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Uncertainty Management among School Administrators and Its Relationship with Proactive Behaviour: Evidence from Public Schools *

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ABSTRACT

This study examines school administrators' uncertainty management and its relationship with proactive behaviour in public schools. Using a predictive correlational design, data were collected from 368 principals and vice principals working in public primary, lower secondary, and upper secondary schools in Ankara, Türkiye. The Uncertainty Management Scale and the Proactive Manager Scale were used, and the data were analysed through descriptive statistics, group comparisons, Pearson correlation, and stepwise multiple regression. The findings showed that administrators reported relatively high levels of uncertainty management, although their tolerance for uncertainty was moderate. Uncertainty management did not differ significantly by gender, educational status, school type, or managerial seniority, whereas principals reported significantly higher levels than vice principals. Proactive behaviour was positively and significantly associated with uncertainty management and emerged as its strongest predictor. Administrative position also made a significant contribution to the predictive model. The study contributes to educational leadership literature by conceptualising proactive behaviour as an adaptive leadership resource through which school administrators may navigate uncertainty within centralised and policy-intensive educational systems.

Keywords: Uncertainty management; proactive behaviour; school administrators; educational organisations

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1. INTRODUCTION

Despite all technological advances and structured planning initiatives, it remains challenging to predict the future of humanity with certainty. This situation has led to different interpretations across many fields and to the emergence of various roles and practices. Today, it no longer seems possible to make definite statements regarding a long and stable working life, the competencies and skills required for a profession, or the limits of working conditions. From this perspective, it is clear that individuals are exposed to rapid change in both their social and professional lives and must cope with an increasingly uncertain future. Individuals frequently encounter events in their work and personal lives that they could not foresee or expect (Van den Bos & Lind, 2002). Therefore, uncertainty has become a common phenomenon in daily life that requires management or reduction (Küçükkömürler, 2017).

Similar to their personal lives, individuals in professional contexts also seek to manage or reduce uncertainty in order to minimise its possible negative effects. However, a review of the literature shows that the unpredictable nature of uncertainty, its different forms, historical development, and characteristics, as well as the extent to which leaders manage uncertainty effectively in accordance with organisational culture, are still not fully understood. Furthermore, most studies on uncertainty have been conducted in laboratory environments or in organisations managed within the framework of business administration (Boccia, 2009; DeLeo, 1993; He et al., 2008; Jairaman et al., 2017; Lin et al., 2011; Lomic, 2001; Roulston et al.,

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2006; Victor & Blackburn, 1987; Westgard, 2010; White & Farrance, 2004; Zadeh, 1983). As Mann (2011) notes, the very issue of managing uncertainty in organisations remains largely uncertain.

In uncertain environments, it is no longer sufficient for organisations to employ individuals who merely comply with rules and follow instructions. Instead, organisations increasingly need employees who proactively contribute to productivity and improvement in the workplace (Belschak et al., 2010; Bindl & Parker, 2010). Proactivity, which refers to the ability to anticipate future situations and take initiative to prevent or eliminate possible negative outcomes (Engel & Etzion, 2011), may play an important role in managing uncertainty. Uncertainty has been shown to significantly affect the quality and level of decision making in organisations (Walker et al., 2003), which necessitates a proactive approach in such contexts. For this reason, whether administrators adopt proactive approaches when confronted with uncertainty in organisational life is an important question. Accordingly, examining the relationship between uncertainty management and proactive behaviours, and determining the extent to which these are exhibited by school administrators, emerges as a significant research issue.

1.1. Theoretical Framework

1.1.1. Uncertainty management and its theoretical foundations

According to Friedman et al. (1999), uncertainty in a scientific context is defined as a systematic lack of knowledge or disagreement arising from the existing knowledge base. Another definition describes uncertainty as a situation in which the decision-maker cannot accurately predict the outcome of an event (Nikolaidis et al., 2011, p. 2). When the details of a situation, event, or circumstance are vague, complex, unpredictable, or ambiguous, uncertainty emerges. Uncertainty may also be experienced when individuals feel insecure about their own level of knowledge or about their understanding of a situation due to inconsistency in the available information (Brashers, 2001). In line with these definitions, uncertainty may be defined as the inability to comprehend a situation, phenomenon, or event due to insufficient or inconsistent data.

Organisational uncertainty can be understood as an individual's inability to predict future events and as the experience of inconsistencies among cognitive perceptions, experiences, and behaviours (Van den Bos & Lind, 2002). In such circumstances, managers are expected to display behaviours that help employees cope with uncertainty and solve the problems it creates, thereby increasing organisational effectiveness and success (Mann, 2011). Organisational uncertainty may have direct negative effects on both employees and the organisation as a whole. This is because uncertainty generally hinders entrepreneurship and restricts action (McMullen & Shepherd, 2006). Unexpected events, accidents, and product safety problems within organisations may lead to declines in performance (Anderson et al., 2009; Song, 2008). Technological change, social and political crises, and environmental uncertainty in the public sector have made modern organisations around the world increasingly vulnerable to uncertainty. Governments and other authorities may themselves become generators of uncertainty or may face uncontrollable uncertainty (Song, 2008).

