performance within low environmental complexity.

The medium integrative complexity group achieved decision-making performance of $\bar{x}=82.67\%$, ($s=4.55$, $n=67$) similar to the performance of all subjects within low complexity environments $\bar{x}=83.75\%$. A Pearson correlation of $r=0.481$ ($n=67$, $p<.01$, 1-tailed) provides strong support for the hypothesis.

The low integrative complexity group achieved decision-making performance of $\bar{x}=75.98\%$ ($s=6.35$, $n=67$) lower than the performance of all subjects within low complexity environments $\bar{x}=83.75\%$. A Pearson correlation of $r=.642$ ($n=68$, $p<.01$, 1-tailed) shows a strong positive relationship between subjects IC and their decision-making performance within situations of low complexity.

2.9 Summary of results in low complexity

Results from managers' decision-making performance within low environmental complexity are in stark contrast to results within high and medium complexity environments from the main experiment. A strong positive relationship is in evidence between the integrative complexity of subjects and their decision-making performance. Analysing results after dividing managers into three groups according to their integrative complexity scores also provides consistent support for the hypothesised positive relations between subjects' integrative complexity and their decision-making performance within low environmental complexity.

A 3x3 ANOVA of the data was used to test whether integrative complexity is positively related to decision-making performance at all levels of environmental complexity. Significant effects were shown for decision-making performance (DMP) and integrative complexity scores (IC) within low environmental complexity (EC), $F(2,200)=164.23$, $p<.001$. However, similar effects were not in evidence within medium levels of environmental complexity $F(2,200)=1.388$, $p=.252$. Within the high environmental complexity condition, small but significant differences in decision-making performance were registered amongst subjects, based on their levels of IC, $F(2,200)=5.45$, $p=.005$. Across all levels of environmental complexity, subjects' decision-making performance differed significantly based on differences in their integrative complexity $F(11,191)=9.357$, $p<.05$.

Within the environmental complexity conditions of the "Furniture Factory" simulation, low IC people did not perform better in low complexity environments, and their results within medium complexity environments were not significantly different from other subjects. High and medium IC subjects performed marginally better than lower IC subjects within high complexity environments.

Some variation in results may be explained by the possibility that high IC individuals did not need to learn the rules of the game and thus excelled in the first (low environmental complexity) trial. This appears consistent with results within medium environmental complexity where there were no significant differences in decision-making performance amongst subjects.

Analyses of these results are generally consistent with interactive and cognitive capability theories, although inconsistent with person-fit theories. Person-fit theories argue that higher integratively complex subjects would make better decisions in high complexity environments and lower integratively complex subjects would make better decisions in low complexity environments. All evidence is to the contrary in the analysis of this study's main experiment.

Whilst the hypothesis that subjects' integrative complexity is positively related to decision-making performance is well supported within unrestricted environmental complexity and within low environmental complexity, it is not supported within high and medium complexity environments

Analysis of the results identifies differences in relationships between subjects' integrative complexity and their decision-making performance within each level of situational complexity. For example, within high environmental complexity, analysis revealed no support for positive relationships between IC and decision-making performance for subjects of high or medium integrative complexity, but significant albeit weak support for relationships between IC and decision-making performance for subjects of low integrative complexity.

In medium environmental complexity there was no support for positive relationships between subjects' IC and their decision-making performance for any subjects regardless of their integrative complexity scores. In marked contrast, within low environmental complexity, subjects' integrative complexity and their decision-making performance correlated strongly and significantly ($p < .01$) for all groups of subjects, categorised by IC, providing significant support for the hypothesis.

These results show that relationships between the integrative complexity of subject managers and their decision-making performance do not consistently satisfy established theories at all levels of environmental complexity. These results do not support the previously described main theories from the literature.

3. Discussion

Whilst the elements of information load and urgency are examined extensively in the literature, it has been mainly in pursuit of improving decision-making in the military and private sectors, and primarily motivated by demands for improved operational performance. As there is ample reference to differences between public and private sector structural and cultural environments (Savas, 1990; Weller et al; 1993; O'Malley, 1995), findings from the military and private sectors may not be transferable to managers within public administration.

Problems of matching complexities between decision-makers' cognitive complexities and environmental complexities to achieve optimal organisational performance, the factors of information load, noxious (potentially unfavourable outcomes), and eucity (favourable outcomes), are compounded by time urgency, especially for longer-term decisions (Streufert & Streufert, 1981; Roberto, 2002). This has obvious implications for decision-making, particularly at a strategic public management level.

