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ABSTRACT

This study aims to explore the frequency and extent of principals’ use of systems thinking activities in Israel; to examine whether principals’ gender and seniority predict their systems thinking activities; and to determine how systems thinking activities are related to school outcomes. Results indicated that principals’ seniority predicted their extent of systems thinking, but no differences were found within principals’ gender. Positive correlations between principals’ systems thinking and middle-leaders’ job satisfaction and organizational commitment were found. Implications for theory, practice, as well as future research, are discussed.

A school is a complex system characterized by uncertainty and randomness since it is a multi-leveled structure comprised of many variables and processes that are interrelated and affect each other in reciprocal relationships (Crick, Barr, Green, & Pedder, 2017; Maroulis et al., 2010). A complex system is one composed of internal and external components on different levels which interact in various processes affecting the entire system (Mitchell & Newman, 2002). Within the school context, external components include the school board, parents, policymakers at the national and regional levels, and the local community. Internal components include the school staff and the students (Kelchtermans, Piot, & Ballet, 2011). The influence of these components varies from school to school and is contingent upon the interactions between them (Davis & Sumara, 2014; Maroulis et al., 2010).

Understanding schools as complex systems requires recognition of the relationships and interdependencies among their various components (Hmelo-Silver, Marathe, & Liu, 2007). Moreover, school’s complexity may require a broader perspective on its leadership and especially on the principal’s role (Leithwood, 2016). This is because the principal’s role is crucial to sustain school success and student achievement (Garza, Drysdale, Gurr, Jacobson, & Merchant, 2014; Jacobson, 2011). Researchers argue that current educational leadership contexts, with their increasing complexity, may benefit from a systemic perspective (Shaked & Schechter, 2017; Fullan, 2014). Therefore, systems thinking (ST), which emphasizes understanding the system as a whole before studying its parts, while simultaneously considering an array of pertinent factors is needed (Forrester, 1968; Fullan, 2005; Gharajedaghi, 2007; Senge, 2006). Especially because of the growing complexity of school management, partly due to an educational context highly focused on measurable student achievements.

ST helps to take into account the behaviors of a system as a whole, within the context of the environment in which it exists (Stroh, 2015). Moreover, it allows to see the influences and the interdependencies between the factors at play (McCaughan & Palmer, 2018). ST therefore may offer school principals perspectives and a range of solutions that would otherwise be unavailable to them if they limit themselves to conventional thinking (Eacott, 2018). As such, by investigating the underlying patterns, structures and assumptions that lead to an event rather than focusing on trying to resolve the event as if it was a problem, principals are better able to discover a variety of...
possibilities rather than just a narrow pathway that we assume to be the only right solution (Mette & Riegel, 2018).

Despite the positive influences of ST on educational outcomes and successful implementation of changes (Daly & Finnigan, 2016), few studies have examined principals’ ST (PST) activities that may enhance school outcomes. Following Shaked, Benoliel, Nadav, and Schechter (2018) conceptualization of PST, which includes the four major activities of Evaluating significance, Openness to a variety of opinions, Leading wholes and Adopting a multidimensional view, the present study attempts to examine PST activities among Israeli principals. Specifically, it has several purposes: first, to explore the extent and frequency at which principals engage in ST activities; second, to determine how principals’ gender and seniority influence their tendency toward the enactment of ST activities; third, to examine how PST activities are related to two main facets of organizational qualities: middle-leaders’ job satisfaction and organizational commitment.

Such an inquiry might be particularly important in the Israeli context since the Israeli education system is characterized by high centralization (Inbar, 2009). The Ministry of Education is responsible of the financial, administrative, organizational, pedagogical and structural aspects of the education system. Recently, cancellation of the urban registration-by-zone regulations has led to increased competition among urban schools. The cancellation of the urban registration-by-zone regulations was carried out concurrently with various other attempts to decentralize the educational system, such as school-based management and school autonomy (Nir, Ben-David, Bogler, & Zohar, 2016). Hence, the Ministry’s declared school autonomy policy has increased principals’ responsibility, and as a result, has increased the complexity of school leadership and management (Addi-Raccah, 2015; Woolner, Clark, Laing, Thomas, & Tiplady, 2014). Such a complexity has led principals to develop management structures in which middle-leaders (e.g., deputy heads, grade-level coordinators and/or curriculum coordinators) are delegated responsibilities in performing leadership roles (Harris & Jones, 2017). In this sense, middle-leaders hold both pedagogical and administrative responsibilities (Bush & Glover, 2014; Ng & Kenneth Chan, 2014).

Our hope that the present study will provide important theoretical contributions to the educational leadership literature. First, research shows that many challenges, which today’s schools encounter, require principals to adopt ST mind-set (Author 3 & Author 4, 2017). Yet, up until the present, research on ST in the field of education has developed the concept using qualitative methodology, while few quantitative studies have been focusing on the antecedents and consequences of ST in the educational context (Shaked & Schechter, 2017; Bui & Baruch, 2010; Pang & Pisapia, 2012). Second, by focusing on PST, the present study may reveal leadership activities previously unexplored within the educational literature, highlighting PST activities as a key variable in enhancing school outcomes. Third, taking a holistic perspective toward school management, this study accords with the argument that conceptualizing schools as complex systems, composed of many networked parts that give rise to emergent patterns through their interactions, holds promise for understanding important problems (Maroulis et al., 2010). Thus, this inquiry may contribute to the body of knowledge on school leadership, deepening our understanding regarding the factors that contribute to PST.