Uncertainty is generally considered to be at the core of both strategic and organisational research. Within organisational research, uncertainty is often addressed within contingency theory, which interprets organisations as adapting their structures and strategies according to environmental conditions. In this theoretical framework, uncertainty is regarded as a fundamental organisational condition shaping the relationship between organisations and their environments (Boccia, 2009). Thompson (2017) considered uncertainty to be a basic organisational and managerial problem and viewed it as a mechanism through which organisations attempt to minimise the negative effects of internal uncertainty. Prominent theories of uncertainty in the social sciences generally fall into two main categories: Uncertainty Reduction Theory (URT) and Uncertainty Management Theory (UMT).

According to URT, uncertainty is a psychologically stressful condition, and individuals therefore attempt to reduce it. This theory assumes that uncertainty is associated with the possibility of negative or undesirable outcomes, which leads individuals to cope with the stress they experience and to strive to reduce uncertainty (Greco & Roger, 2001). In contrast, Uncertainty Management Theory proposes that not all uncertainty is negative and that the possible outcomes of uncertainty may sometimes be evaluated positively (Brashers, 2001). UMT suggests that individuals make use of uncertainty in ways that align with their interests or needs. Accordingly, uncertainty is not always distressing; in some cases, individuals may use uncertainty to maintain hope, optimism, and psychological well-being (Kosenko, 2014).

It is widely argued that uncertainty generates feelings of vulnerability or anxiety, which may distort perception and information processing. This situation may lead to premature decision-making, dilemmas, rejection of information, rigid categorisations, and a return to previous methods. In addition, irregularities arising from uncertainty may make it difficult to develop appropriate strategies for adapting to current and future conditions (Clampitt & Williams, 2004).

Many strategic decisions in organisations are influenced by individual attitudes toward uncertainty. From this perspective, the management of uncertainty is closely related to how those responsible for strategic decision-making cope with uncertainty. However, other employees in the organisation are also required to deal with uncertainty and face problems arising from it in their daily work relationships. Job design plays a key role in this respect. It shapes the daily uncertainties that employees experience in their roles and determines the resources available to them to manage these uncertainties. Since organisational

design strongly influences job design, it also shapes the types of uncertainty employees encounter and the organisational resources available to them to cope with uncertainty (Grote, 2009).

Leadership behaviours exhibited under conditions of uncertainty differ from those displayed under normal organisational circumstances. Uncertainty significantly influences individual behaviour and various psychological processes in the workplace. When uncertainty prevails, the successful management of processes leads to attributes such as trust, respect, and approval being ascribed to leaders. This is particularly important for identifying those who can provide support for radical organisational change. In other words, behaviours displayed under uncertainty allow an assessment of whether the leader is suitable for the organisation and strongly influence employees' perceptions of the leader (Krackhardt & Stern, 1988). Recent studies suggest that uncertainty in educational organisations is shaped not only by environmental complexity but also by institutional and structural conditions. In centralized education systems, school leaders frequently operate under conditions characterised by policy reforms, accountability pressures, bureaucratic constraints, and limited administrative autonomy. These conditions may increase both the frequency and intensity of uncertainty experienced by school administrators and influence how uncertainty is interpreted and managed (Bellibaş & Gümüş, 2019; Karakose et al., 2024). Consequently, uncertainty management in schools should be understood not merely as an individual competence but also as a leadership practice that is shaped by organisational and systemic conditions.

1.1.2. Proactive behaviour

In an organisational context, proactive behaviour is defined as preventive or forward-looking actions that employees take to influence themselves and/or their environment (Grant & Ashford, 2008). Ruch (1993) defines proactive behaviours in organisations as any work behaviour involving planning for the future, anticipating future job opportunities or foreseeing changes in a method or technique. As job roles become more dynamic and less strictly defined, proactive behaviour and initiative-taking emerge as key factors in organisational success (Frese et al., 1997). Consequently, behaviours such as problem solving, taking personal initiative and engaging in self-starting actions have become increasingly desirable in contemporary organisations.

In professional settings, adopting a proactive approach is generally preferable to reacting only after events occur. Organisations are expected to anticipate future trends, develop awareness, avoid being locked into current conditions and demonstrate the capacity to envision the future. This includes being aware of potential risks and knowing how to respond appropriately even under pressure. Proactive organisational systems can provide decision-makers with early warnings and guidance to optimise performance and improve processes (Magoutas et al., 2014).