There are implications for public sector practices where "ministerials", short-term urgent demands for decisions, frequently come from senior levels of political structures and require short-term responses. Unfortunately, many such decisions may have long-term legislative and societal implications and decisions made in urgency may have adverse longer-term repercussions. The better matching of managers to the complexity of their working environments, at various levels of the public sector, then becomes critical.

Anecdotal evidence suggests a world of increasing complexity so the facility to effectively assess and select suitable managers has implications for organisational productivity, occupational health and safety, and the selection and recruitment of public sector managers.

As concluded by Ree & Earles (1994), Highhouse (2002), and echoed by Clark-Murphy (2003a,b) current practises are not holding up to scientific scrutiny. Many government organisational structures and behaviours are still based on the theories and fads that emanated from theories of the 1970s-2000. Although more recent developments in research related to cognitive capability, cognitive task analysis and naturalistic decision-making seem promising; they are in their relative infancy and have yet to be developed in application and to impact on organisational structures and decision-making.

As environmental complexity is publicly identified and proposed as a factor influencing public sector managerial decision-making performance, advances in understanding these relationships are warranted to provide more empirical evidence. The results could contribute to the development of a predictive model of managerial decision-making performance providing subsequent benefits to managers, their organisations, and society at large.

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Table 1. Raw measures from the decision making simulation. (from page 11)

Main Experiment	Mean	S.D.	min	max	n=
Critical thinking ability	34.4	1.7	30	37	203
Integrative complexity	8.8	2.1	3	14	203
Decision making performance across all levels of environmental complexity	80.5%	5.0	56	112	203
Decision making performance in low environmental complexity	84%	8.6	59	100	203
Decision making performance in medium environmental complexity	86%	7.6	65	112	203
Decision making performance in high environmental complexity	72%	7.9	56	87	203

Table 2. (ref page 13) Decision-making performance (DMP) by integrative complexity (IC) grouping within three levels of environmental complexity (EC).

Dependent variable: decision-making performance (DMP)

IC level	EC level	Mean	s.d.	N
low	low	75.98	6.35	67
	medium	85.03	8.54	68
	high	69.57	7.67	68
	overall	76.87	4.71	203
medium	low	82.67	4.55	67
	medium	87.10	8.00	68
	high	72.93	8.84	68
	overall	80.21	4.52	203
high	low	92.45	4.67	67
	medium	85.17	5.92	68
	high	73.66	6.51	68
	overall	83.44	3.46	203
total	low	83.75	8.55	67
	medium	85.77	7.60	68
	high	72.05	7.89	68
	overall	80.52	4.98	203

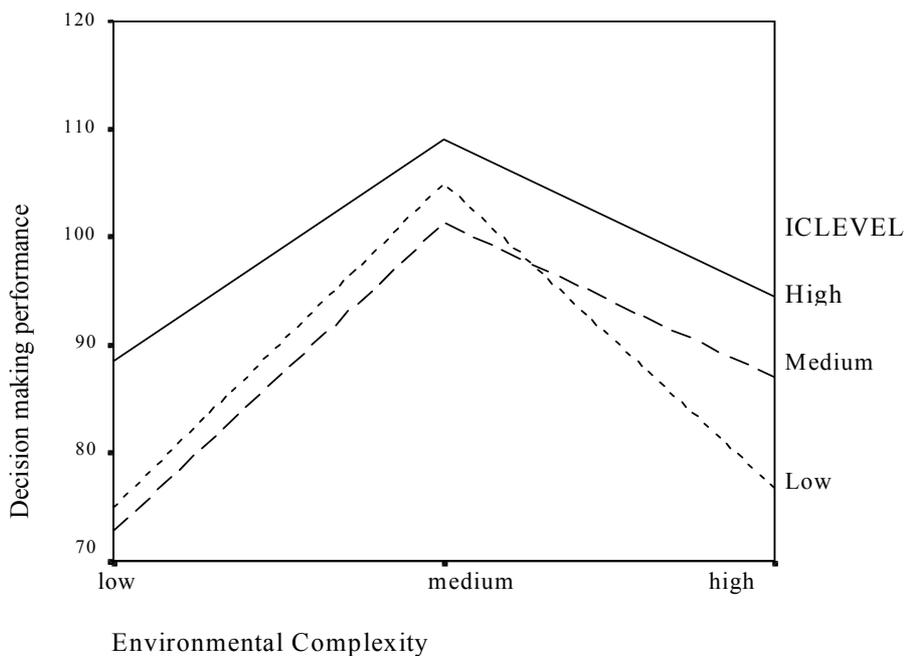


Figure 1. Decision-making performance (DMP) by integrative complexity (IC) grouping within three levels of environmental complexity (EC). (Ref. p13)