The research questions that guided this investigation were as follows:

**R1: Which ST activities do principals use, how frequently, and to what extent?**

**R2: How do the principals’ personal characteristics of gender and seniority shape their PST activities?**

**R3: How do PST activities facilitate the organizational qualities of middle-leaders’ organizational commitment and job satisfaction?**
Theoretical background and hypotheses

ST is a holistic approach aimed at exploring options for system improvement (Checkland & Poulter, 2006). This approach arises from the complexity theory, which provides conceptual tools to conceptualize how order appears within complex systems (Johnson, 2010), and serves as an important framework for understanding wholes, their parts and how they interact (Wilson & Van Haperen, 2015). According to this approach there are connections between all parts of any given system; each part affects others (Checkland & Poulter, 2006; Richmond, 1994; Senge, 2006). In contrast to the prevailing reductionist approach that attempts to understand systems by breaking them down into sub-systems (Rosenberg, 2006), ST focuses on the emerging organizational properties created by the ongoing interactions among the system’s components. Accordingly, in order to fully understand why a certain phenomenon arises and persists, it is essential to understand its parts in relation to the whole (Hammond, 2005).

Research literature suggests that ST is an effective approach in various fields (Wilson & Van Haperen, 2015). First, it facilitates group learning, shared decision-making and improved organizational resilience (Jaaron & Backhouse, 2014). Second, it increases coordination and cooperation between authorities and agencies (Leischow et al., 2008). Third, it was found to assist managers in dealing with environmental conflicts (Elias, 2008) and to facilitate planning and resource mobilization (Chu & Jia, 2014). Finally, the ST approach is an interdisciplinary conceptual framework that can be adapted to an exceptionally wide range of areas such as scientific, organizational, personal, and various public arenas as well.

Within the educational context, research has demonstrated that ST helps in dealing with specific local domains within the school. For example, Dyehouse, Bennett, Harbor, Childress, and Dark (2009) indicated that applying ST in evaluating educational programs improves the precision of data interpretation and assessment. This precision is achieved through observing the given problem from a new perspective, and from formulating solutions that arise from identifying patterns and relationships within the school system. Similarly, Wells and Keane (2008) demonstrated how ST helps supervisors to form and activate professional learning communities.

Miller-Williams and Kritsonis (2009) suggested that ST may provide a primary framework for comprehensive school reform through strategic planning focused on pre-determined measurement results that encompass the organization’s resources and objectives and define how the latter are to be achieved. In addition, ST was proposed as a framework for addressing the problem of teachers’ attrition by promoting creative and unique solutions (Minarik, Thornton, & Perreault, 2003). Finally, ST is also useful in improving schools’ public relations by helping educational leaders see the school community’s responses as a continual and systematic process necessary for encouraging community support of the school to improve students’ learning (Chance, 2005).

ST was proposed for school principals, to help them face the demands and challenges of the complex educational system (Senge et al., 2012). Recently, Author3 and Author4 (2014, 2017) pinpointed a wide range of areas in which ST can be applied by school principals in daily school life, including the following areas: discipline, school resources, “difficult” students, event analysis, violence prevention, student achievements and parents’ inquiries. They have suggested that by embracing a holistic approach, ST enables principals to better understand processes that occur and outcomes that manifest in their school settings. More recently, Shaked et al. (2018) identified four activities of PST through which effective principals apply it in their schools, as presented below:

(1) Adopting a multidimensional view. This activity refers to the principal’s choice of a multifaceted perspective on school issues. This refers to their internalizing that every particular event has several possible reasons, courses of action, and responses, and that they should take into account that each event is affected by, and affects, other components of the system. This activity includes some sub-characteristics such as: (a) varied effects of components and operations – effective principals consider any phenomenon or action to be
influenced by various elements of the system, and consider the possibility that various effects arise from interactions within the system; (b) motivations and implications – understanding that since each element is part of the large and complex school system, it necessitates contemplation in terms of the motivations and implications that have led to a certain event; (c) small changes can produce significant results – the focus is on seeking the sort of change that will bring about significant improvement with minimal effort; (d) tolerating ambiguity and uncertainty – based on the ability to understand that the seemingly-separate details of a given situation are actually parts of one big picture.

(2) Openness to a variety of opinions. This activity refers to the principal’s acknowledgment of the existence of multiple opinions. This includes principals’ self-awareness of their limitations and willingness to learn from others. This activity includes the following sub-characteristics: (a) involving teachers in decision-making – engaging staff members in discussion to share thoughts, experiences, reflections and points of view before reaching decisions; (b) clarifying the causes of various events – principals’ clarification of the reasons that have led to certain events, thus avoiding disproportionate reliance on the principal’s personal views which may actually be erroneous; (c) holding discussions with people who have conflicting educational views – listening to opposing perspectives which opens up additional ways of thinking, allowing the principal to see the picture more broadly.

(3) Leading wholes. This activity refers to the principal’s capacity to see any topic in the school from a holistic point of view. A holistic perspective is oriented toward seeing the big picture and not only its parts, i.e., it facilitates the perception and conceptualization of various issues and aspects of school life as wholes, rather than as a collection of isolated components. This activity includes three sub-characteristics: (a) seeking solutions that influence the entire workplace environment, and not only specific details – stemming from the understanding that each detail is part of one large picture; (b) identifying recurring patterns – principals who wish to see the full picture of events will look back and try to connect events that seem unrelated in order to discover structures and patterns; (c) viewing multiple perspectives – different points of view concerning a given subject may form a comprehensive big picture and a thorough understanding of the situation.

(4) Evaluating significance. This activity refers to the principal’s ability to examine the importance and relevance of each element in light of the entire system. This involves sorting out the elements and events according to their order of importance in the system, filtering events that are less significant to the system in the given context, and identifying those that consist warning signs indicating specific problems. This activity includes four sub-characteristics: (a) identifying small events that have broad repercussions – the ability to identify events that seem minute and marginal, but in fact have significant implications for the entire system; (b) taking unexpected occurrences into account – identifying potential occurrences and treating problems even before they fully unfold; (c) making decisions in accordance with school goals; and (d) using a variety of perspectives to reach a decision in order to examine the true weight of certain events.

Based on the above typology, this study’s first goal is to exhibit a picture of the extent and frequency of PST activities. The second goal is to examine whether the principals’ characteristics of gender and seniority influence their tendency to employ ST. The third goal is to determine how these activities are related to the organizational qualities of middle-leaders’ job satisfaction and organizational commitment.