Uncertainty in complex systems may render decision-making and organisational functioning difficult. In situations where uncertainty is high, planned activities may stall and ongoing operations may become ineffective. Due to the inherent complexity of social and educational systems, it is often impossible to obtain complete information, and even well-designed predictions about the future may prove insufficient (Berkes, 2007). Therefore, rather than attempting to eliminate uncertainty completely, adopting a proactive stance focused on anticipating potential threats and opportunities becomes essential. From an educational leadership perspective, proactive behaviour may be viewed as an adaptive mechanism that enables school administrators to respond effectively to uncertainty. Rather than merely reacting to external demands, proactive leaders anticipate emerging challenges, seek relevant information, mobilise organisational resources, and initiate preventive actions before problems escalate. In this sense, proactive behaviour may contribute not only to organisational effectiveness but also to administrators' capacity to navigate uncertainty in complex educational environments.

In educational contexts, uncertainties may arise from inconsistent practices, inadequate data collection in decision-making processes, limited stakeholder participation, or insufficient evaluation of outcomes. Reforms and policy changes may also lead to uncertainty and anxiety among school stakeholders. In this respect, proactive behaviour in educational processes is essential. Many changes affecting schools are turbulent and unpredictable. These changes create uncertainty for organisations and do not follow a fixed timeline. Therefore, organisations need to be adaptable, flexible, and sensitive to changing conditions while adopting a more anticipatory approach (Livingston, 1997). School administrators play a critical role in reducing uncertainties encountered in educational environments. Determining their capacity to manage uncertainty and whether proactive behaviour contributes to this capacity is therefore an important research issue.

Although uncertainty and proactive behaviour have been widely discussed in organisational psychology and management literature, empirical studies examining these constructs together in educational settings remain limited. Existing research predominantly focuses on business organisations or laboratory-based studies, and school settings have received comparatively little attention. Moreover, most studies investigate uncertainty primarily in terms of its negative outcomes, rather than how it can be managed or utilised constructively. There is also a lack of research addressing how proactive behaviour contributes to administrators' capacity to manage uncertainty, particularly in public schools operating in complex and rapidly changing policy environments. In the Turkish context, studies that simultaneously examine uncertainty management and proactive behaviour among school administrators remain limited. Therefore, there is a clear need for empirical research that explores the relationship between proactive behaviour and uncertainty management within educational organisations. Furthermore, limited attention has been given to how school administrators experience, interpret,

and respond to uncertainty within highly centralized educational systems. While previous studies have generally examined uncertainty as an organisational challenge or proactive behaviour as an individual characteristic, less is known about how proactive behaviour functions as a leadership resource under conditions of policy pressure, organisational complexity, and constrained decision-making. Addressing this gap may contribute to a more contextualised understanding of uncertainty management in educational organisations.

1.2. Purpose of the Study

In centralized educational systems, uncertainty is not experienced solely as a consequence of environmental complexity. It is also shaped by bureaucratic regulations, policy changes, accountability pressures, and limited administrative autonomy. School administrators are therefore required not only to reduce uncertainty but also to actively manage and navigate it while maintaining organisational functioning. From this perspective, proactive behaviour may serve as an adaptive leadership resource that enables administrators to anticipate challenges, mobilise organisational responses, and cope with uncertainty more effectively. Accordingly, examining the relationship between proactive behaviour and uncertainty management may provide insight into how school leaders maintain organisational functioning and exercise professional agency under conditions of uncertainty.

The originality of the present study lies in moving beyond a general examination of the relationship between proactive behaviour and uncertainty management. Rather than treating proactive behaviour merely as an individual organisational behaviour, this study positions it as a context-sensitive leadership resource through which school administrators navigate uncertainty under conditions of centralized governance, policy pressure, and constrained decision-making autonomy. In doing so, the study seeks to contribute to a more contextualised understanding of uncertainty management in educational leadership.

The purpose of this study is to examine the level of uncertainty management behaviours displayed by school administrators and to determine the relationship between uncertainty management and proactive behaviour. In addition, the study investigates whether uncertainty management differs according to selected demographic variables. Within this framework, the study focuses on principals and vice principals working in public primary, lower secondary and upper secondary schools. In line with this overall aim, the study seeks to answer the following research questions:

1. What is the level of uncertainty management behaviours exhibited by school administrators?
2. Do school administrators' uncertainty management behaviours differ significantly according to gender, administrative seniority, school type, position (principal/vice principal) and educational status?
3. What is the relationship between school administrators' uncertainty management and proactive behaviour?
4. Do proactive behaviour and other independent variables (gender, administrative seniority, school type, position and educational status) significantly predict school administrators' uncertainty management?

2. METHODOLOGY

This study was conducted using a correlational research design within the quantitative research paradigm. Correlational designs aim to determine the relationship between two or more variables (Fraenkel et al., 2012; Karasar, 2002). In the present study, the direction and strength of the relationship between school administrators' proactive behaviours and their levels of uncertainty management were examined. In addition, the predictive power of proactive behaviour on uncertainty management was tested. For this reason, the study was designed as a predictive correlational research model.