**Antecedents to PST: principals’ gender and seniority**

In the present study, we focus on principals’ gender and seniority, with seniority referring to the duration of employment in the school. These characteristics were chosen as predictors of the PST since studies have shown a significant correlation between these personal characteristics and
principals’ leadership behavior (Goldring, Huff, May, & Camburn, 2008; Sebastian & Moon, 2017). Therefore, we propose that principals’ gender and seniority may influence principals’ tendency to employ PST activities.

**Principal gender**

Various researchers have explored gender’s impact on leadership style (Eagly, Johannesen-Schmidt, & van Engen, 2003; Sebastian & Moon, 2017), which was found to be related to social and communal norms associated with typical gender roles (Eagly & Johannesen-Schmidt, 2001). Specifically, female leadership style has been characterized as collaborative and supportive, with interpersonal relationships that are collegial, friendly, emotional, humane and caring (Sebastian & Moon, 2017). In addition, females tend to lead in a subjective, democratic, participatory and interactive way. Research showed that women tend to promote cooperation over competition, and to solve problems by adapting, negotiation, consultation and compromise (Sebastian & Moon, 2017). In contrast, the male leadership style typically includes characteristics such as determination, courage, power, security, aggression, objectivity, logic, self-confidence and vigor (Eagly et al., 2003). Research also showed that male managers display a more autocratic and directive leadership style than women (Sebastian & Moon, 2017).

ST activities of Adopting a multidimensional view and Openness to a variety of opinions involve collaboration between principals and the school community, i.e., the teaching staff, parents and students (Shaked et al., 2018). Through collaboration, principals hear opinions from community members and thus may become acquainted with many aspects of the topic at hand. Such activities involve an expansion of interpersonal relationships. In addition, this collaboration may help principals to correctly Evaluate significance of various events in school life and present a holistic perspective that reflects the activity of Leading wholes. Since PST encompasses activities that are characterized by a more democratic, participatory, interactive and caring approach, enhancing interpersonal relationships, it seems that a female leadership style which emphasizes cooperation and collegiality would be more related to PST than a male leadership style. Hence,

**H1:** Differences will be found between male and female principals in their levels of PST activities of Adopting a multidimensional view, Openness to a variety of opinions, Leading wholes and Evaluating significance: a higher level of ST activities will be found among women principals compared to men principals.

**Principal seniority**

The literature on principal seniority pointed to several models for describing the career stages of school principals’ development (Earley & Weindling, 2004). The underlying assumption behind these models is that school principals progress through a series of distinct occupational stages during their careers, with each stage being characterized by changes in aims, needs, dilemmas, perspectives, behaviors, and relationships (Oplatka, 2012).

Four common key stages were observed as principals progress through their career, although development through these stages may not be linear and continuous: (1) the induction stage – in which novice principals undergo socialization to the school and to their role; (2) the self-establishment stage – characterized by growth and enthusiasm; (3) the maintenance stage – which usually takes place in mid-career years, during which some principals may feel a sense of stagnation, erosion and loss of enthusiasm, while others may still continue to exhibit high levels of enthusiasm and job satisfaction; and (4) the disenchantment stage – which characterizes veteran principals who feel a sense of stagnation and being trapped in their position. At this stage, principals experience a decline in enthusiasm and usually respond negatively to any initiative for change (Oplatka, 2012). However, this is not to say that all principals at some point are necessarily a uniform group that behaves in the same way. There may be
other factors, such as personality, or past experiences that can affect the principals’ behavior and the pace of their transition between the various stages (Oplatka, 2010).

Considering the overall norm, relatively new principals may need quite a bit of support from those around them as they are at a stage where they are undergoing socialization. Principals at the earlier stage of their career tend to discuss various issues with colleagues and with the school community at large, involving them in decision-making. However, as principals with high seniority may experience a decline in enthusiasm and sometimes react negatively to initiative suggesting change, they may tend to avoid listening to different opinions than their own. This is consistent with previous theories explaining career stages (Daresh, 1986; Day & Bakioghu, 1996; Huberman, 1989; Super, 1990; Weindling, 1999), indicating less varied and challenging tasks as the seniority progresses. Similarly, in Bowers and White (2014) study, veteran principals were found to be less involved in activities relating to the achievement growth of their school.

PST is characterized by a willingness to learn from others’ opinions. Adopting a multidimensional view as well as Openness to a variety of opinions lead to discussions even with people who hold different educational perceptions and opinions. Similarly, this gives rise to the educational staff’s involvement in decision-making (Shaked et al., 2018). A senior principal who is less open to change may prefer to avoid discussions involving the educational staff in decision-making. Moreover, principals who engage in Leading wholes seek innovative and creative ideas for finding holistic solutions to improve the entire system. Such ideas involve change, therefore principals with high seniority who sometimes tend to respond negatively to suggestions for change may not be overjoyed by the prospect of dealing with these new initiatives. Finally, Evaluating significance necessitates sorting and selecting events that require treatment. This choice involves a change in the principal’s routine work. Thus, senior principals who would rather stick to their familiar tasks are less likely to apply Evaluating significance. To conclude, a senior principal may be less open to innovative initiatives, changes and differing opinions, and thus may be less inclined to use ST than a more junior principal. Therefore,

**H2: Principal seniority is negatively associated with the PST activities of Adopting a multidimensional view, Openness to a variety of opinions, Leading wholes and Evaluating significance.**

**Consequences of PST: job satisfaction and organizational commitment**

In investigating organizational qualities, we focus on middle-leaders’ job satisfaction and organizational commitment to the school. Job satisfaction refers to teachers’ affective reactions to their work or to their teaching and administrative roles (Skaalvik & Skaalvik, 2017). Organizational commitment is defined by Mowday, Steers, and Porter (1979) as “the relative strength of an individual’s identification with and involvement in a particular organization”.