2.1. Sample

The target population was defined with reference to school administrators (principals and vice principals) working in public primary, lower secondary, and upper secondary schools in the nine central districts of Ankara (Çankaya, Yenimahalle, Gölbaşı, Altındağ, Keçiören, Mamak, Etimesgut, Pursaklar and Sincan) during the 2017–2018 academic year. Due to time, accessibility and cost constraints, a sample was selected from the population. Proportional stratified random sampling was used. In this method, the number of individuals selected from each stratum is proportional to the stratum size in the population (Christensen et al., 2015; Karasar, 2002).

The target population consisted of 2,320 school administrators. Based on proportional stratified sampling, the required sample size was calculated as 339. However, during the data collection process, a total of 368 school administrators voluntarily participated in the study. Since this number exceeded the minimum sample size required for representativeness, all 368 forms were included in the analysis. Descriptive characteristics of the participants are presented in Table 1.

Table 1.
Descriptive Statistics for Administrators in the Sample

Variable	Level	n	%
Gender	Female	75	20.4

	Male	293	79.6
Education Status	Bachelor's Degree	275	74.7
	Master's Degree	93	25.3
School type	Elementary school	103	28.0
	Middle school	110	29.9
	High school	155	42.1
Management Seniority	1-6 years	166	45.1
	7-12 years	100	27.2
	13 years and above	102	27.7
Position	Principal	118	32.1
	Vice Principal	250	67.9
Total		**368**	**100**

In the sample, approximately one fifth of the participants were female and one quarter held a graduate degree.

2.2. Data Collection Tools

Quantitative data were collected using the Uncertainty Management Scale (UMS) and the Proactive Manager Scale (PMS).

Uncertainty Management Scale (UMS). The scale was developed within the scope of the doctoral dissertation from which the present article is derived. Although the dissertation was completed in 2019, the scale development process preceded the completion of the dissertation. Therefore, the 2019 date refers to the completion/publication year of the dissertation rather than the initial development date of the instrument. The scale was developed by Atalay Mazlum (2019). Factor analyses showed a four-dimensional structure (KMO = .81; χ^2/df = 2.45; CFI = .95; RMSEA = .056). Cronbach's alpha coefficients ranged between .82 and .90, indicating high internal consistency.

Proactive Manager Scale (PMS). The scale developed by Fidan and Balcı (2016) consists of 26 items grouped under six factors. In the present study, confirmatory factor analysis was conducted again, and the original structure was retained. The Cronbach's alpha coefficient was .91. Goodness-of-fit indices indicated acceptable fit (CFI = .97; χ^2/df = 1.74; NFI = .93; IFI = .97; RMSEA = .059).

2.3. Data Analysis

Prior to the analysis, missing data, outliers, normality and reliability were examined. Skewness–kurtosis values and normality tests indicated that the data showed an approximately normal distribution; therefore, parametric analyses were used.
Confirmatory factor analyses were conducted to validate the measurement tools, and internal consistency was examined using Cronbach's alpha coefficients. Pearson correlation analysis was performed to determine the relationships between the variables. Stepwise multiple regression analysis was used to examine whether proactive behaviour and demographic variables significantly predicted school administrators' uncertainty management levels. Stepwise multiple regression analysis was employed to determine the relative contribution of proactive behaviour and demographic variables in explaining uncertainty management and to identify the most parsimonious predictive model.

3. FINDINGS

3.1. School Administrators' Behaviours in Managing Uncertainty

Based on the data obtained from the Uncertainty Management Scale (UMS), descriptive statistics regarding the sub-dimensions of Uncontrollable/Unpredictable Forces, Organisational Change, Manager–Employee Relations and Communication, Uncertainty Tolerance, and the total uncertainty management score are presented in Table 2.

Table 2.
Descriptive statistics related to uncertainty management

Factors	$\bar{X}$	***SD***
Uncontrollable/Unpredictable Forces	3.82	0.56
Organizational Change	4.27	0.52
Manager-Employee Relationship and Communication	4.31	0.50
Tolerance for Uncertainty	3.05	0.63
Total	**3.87**	**0.40**

School administrators reported that they frequently managed uncertainties arising from situations beyond their control or that could not be foreseen ($\bar{X}$ = 3.82). This indicates that participants generally perceive themselves as competent in managing

events that develop independently of their influence. Administrators also reported high levels of uncertainty management in the organisational change dimension ($\bar{X}$ = 4.27), suggesting that they effectively manage uncertainties stemming from changes in educational processes and practices. Similarly, a high mean score was obtained for manager–employee relations and communication ($\bar{X}$ = 4.31). This result indicates that administrators perceive themselves as effective in managing uncertainty in communication processes and interpersonal relations within schools. In contrast, the mean score for tolerance for uncertainty was at a moderate level ($\bar{X}$ = 3.05). This suggests that administrators sometimes tolerate ambiguity and uncertainty when making decisions.