**Job satisfaction**

Research has indicated that teachers’ job satisfaction plays an important role in predicting student outcomes. Teachers who are highly satisfied with their jobs tend to have higher levels of motivation and an increased commitment to their students (Rocchi & Camiré, 2018). Thus, teachers’ job satisfaction has also been considered an important element in understanding their burnout and absenteeism (Neto, 2013) and is likely to influence their decision to leave a school or the field of teaching altogether (Shen, Leslie, Spybrook, & Ma, 2012).

Studies have shown that organizational and leadership factors are among the explanatory parameters of job satisfaction. Organizational factors include employees’ participation in the organization’s decision-making processes, as well as in various additional aspects of the work environment such as employee empowerment, training and development (Bogler & Nir, 2015; Fritzsche & Parrish,
Leadership factors include principals’ leadership style and principals’ support of their staff (Cerit, 2009; Dou, Devos, & Valcke, 2017). ST is a leadership approach that creates a supportive and empowering environment, contributing to job satisfaction. Specifically, Adopting a multidimensional view encourages the sharing of ideas and thoughts between the management team, the teaching staff and the school community. Teachers in general, and middle-leaders in particular, can voice their own unique personal views and contemplate various subjects from a variety of perspectives. Sharing of this sort can contribute to job satisfaction (Bogler & Nir, 2015). As for Openness to a variety of opinions, principals who demonstrate this ST activity, engage in personal interactions creating a platform for knowledge exchange and staff members’ joint exploration (Author3 et al., 2018; Price-Mitchell, 2009). Such a collaborative-learning work environment, which enhances knowledge exchange, may enhance job satisfaction (Dou et al., 2017). In the context of Leading wholes, principals who engage in it effectively seek and find solutions that influence the entire work environment (Author3 et al., 2018), contributing to its becoming a positive and healthy one, increasing middle-leaders’ job satisfaction. Finally, principals who Evaluate significance will deal with the most important and significant issues and choose to share them with their staff. Involving middle-leaders in such important issues may promote their feelings of empowerment, increasing their motivation and improving their job satisfaction. Hence,

H3: PST activities of Adopting a multidimensional view, Openness to a variety of opinions, Leading wholes and Evaluating significance are positively associated with middle-leaders’ job satisfaction.

Organizational commitment

Based on three factors, organizational commitment is comprised of: identification – acceptance of the organization’s goals and values; involvement – willingness to invest efforts on behalf of the organization; and loyalty – the level of importance which the employee attaches to keeping up membership in the organization (Bogler & Somech, 2004). Organizational commitment is essential for school effectiveness and may indirectly affect students’ achievements (Park, 2005). Several studies indicated that school staff’s commitment to the school can be an important predictor of teachers’ job performance since it is positively related to their dedication to attaining its goals (Dee, Henkin, & Singleton, 2006).

Studies indicated that when teachers are involved in the school’s organizational activities and receive opportunities to influence practices, policies, and instruction, they demonstrate a higher level of organizational commitment (Ware & Kitsantas, 2011). Similarly, studies showed that school faculty cooperation, trust and autonomy affect their commitment to the school. PST involves Leading wholes, which includes viewing their middle-leaders as an integral part of the system and seeking their views and perspectives in order to obtain a comprehensive picture. Similarly, Adopting a multidimensional view means listening to teachers’ opinions in order to obtain a broader picture of reality. Such activities are likely to lead middle-leaders to feel connected, involved and motivated to be active participants in school activities by taking on additional responsibilities and engaging in decision-making (Shaked & Schechter, 2017). In addition, PST involves Openness to a variety of opinions achieved by conducting discussions and sharing ideas with various staff members (Author3 et al., 2018), allowing principals to Evaluate significance of the various events at hand. Providing an opportunity for middle-leaders to be involved in decisions, which traditionally were not within the scope of their duty, including when they suggest views that conflict with those of senior staff members, may raise their morale. In this way, they identify with the school’s goals, which in turn can strengthen their desire to remain members of the school and demonstrate a willingness to invest the extra effort required for fulfilling their duties. Thus, it seems that PST activities can create conditions conducive to organizational commitment. Therefore,
**H4:** PST activities of Adopting a multidimensional view, Openness to a variety of opinions, Leading wholes and Evaluating significance are positively associated with middle-leaders’ organizational commitment.

**Method**

**Setting**

The Israeli national school system serves approximately 2 million students, with approximately 73 percent in the Jewish sector and 27 percent in the Arab sector (Israeli Central Bureau of Statistics, 2016). The Israeli student achievement distribution is characterized by a low level of achievement, as evidenced in Gini coefficient that measures a nation’s distributional inequality. The gap is evident between Jews and Arab (About 155 points higher for the Jewish students than the total test score of 800) and students from weak socioeconomic backgrounds and those from strong backgrounds (Organization for Economic Co-operation and Development – OECD, 2016). Mindful of this great diversity of school populations, declared policy in Israel has been directed toward narrowing the achievement gap upwards. However, despite policy efforts, the achievement gap remains extremely wide (BenDavid-Hadar, 2016).

**Participants and procedure**

Data collection was performed in several steps. After receiving the approval for the research project by the Ministry of Education, schools were randomly selected from a list of elementary schools provided by the Ministry of Education. At first, we contacted each school’s principal, explained the study’s purpose, guaranteed anonymity, and emphasized the importance of candid answers. After the principals committed to having their school participate, the questionnaires were distributed to middle-leaders for completion. The questionnaires dealt with their PST activities, job satisfaction and organizational commitment. Both principals and middle-leaders provided demographic information.

Data were collected from a sample of 229 middle-leaders and their principals randomly chosen from 229 schools in Israel. Middle-leaders sampled were subject coordinators. Only middle-leaders who had worked in the school for more than one year were included in the study so as to ensure that all respondents had sufficient time to develop perceptions and attitudes toward their organizations, principals and coworkers.

The demographic breakdown for the middle-leaders was as follows: sixty two percent of the middle-leaders were women; their average age was 39.06 years (SD = 7.34), and their average job tenure in the profession was 12.29 years (SD = 7.52). With respect to education, 70.4% held a B.A., 28.3% held an M.A. As for the principals, 66% of them were women and their average tenure in their present school was 9.44 years (SD = 6.95). With respect to education, 15.6% held a B.A., 74.4% held an M.A., and 5% held a PhD. School size was based on the number of enrolled students with an average of 407.99 enrolled students per school (SD = 165.13).

**Measures**

**Principals’ systems thinking**

To assess the frequency at which a principal displayed ST activities, middle-leaders answered the 17-item PST scale validated for schools by Shaked et al. (2018). To analyze the internal structure of the PST scale, we conducted a confirmatory factor analysis (CFA). The CFA indicated acceptable goodness-of-fit indexes ($\chi^2$/df = 1.596, CFI = .947, TLI = .934, IFI = .948, RMSEA = .051). Based on CFA, PST includes four ST activities: Adopting a multidimensional view (e.g., ‘The principal tries to understand how certain components of the school affect the way other components in it function’;
6 items, $\alpha = .78$); Openness to a variety of opinions (e.g., ‘The principal tends to involve teachers in decision-making processes’; 4 items, $\alpha = .83$); Leading wholes (e.g., ‘The principal tends to suggest solutions that affect the entire work environment, rather than just specific details’; 3 items, $\alpha = .79$); Evaluating significance (e.g., ‘The principal spots small events that are nevertheless meaningful’; 4 items, $\alpha = .73$). Middle-leaders responded on a 5-point Likert scale, ranging from (1) Never to (5) Always (Please see Appendix).

**Job satisfaction**
Job satisfaction was assessed by Zak’s (1975) 10-item questionnaire (e.g., ‘If I had to choose a new profession, I would choose the same one’; ‘Overall I’m satisfied with my job’; $\alpha = .81$). Middle-leaders responded on a 5-point Likert scale, ranging from (1) Strongly disagree to (5) Strongly agree.

**Organizational commitment**
To measure middle-leaders’ organizational commitment, we used the Mowday, Steers, and Porter’s (1979) Organizational Commitment Questionnaire, adapted by Somech and Bogler (2002), which was specifically adjusted to suit the educational setting. The 15 items refer to the strength of an individual’s identification with, and involvement in, a particular organization (e.g., ‘I talk about my school with my friends as a great place to work at’; $\alpha = .80$). Middle-leaders responded on a 5-point Likert scale, ranging from (1) Strongly disagree to (5) Strongly agree.

**Demographic information**
Both principals and middle-leaders filled out a demographic information questionnaire, which included personal variables (age and gender), professional variables (education, seniority in the profession, seniority in the organization and role in school) and organizational variable (number of students in the school).

**Data analysis**
In order to determine if principals made differential use of one or more of the PST activities, we first used ANOVA analyzes of variance with repeated measures. Next, in order to discover if principals’ characteristics of gender and seniority were related to ST, multiple regression analyses and $t$-test analysis were employed. Finally, in order to identify which of the activities of the PST variables were the best predictors of the organizational qualities of job satisfaction and organizational commitment, two stepwise multiple regression analyses were conducted. Data analyzes was conducted using SPSS 21 software.

**Researchers’ role**
Attention was paid to how the researchers’ personal experiences might impact theoretical and methodological perceptions concerning the inquiry. As the researchers of this study come from different backgrounds, Author 1 works in the Israeli school system, Author 3 was a school principal for 17 years and is currently an educational leadership researcher while Author 2 and Author 4 explore the Israeli school system as University researchers. This joint work, which includes ongoing mutual reflection, allowed the authors to become more aware of the conceptual and methodological issues pertaining to the current research. Inquiring into systemic thinking based on multidimensional views and opinions of various research group members may raise conceptual and methodological issues for possible future avenues of research (please see this section at the latter part of the manuscript).
Results

Description of PST activities: distribution and frequency

We have aimed to shed light on PST activities by examining and analyzing their mean frequency and distribution. An examination of PST frequencies indicated that the means were between 3 – “moderately” and 4 – “often shown” levels, indicating high occurrence for all activities. Adopting a multidimensional view occurred the most (see Table 1) and was the activity most frequently engaged in (86.5%) by principals, with the highest average mean of 3.67 (SD = .55), followed by Evaluating significance (77.3%) with an average mean of 3.61 (SD = .71). Openness to a variety of opinions (72.1%) was prevalent among the majority of principals with an average mean of 3.54 (SD = .72). According to middle-leaders’ perceptions, principals engaged less frequently in Leading wholes (67.7%) with an average mean of 3.58 (SD = .74).

The descriptive statistics and inter-correlations among the study variables are presented in Table 1.

ANOVA analysis

In order to determine if principals accorded differential use to one or more of the ST activities, we first used ANOVA analyses of variance with repeated measures (Table 2). Results indicated that differences between each of the repeated factors of the PST activities of Adopting a multidimensional view, Openness to a variety of opinions, Leading wholes and Evaluating significance was significant (F (3, 684) = 3.02, p < .05, η² = .01). In line with Kirk (1996), partial eta-squared values (η²) are provided as indicators of effects and their size effects. Kirk (1996) has also recommended rules of thumb for estimating degree of effect: small, medium, and large degree of effect for an F-statistic have partial eta-squared values of .01, .06, and .14, respectively. These partial values reveal a small effect (Kirk, 1996).