3.2. Comparison of School Administrators' Uncertainty Management Levels by Independent Variables

This section presents whether school administrators' levels of uncertainty management differ according to gender, position, educational status, school type, and managerial seniority. Table 3 shows the results of independent samples t-tests conducted for gender, position, and educational status.

Table 3.
Comparison of uncertainty management levels by gender, role, and educational status

Variable	Group	n	$\bar{X}$	*SD*	*SE*	t-test		
						t	***df***	***p***
Gender	Female	75	118.74	13.42	1.55	-0.983	366	.326
	Male	293	120.30	11.93	0.70			
Position	Principal	118	124.68	11.35	1.04	5.242	366	< .001
	Vice Principal	250	117.76	12.04	0.76			
Education Status	Bachelor's Degree	275	120.41	11.88	0.71	1.170	366	.243
	Master's Degree	93	118.69	13.27	1.37			

The results showed that there was no statistically significant difference in uncertainty management according to gender (t = -0.983, p = .326) or educational status (t = 1.170, p = .243). However, there was a significant difference according to position (t = 5.242, p < .001). School principals obtained significantly higher uncertainty management scores than vice principals. This finding indicates that principals perceive themselves as more competent in managing uncertainty than vice principals. Table 4 presents the one-way ANOVA results regarding school type and managerial seniority.

Table 4.
Comparison of uncertainty management levels according to school type and managerial seniority

Variable	Group	n	$\bar{X}$	*SD*	*SS*	*df*	*MS*	*F*	*p*	Difference (Tukey)
School type	Elementary	103	121.73	11.39	489.44	2	244.72	1.636	.196	-
	Middle	110	118.78	13.55						
	High	155	119.66	11.76						
Seniority in management	1-6 years	166	119.25	12.60	654.68	2	327.34	2.195	.113	-
	7-12 years	100	119.00	12.01						
	13+ years	102	122.13	11.74						

The results showed that total uncertainty management scores did not differ significantly by school type, F(2, 365) = 1.636, p = .196, or managerial seniority, F(2, 365) = 2.195, p = .113. In other words, neither the level of school (primary, lower secondary, upper secondary) nor length of service in administration affected administrators' perceived levels of managing uncertainty.

3.3. Relationship Between Uncertainty Management and Proactive Behaviour

The relationships between uncertainty management and proactive behaviour were examined using Pearson correlation analysis. The results are presented in Table 5.

Table 5.
Correlations between uncertainty management sub-dimensions and proactive behaviour (total).

Variables*		UF	OC	MER	TU	Uncertainty Management
Proactive Behaviour	*r*	.474	.560	.565	.192	.606
	p	< .001	< .001	< .001	< .001	< .001

*UF:Uncontrollable/Unpredictable Forces; OC: Organizational Change; MER: Manager-Employee Relations and Communication; TU: Tolerance for Uncertainty.

The findings indicated that the relationship between school administrators' proactive behaviour and their overall uncertainty management levels was positive and significant (r = .606, p < .001). As administrators' proactive behaviours increased, their uncertainty management levels also increased. Significant positive relationships were also observed between proactive behaviour and all sub-dimensions of uncertainty management. The strongest correlation was found with organisational change and manager-employee relations and communication dimensions, indicating that proactive administrators are particularly more effective in dealing with uncertainties arising from change processes and interpersonal relationships. A moderate positive relationship was found between proactive behaviour and uncontrollable/unpredictable forces, while a low-level positive relationship was observed between proactive behaviour and tolerance for uncertainty.

3.4. Prediction of Uncertainty Management by Proactive Behaviour and Independent Variables

Stepwise multiple regression analysis was conducted to determine whether proactive behaviour and independent variables predicted uncertainty management. The results are presented in Table 6.

Table 6.
Stepwise multiple regression analysis predicting uncertainty management

Panel A. Model summary								
Model	**Predictors entered**	**R**	**R^2**	**Adj. R^2**	**ΔR^2**	**F**	**df**	**p**
1	Proactive behaviour	.606	.367	.365	.367	212.049	(1, 366)	< .001
2	Proactive behaviour, position	.618	.382	.378	.015	112.622	(2, 365)	< .001

Panel B. Coefficients for the final model							
Predictor	**B**	**SE**	**β**	**t**	**p**	**Zero-order r**	**Partial r**
Constant	65.256	5.241	—	12.451	< .001	—	—
Proactive behaviour	.570	.042	.575	13.566	< .001	.579	.558
Position	-3.284	1.112	-.125	-2.953	.003	-.153	-.122

Note. R^2 = coefficient of determination; Adjusted R^2 = adjusted coefficient of determination; ΔR^2 = change in explained variance; SE = standard error; β = standardized regression coefficient. Position was coded according to the coding scheme used in the original analysis.