Fisher’s LSD tests were used to follow up this effect. Post-hoc LSD comparisons (Table 2) reveal that the largest mean differences were found between Adopting a multidimensional view (M = 3.67, SD = .55) and Openness to a variety of opinions (M = 3.54, SD = .72) and between Adopting a multidimensional view and Leading wholes (M = 3.58, SD = .74). However, no mean difference was found between Adopting a multidimensional view and Evaluating significance (p > .05). Also, no mean difference was found between Openness to a variety of opinions and Leading wholes (p > .05) or between Leading wholes and Evaluating significance (p > .05). Furthermore, with a standard deviation of .55, the Adopting a multidimensional view variable was characterized by a nonnormal distribution tending toward higher levels (see Table 2 and Figure 1). This reveals principals’ strong tendency to see several aspects of a given issue simultaneously. It is noteworthy that this is the lowest dispersion in comparison with the other PST

Table 1. Descriptive statistics and intercorrelation matrix for study variables N = 229.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>% Responding More than “moderately”</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
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<tbody>
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<td>1 PST: Total</td>
<td>3.64</td>
<td>.51</td>
<td>90.4</td>
<td>.84***</td>
<td>.75***</td>
<td>.72***</td>
<td>.79***</td>
<td>.21***</td>
<td>.43***</td>
<td>-.35**</td>
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</tr>
<tr>
<td>2 PST: Adopting a multidimensional view</td>
<td>3.67</td>
<td>.55</td>
<td>86.5</td>
<td>.46***</td>
<td>.46***</td>
<td>.57***</td>
<td>.10</td>
<td>.36***</td>
<td>-.29**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 PST: Openness to a variety of opinions</td>
<td>3.54</td>
<td>.72</td>
<td>72.1</td>
<td>.52***</td>
<td>.48***</td>
<td>.20***</td>
<td>.24***</td>
<td>-.31**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 PST: Leading wholes</td>
<td>3.58</td>
<td>.74</td>
<td>67.7</td>
<td>.46***</td>
<td>.17***</td>
<td>.31***</td>
<td>.32**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 PST: Evaluating significance</td>
<td>3.61</td>
<td>.71</td>
<td>77.3</td>
<td>.22***</td>
<td>.41***</td>
<td>.23**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Job satisfaction</td>
<td>3.75</td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
<td>.51***</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Organizational commitment</td>
<td>3.66</td>
<td>.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.34**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Seniority</td>
<td>9.44</td>
<td>6.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PST = Principals’ systems thinking
*p < .05; **p < .01; ***p < .001.
activities, indicating principals’ tendency to perceive any given issue’s emergence and existence as stemming from a wide range of potential sources.

*Evaluating significance*, the second highest mean with an average mean of 3.61 (SD = .71) and a high dispersion, indicates the differences across the sample regarding principals’ tendency to consider elements of school life according to their significance in terms of the entire system, distinguishing between important and less important issues to be resolved, and identifying patterns (see Table 2 and Figure 1). Regarding *Leading wholes* activities, descriptive statistics reveal that this activity presents an average mean of 3.57 (SD = .74), and the highest dispersion as compared with the other PST activities, indicating differences regarding principals’ tendencies to adopt a holistic view, i.e. to see the big picture (see Table 2 and Figure 1). Finally, although the mean score for the PST of *Openness to a variety of opinions*, which involved the principal’s desire to understand the full picture by listening to additional points of view, appeared to be the lowest mean with an average of 3.53 as compared with other activities, it is worth noting that *Openness to a variety of opinions* also had a high dispersion (SD = .72) (see Table 2 and Figure 1).

### Table 2. Post-hoc analysis for the principal systems thinking activities.

<table>
<thead>
<tr>
<th>(I) factor1</th>
<th>(J) factor1</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopting a multidimensional view</td>
<td>Openness to a variety of opinions</td>
<td>.13**</td>
<td>.04</td>
</tr>
<tr>
<td>Adopting a multidimensional view</td>
<td>Leading wholes</td>
<td>.09*</td>
<td>.04</td>
</tr>
<tr>
<td>Adopting a multidimensional view</td>
<td>Evaluating significance</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Openness to a variety of opinions</td>
<td>Leading wholes</td>
<td>−.04</td>
<td>.04</td>
</tr>
<tr>
<td>Openness to a variety of opinions</td>
<td>Evaluating significance</td>
<td>−.07</td>
<td>.04</td>
</tr>
<tr>
<td>Leading wholes</td>
<td>Evaluating significance</td>
<td>−.03</td>
<td>.05</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01.

![Figure 1. Mean frequencies for principal systems thinking activities.](image-url)
Hypotheses test

**ST antecedents: principal characteristics of gender and seniority**

The results showed that there were no significant differences in the level of PST between male and female principals (\( p < .05 \)). In addition, no significant differences were found between male and female principals in each of the ST activities (\( p < .05 \)). This is not in line with hypothesis 1.

A multiple regression analysis was computed to determine seniority’s contribution to PST prediction. PST was used as the dependent variable and seniority was used as a predictor. The analysis showed (see Table 3) that seniority accounted for 12% of the variance in PST (\( F(1,85) = 11.61, p < .05 \)). In line with hypothesis 2, results showed that seniority was negatively associated with PST (\( \beta = -.35, p < .001 \)).

**ST outcomes: the organizational qualities of job satisfaction and organizational commitment**

**Job satisfaction**

The regression analysis showed (see Table 4) that PST significantly explained 4.6% of variance in job satisfaction (\( \beta = .21, p < .005 \)). This result is in line with hypothesis 3. In order to identify which of the PST activities were the best predictors of job satisfaction, we conducted a multiple regression analysis. Job satisfaction was used as the dependent variable. The PST variables of Evaluating significance, Openness to a variety of opinions, Leading wholes and Adopting a multidimensional view were used as predictors. Regression analysis (Table 4) shows that 6.9% of the variance in job satisfaction was explained by only one predictor, Evaluating significance (\( \beta = .19, p < .05 \)).

**Organizational commitment**

The regression analysis results showed (see Table 5) that PST significantly explained 18.9% of variance in organizational commitment (\( \beta = .43, p < .001 \)). This result is in line with hypothesis 4. In order to identify which of the PST activities were the best predictors of organizational commitment, we conducted an additional regression analysis. Organizational commitment was used as the dependent variable. The PST variables of Adopting a multidimensional view, Openness to a variety of opinions, Leading wholes and Evaluating significance were used as predictors.

<table>
<thead>
<tr>
<th>Table 3. Regression results of seniority’s influence on PST activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictors</td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>ST: Total</td>
</tr>
<tr>
<td>F = 11.61***</td>
</tr>
<tr>
<td>ΔR² = 12.0</td>
</tr>
</tbody>
</table>

***p < .001.

<table>
<thead>
<tr>
<th>Table 4. Regression results of PST activities of evaluating significance, openness to a variety of opinions, leading wholes, and adopting a multidimensional view on job satisfaction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictors</td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>Adopting a multidimensional view</td>
</tr>
<tr>
<td>Openness to a variety of opinions</td>
</tr>
<tr>
<td>Evaluating significance</td>
</tr>
<tr>
<td>Leading wholes</td>
</tr>
<tr>
<td>F = 4.15***</td>
</tr>
<tr>
<td>ΔR² =.69</td>
</tr>
</tbody>
</table>

***p < .001.
Regression analysis (Table 5) showed that Evaluating significance and Adopting a multidimensional view explained 20.3% of the variance in organizational commitment and were the best predictors of organizational commitment respectively ($\beta = .17$, $p < .05$; $\beta = .27$, $p < .001$).

Discussion

The research literature presents ST as an effective management approach that facilitates the overcoming of situations characterized by dynamic change and complexity (Wilson & Van Haperen, 2015). It has been explored as a means of dealing with specific local school issues (Brown, 2012; Jolly, 2015) and was also recommended for school principals (Fullan, 2014; Benoliel, Shaked, Nadav, & Schechter, 2019). The present study was geared toward examining a set of elementary principals’ ST activities and determining the frequency of their use in Israel. In addition, we examined the relationship between principals’ individual characteristics of gender and seniority and PST activities, as well as PST activities’ relationship to the organizational qualities of middle-leaders’ job satisfaction and organizational commitment.

First, regarding the results related to the dispersion and frequency of the proposed set of activities, an examination of the frequencies indicated that the means were between 3 “moderately” and 4 “often shown” levels, indicating high occurrence for all activities. The complex challenges with which the present day’s principals often deal are characterized by rapid change, high and diverse expectations on the part of principals, supervisors and students’ parents (Crick et al., 2017; Maroulis et al., 2010). The results of the current study show that principals often employ ST strategies, which were found to be effective in coping with organizational complexity (Jaaron & Backhouse, 2014; Wilson & Van Haperen, 2015). Adopting a multidimensional view occurred most often, and was the activity most frequently engaged in by principals, with the highest average mean. These results may be explained, at least to some extent, by Frank’s (2010) assertion that a wide range of jobs and organizational positions leads to broad multidisciplinary and interdisciplinary knowledge. Such knowledge enables the examination of events from a multidimensional perspective. This is consistent with school principals’ typical course of development as they often begin their professional careers as teachers and eventually progress to management positions through a variety of administrative and leadership roles as well as formal responsibilities, the holders of which are often referred to as “middle-leaders” (Bush, 2009). These roles include grade-level coordinators, department coordinators, vice-principals, counselors and others. Experience in a variety of roles helps principals to acquire many points of view regarding school reality. Principals’ diverse and numerous experiences allow them to understand the importance of Adopting a multidimensional view, which this study has found to be the activity with the highest mean.

Results also showed that principals tended to engage “moderately often” to “often” in Evaluating significance, namely in determining the significance of various occurrences in everyday school life from the perspective of the system as a whole. This activity is particularly important as it is conducive to identifying unexpected events and taking them into account in advance, as well as identifying the potential for one occurrence to influence others and the whole (Frank, 2010). Moreover, it plays an important role in principals’ ongoing sense-making. Author3 and Author4 (2017) argued that with ST as a common frame of reference, principals can make sense of events and increase information sharing.

Table 5. Regression results of PST activities of evaluating significance, openness to a variety of opinions, leading wholes, and adopting a multidimensional view on organizational commitment.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>$\beta$</th>
<th>$t$</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>9.82</td>
<td>.00</td>
<td></td>
</tr>
<tr>
<td>Adopting a multidimensional view</td>
<td>.17</td>
<td>2.16</td>
<td>.03</td>
</tr>
<tr>
<td>Openness to a variety of opinions</td>
<td>-.03</td>
<td>-.42</td>
<td>.67</td>
</tr>
<tr>
<td>Leading wholes</td>
<td>.12</td>
<td>1.65</td>
<td>.10</td>
</tr>
<tr>
<td>Evaluating significance</td>
<td>.27</td>
<td>3.59</td>
<td>.00</td>
</tr>
</tbody>
</table>

$F = 14.24^{***}$

$\Delta R^2 = 20.3$

***$p < .001$. 

Regression analysis (Table 5) showed that Evaluating significance and Adopting a multidimensional view explained 20.3% of the variance in organizational commitment and were the best predictors of organizational commitment respectively ($\beta = .17$, $p < .05$; $\beta = .27$, $p < .001$).
among school staff, thus advancing the potential for organizational goal accomplishment. Sense-making theorists have argued that this action is based, among other things, on the selection of information from the environment (Porac, Thomas, & Baden-Fuller, 1989; Weick, 1995). Leaders determine what to emphasize, downplay, or ignore in situations they must interpret (Evans, 2007). Therefore, Evaluating significance may support the sense-making process, which principals undergo personally and collectively while dealing with the growing complexity in school systems.

Regarding principals’ characteristics of gender and seniority, our results showed that principal seniority in the organization was negatively related to the tendency toward ST. The greater the principals’ seniority, the lower their tendency to engage in ST activities. This finding is aligned with previous research (Hvidston, Range, McKim, & Mette, 2015; Oplatka, 2012) indicating that late career principals tend to less prioritize innovative instructional initiatives or prefer to engage in routine tasks. However, our results showed that novice principals were perceived as using ST activities. PST includes discussions, involving the educational staff in decision-making and searching for creative ideas for dealing with events in a holistic manner. Perhaps because novice principals who are still at the height of their professional growth and enthusiasm (Oplatka, 2012), and who draw support from their environment, are more likely to be receptive to change. However, there may be other characteristics besides seniority that may affect openness to change and continuous personal renewal.