The stepwise multiple regression analysis indicated that proactive behaviour significantly predicted uncertainty management in the first model, $F(1, 366) = 212.049$, $p < .001$. Proactive behaviour alone explained approximately 36.7% of the variance in uncertainty management ($R^2 = .367$, adjusted $R^2 = .365$). When administrative position was added in the second step, the model remained statistically significant, $F(2, 365) = 112.622$, $p < .001$, and the proportion of explained variance increased to 38.2% ($R^2 = .382$, adjusted $R^2 = .378$). Thus, administrative position accounted for an additional 1.5% of the variance ($\Delta R^2 = .015$).

In the final model, proactive behaviour was a positive and significant predictor of uncertainty management (β = .575, $p < .001$), whereas administrative position also made a significant contribution to the model (β = -.125, $p = .003$). Proactive behaviour was the stronger predictor. Overall, the findings indicate that higher levels of proactive behaviour are associated with higher levels of uncertainty management and that administrative position provides a small but statistically significant additional contribution to the prediction of uncertainty management.

4. RESULTS, DISCUSSION AND RECOMMENDATIONS

4.1. Perceived Competence and the Limits of Self-Reported Uncertainty Management

The findings of the present study indicate that school administrators generally perceive themselves as competent in managing uncertainty within educational organisations. This finding may be associated with administrators' professional experience, accumulated exposure to organisational change, and their responsibility for maintaining continuity in educational processes. Schools operate in environments characterised by complexity, policy changes, stakeholder expectations, and organisational pressures, all of which may contribute to the development of adaptive managerial responses to uncertainty. Similar studies have also suggested that school leaders working under conditions of organisational complexity tend to develop practical coping strategies and adaptive leadership approaches over time (Karakose et al., 2024).

However, this finding should be interpreted with caution. Since the data were obtained through self-report measures, the high level of uncertainty management identified in the study may reflect perceived competence rather than actual managerial effectiveness. School administrators may evaluate themselves positively due to professional role expectations, institutional norms, and the leadership responsibilities attached to administrative positions. In educational organisations, administrators are often expected to maintain order, provide direction, and demonstrate control even under uncertain conditions. Therefore,

perceptions of uncertainty management may partly be shaped by administrative identity, organisational culture, and the expectation that school leaders should appear capable of handling uncertainty.

This interpretation is important because uncertainty management does not necessarily mean the elimination of uncertainty. As Mowles (2015) notes, managers may be experienced in assuming responsibility while also recognising that complete control is impossible. The nature of uncertainty management itself contradicts the idea of full predictability and control. From this perspective, uncertainty management should be understood not simply as the ability to control uncertain situations, but as the capacity to maintain organisational functioning despite incomplete information, ambiguity, and change. This distinction is particularly relevant in educational organisations, where administrators are frequently required to respond to policy shifts, stakeholder demands, and procedural changes without having full control over their causes or consequences.

4.2. Tolerance for Uncertainty in Centralized Educational Systems

One of the notable findings of the study is that school administrators reported relatively high levels of uncertainty management but only moderate levels of tolerance for uncertainty. This result suggests a meaningful tension between managing uncertainty and tolerating uncertainty. Administrators may perceive themselves as capable of dealing with uncertain situations, yet they may still prefer predictability, procedural clarity, and structured decision-making environments. In this sense, uncertainty management does not necessarily imply comfort with ambiguity. Rather, it may reflect administrators' efforts to minimise uncertainty through planning, control, communication, and compliance with formal procedures.

This tendency may be associated with the structural and cultural characteristics of centralized educational systems. In highly bureaucratic systems, administrators are generally expected to operate within clearly defined regulations, hierarchical authority structures, and accountability mechanisms. Recent research on school leadership similarly indicates that school leaders often work under conditions of extensive responsibility, limited authority, bureaucratic pressure, and rapidly changing legislation (Karakose et al., 2024). Moreover, school leader autonomy has been identified as a key concept for understanding the complex relationship between education policy and school-level practice (Nordholm et al., 2025). Under such conditions, ambiguity may be perceived not only as a managerial challenge but also as a professional risk. Consequently, administrators may prefer procedural certainty in order to reduce possible organisational and personal consequences.

In the Turkish education system, frequent bureaucratic changes, policy revisions, and reform initiatives may create recurring uncertainty for school administrators. Their relatively high perceived competence in uncertainty management may therefore reflect accumulated experience with change, while their moderate tolerance for uncertainty may indicate a continuing preference for predictability and formal guidance. The findings are also consistent with Hofstede's (2001) uncertainty avoidance framework, which suggests that individuals in high uncertainty avoidance cultures tend to value rules, stability, and structured processes. Similarly, Minkov and Hofstede (2014) argue that individuals operating in such cultural contexts often prefer maintaining existing structures rather than facing uncertain future conditions. From this perspective, the moderate level of uncertainty tolerance found in this study may be interpreted as a contextually meaningful result. School administrators may have developed practical strategies for managing uncertainty, but this does not mean that uncertainty is experienced as comfortable, desirable, or professionally safe.

4.3. Administrative Position, Authority, and Role-Based Differences

The study found no significant differences in uncertainty management according to gender, educational status, school type, or managerial seniority. This finding may indicate that perceived uncertainty management is shaped less by demographic characteristics and more by the organisational conditions and role expectations shared by school administrators. In centralized educational systems, administrators working at different school levels may be exposed to similar policy pressures, procedural obligations, and accountability demands. Therefore, uncertainty may function as a common administrative condition rather than one that varies strongly according to individual demographic variables.

In contrast, administrative position emerged as a significant factor. Principals reported significantly higher levels of uncertainty management than vice principals. This finding may be explained not only by differences in professional experience, but also by organisational authority structures and role expectations within schools. Principals generally occupy positions associated with greater decision-making autonomy, institutional legitimacy, and responsibility for organisational coordination. In contrast, vice principals often perform more implementation-oriented tasks and may have more limited influence over strategic decisions. Consequently, uncertainty management may be shaped not only by individual competencies but also by the degree of authority embedded within administrative roles.

This role-based interpretation is also consistent with recent international evidence suggesting that principals working in centralized governance structures are required to mediate policies and regulations from the top while simultaneously responding to the specific needs of their schools (Sun et al., 2024). In this respect, principals' higher uncertainty management scores may reflect not only individual competence but also their formal responsibility for translating external policy demands into school-level action. This interpretation may also be linked to research on professional authority and acceptance in teacher–leader interactions. Deniz (2025) suggests that leadership practices are shaped within dynamic boundaries of

professional acceptance, role expectations, and interactional legitimacy. Similarly, Deniz and Erdener (2020) emphasise that school leaders' responsibilities and influence differ according to their formal positions within schools.

From this perspective, principals may perceive themselves as more capable of managing uncertainty because their formal roles provide greater legitimacy and control over organisational processes. Vice principals, on the other hand, may experience uncertainty within more constrained zones of authority, where initiative-taking depends partly on the decisions, expectations, and delegation practices of principals. This finding therefore extends beyond a simple comparison of principals and vice principals. It suggests that uncertainty management is partly role-dependent. The capacity to manage uncertainty may be strengthened when administrators have access to decision-making authority, institutional legitimacy, and opportunities to coordinate organisational responses. Accordingly, supporting vice principals' participation in decision-making processes may contribute to the development of broader uncertainty management capacity within schools.

4.4. Proactive Behaviour as an Adaptive Leadership Resource

The study found a positive and significant relationship between proactive behaviour and uncertainty management. Although this relationship is theoretically expected, its significance in the present study lies in how proactive behaviour functions within educational organisations. Proactive behaviour should not be understood merely as a general individual tendency to take initiative. In the context of school administration, it may operate as an adaptive leadership resource that enables administrators to anticipate challenges, seek relevant information, mobilise organisational resources, and take preventive action before uncertainty becomes organisationally disruptive.

This interpretation is consistent with Goerdel's (2006) argument that proactive managerial behaviour reduces uncertainty and prevents future losses by emphasising precautionary action. Similarly, proactive management may allow administrators to transform uncertainty from a source of paralysis into an opportunity for preparation and organisational learning. In centralized educational systems, administrators frequently encounter situations in which regulations, expectations, and organisational demands change rapidly. Under such conditions, proactive behaviour may help school leaders maintain organisational functioning despite incomplete information and shifting external requirements. Therefore, the importance of proactive behaviour lies not merely in predicting uncertainty management, but in enabling school leaders to act under conditions where full certainty is rarely available.

The correlation results also showed that proactive behaviour had the strongest relationships with the manager–employee relations and communication dimension and the organisational change dimension. These findings are theoretically meaningful. Uncertainty in schools is not experienced only as an individual cognitive state; it is also produced and managed through communication, relationships, and organisational interaction. According to Thau et al. (2009), managerial behaviour shapes employee responses through mechanisms of reciprocity, and poor managerial communication may heighten employees' perceptions of uncertainty. Berger (1986) similarly argues that communication is central to coping with uncertainty because coordinated interaction enables uncertainty reduction. In this sense, proactive administrators may be more capable of reducing relational ambiguity, clarifying expectations, and sustaining trust-based communication during periods of change.

The strong relationship between proactive behaviour and organisational change is also significant. Bindl and Parker (2010) emphasise that rapid change and innovation demands increase both uncertainty and the need for proactive behaviour in modern organisations. As Grant et al. (2009) argue, organisational success increasingly depends on initiative-taking rather than merely fulfilling assigned tasks. In schools, this means that administrators who anticipate possible changes, prepare alternative responses, and involve stakeholders in problem-solving processes may be better positioned to manage uncertainty arising from reforms, procedural changes, or shifting institutional expectations.

At the same time, the relatively low correlation between proactive behaviour and tolerance for uncertainty should not be overlooked. This finding suggests that proactive behaviour and uncertainty tolerance are related but distinct constructs. Administrators may act proactively not because they are comfortable with uncertainty, but because they seek to reduce or manage it. Crant (2000) notes that contextual factors such as organisational norms and perceived uncertainty shape proactive behaviour. In bureaucratic school environments, proactive behaviour may therefore emerge as a strategy for restoring predictability rather than as an expression of high tolerance for ambiguity. This interpretation helps explain why administrators can report high uncertainty management and proactive behaviour while still displaying only moderate tolerance for uncertainty.

4.5. Theoretical Contribution and Practical Implications

The regression analyses demonstrated that proactive behaviour is the strongest predictor of uncertainty management. This finding indicates that administrators who act proactively are more likely to perceive themselves as capable of managing uncertainty in educational settings. Consistent with Ashford and Cummings (1985), successful administrators tend to proactively seek information when confronted with uncertainty. Such information-seeking should not be interpreted only as a cognitive response; it also reflects an organisational orientation toward preparation, initiative, and adaptive decision-making.

The predictive role of proactive behaviour may also be interpreted within the broader discussion of professional agency in educational leadership. School administrators often operate under structural constraints, limited autonomy, and increasing accountability pressures. In such contexts, proactive behaviour may represent an important form of professional agency through which administrators actively shape organisational responses rather than merely reacting to external demands. This interpretation extends the discussion beyond individual behaviour and highlights the organisational significance of proactive leadership under conditions of uncertainty.

The finding that position also significantly predicted uncertainty management reinforces the argument that uncertainty management is not solely an individual capacity. Rather, it is shaped by formal role, organisational authority, and access to decision-making opportunities. Principals' higher uncertainty management scores may reflect the greater institutional legitimacy and strategic responsibility associated with their positions. This suggests that schools should not rely only on principals' individual capacity to manage uncertainty. Instead, uncertainty management should be developed as a distributed organisational capacity by strengthening the leadership roles of vice principals, improving communication mechanisms, and creating opportunities for shared decision-making.

In practical terms, the findings suggest several implications for school administration. School administrators may benefit from developing scenario-based planning portfolios, strengthening communication and participation mechanisms, and receiving professional development focused on proactive leadership and uncertainty tolerance. In addition, vice principals should be supported in gaining decision-making and leadership experience so that uncertainty management capacity is not concentrated only in the principal's role. Developing proactive behaviour and enhancing tolerance for uncertainty may significantly contribute to more effective management of uncertainty in educational organisations. By linking proactive behaviour with uncertainty management in a centralized educational context, the present study also contributes to debates on school leader autonomy and professional agency. Rather than treating uncertainty management as a purely individual managerial skill, the findings suggest that it is shaped by the interaction between proactive leadership behaviour, formal authority, and the structural conditions under which school administrators work. This perspective strengthens the originality of the study by positioning proactive behaviour as a mechanism through which school leaders exercise agency despite constrained decision-making autonomy.

The contribution of the present study lies not merely in demonstrating a positive relationship between proactive behaviour and uncertainty management, but in conceptualising proactive behaviour as an adaptive leadership resource for school administrators operating within centralized and policy-intensive educational systems. These findings extend the educational leadership literature by showing that uncertainty management is not only a personal managerial competency, but also a context-sensitive leadership practice shaped by organisational authority, professional agency, role expectations, and systemic constraints. In doing so, the study offers a contextualised explanation of how school administrators may navigate uncertainty in bureaucratic and rapidly changing educational environments.

4.6. Limitations And Recommendations for Future Research

This study has several limitations. First, the data were collected through self-report scales. Therefore, the findings are based on participants' perceptions and may be influenced by social desirability or self-evaluation bias. Future studies may include multiple data sources such as supervisor or peer evaluations. Second, the research design was cross-sectional; thus, the relationships identified cannot be interpreted as causal. Longitudinal or experimental studies are recommended to better clarify causality between proactive behaviour and uncertainty management. Third, the sample consisted only of school administrators working in public schools in Ankara Province. Therefore, the generalisability of the findings is limited. Future research may include different provinces, private schools, or cross-cultural samples.

Finally, although the doctoral thesis from which this study is derived included qualitative data, only quantitative findings were reported here. Future studies may use mixed-method designs to provide deeper insight into how administrators experience and manage uncertainty. Despite these limitations, the study contributes to the literature by demonstrating that proactive behaviour is a significant predictor of uncertainty management among school administrators.

Research and Publication Ethics Statement

Administrative permission to conduct the research in public schools was granted by the Ankara Provincial Directorate of National Education on 18 September 2018 (No. 14588481-605.99-E.16700444). The research protocol was subsequently approved by the Ankara University Social Sciences Sub-Ethics Committee on 4 March 2019 (Meeting No. 03, Decision No. 70). The reference to the 2017-2018 academic year concerns the population frame used in the quantitative phase and does not refer to the data collection period.

Contribution Rates of Authors to the Article

The author was responsible for the conceptualization and design of the study, data collection, data analysis and interpretation, and the preparation and revision of the manuscript.

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Statement of Interest

The author declares that there is no conflict of interest.

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