As for gender, results indicated that this characteristic did not influence tendencies toward PST. A review of gender and leadership literature has shown that there are studies pointing to differences between women and men in leadership style (Sebastian & Moon, 2017). However, although this result is surprising, it may be due to an organizational culture. In this regard, research literature indicates that leadership styles and behaviors seem to be more related to the type and culture of the organization than to individual employees’ gender (Martin, 2015). This may explain our study’s findings, which examined leadership style in elementary schools. The data of the Israeli Central Bureau of Statistics show that in elementary schools most school leaders are women, and the vast majority of teachers are women as well (Israeli Central Bureau of Statistics, 2017). Therefore, it seems that primary school culture is more feminine in style. If the principal’s leadership style and the teaching staff’s behavior are influenced by the female culture in the school, this may explain why no differences were found between men’s and women’s PST activities.

This study also proposed to investigate the relationship between PST and the organizational qualities of middle-leaders’ job satisfaction and organizational commitment. In line with our hypotheses, the results showed positive correlations between PST and middle-leaders’ job satisfaction and organizational commitment. It seems that PST activities make for a supportive and empowering work environment. Adopting a multidimensional view and Openness to a variety of opinions encourage the teaching staff to be active in decision-making and to take responsibility. Leading wholes is conducive to finding solutions that influence the entire workplace environment. Evaluating significance advocates filtering out less essential elements of the complex and dynamic school reality. Middle-leaders’ participation in organizational activity in a way that affects the significant aspects of school life creates a sense of empowerment and a work environment encouraging job satisfaction and organizational commitment (Ware & Kitsantas, 2011). These results are particularly important since researchers presume that job satisfaction is an independent variable that is a predictor of other behaviors in the organization (Hsieh, 2016; Schermuly, Schermuly, & Meyer, 2011). Similarly, organizational commitment plays an important role in organizations and in employee development, correlating positively with job performance, organizational compliance, personal development, loyalty to the organization, and individual initiatives (Bogler & Nir, 2015).

More importantly, this study’s results confirmed not only that PST is advantageous to job satisfaction and organizational commitment, but that principals tend to perform the specific activities that enhance organizational qualities more frequently than they use the other two ST activities. Indeed, our results show that Evaluating significance emerged as the best predictor of job satisfaction whereas Evaluating significance and Adopting a multidimensional view were the best predictors of organizational commitment. These results may be explained by the fact that the
A principal who acts in line with **Evaluating significance** sorts and filters events that are less significant to the system and deals primarily with the issues most important for the school (Shaked & Schechter, 2017). Similarly, they share information with their staff members and ask for their opinions on given topics. In this way, they can form a multidimensional perspective on the issue at hand. Sharing and involvement of staff members lead to their increased commitment to the organization (Ware & Kitsantas, 2011).

Turning to practice, first, the findings of this study reveal the relationship between PST and middle-leaders’ job satisfaction and organizational commitment. Therefore, implementing the ST approach at the management level can help principals overcome the school management complexity and enhance middle-leaders’ satisfaction and organizational commitment, which may lead to improve school outcomes (Park, 2005; Rocchi & Camiré, 2018). Second, the results showed that **Adopting a multidimensional view** and **Evaluating significance** are the main activities according to which job satisfaction and organizational commitment can be predicted. This underscores the importance of developing and strengthening these activities. However, this study also showed that senior principals tend to make less use of ST. Therefore, it is particularly important to assimilate ST application among these principals, throughout the various stages of their careers, as it will give them practical tools to advance in their role. The assimilation of ST activities can be done through seminars for senior principals, as well as via various courses, staff meetings, learning communities and the like. In these settings, principals will raise problems and issues which they encounter in school life, and discuss various possibilities of dealing with them with their colleagues. Such meetings may help principals to open up to a variety of opinions emanating from the people around them, and to examine a given topic’s multiplicity of aspects, leading to a holistic perspective oriented toward seeing the big picture and the relevance of each element within it to the entire system.

Finally, the systems thinking approach can be incorporated into preparation programs for pre-service principals. In this regard, mentoring and practicing the approach for principals at different stages of their educational careers can be part of professional development in advanced studies, academic courses and instruction books. Teaching this approach may help principals see the school as a whole system while taking into account the interdependencies that result from the relationships between the various system’s components.

**Limitations and future research**

This study has several limitations warranting further inquiry. First, the data were largely self-reported and therefore subject to bias. However, recent studies indicate that self-reporting data is not as limited as previously believed, and people often appraise their social environment accurately (Alper, Tjosvold, & Law, 1998). Another limitation stems from the homogeneity of the sample. In this study, a population of middle-leaders from elementary schools in Israel only was examined, hence the findings should be taken cautiously. There is also a need to repeat the study in different social and cultural contexts in order to enable generalization of the findings to broader populations. In addition, the way in which this study was carried out raises the issue of causality. The data cannot provide direct evidence of causal relationships between PST and other variables, since it is not possible to infer the nature of a causal relationship between variables from a statistical correlation (Trochim & Donnelly, 2005). Conceivably, the causal order could be reversed, and reciprocal causality cannot be ruled out either. In future research it would be advisable to use longitudinal designs to further validate the causal inferences suggested in the current study. In addition, this study examined only select variables, therefore further research should expand the inquiry to additional variables which combine characteristics at the individual (e.g., personality characteristics),
team (e.g., team performance, teachers’ motivations, collective efficacy), school levels (e.g., organizational culture, school climate) and environmental levels (e.g., the greater district system).

**Conclusion**

ST provides a framework and tools to engage with multiple perspectives and recognize interrelationships among organizational elements (McCaughan & Palmer, 2018). Insofar as ST was found as a beneficial management approach, which enables us to cope effectively with complex systems (Wilson & Van Haperen, 2015), the current study examined the usage of ST activities by elementary school principals in Israel. First, findings revealed that *Adopting a multidimensional view* and *Evaluating significance* are the ST activities most frequently engaged in by principals. Second, while gender was not found to be associated with PST, seniority in the organization was found to be negatively related to PST. Third, PST was found to improve the organizational qualities of middle-leaders’ job satisfaction and organizational commitment. Finally, and importantly, this study’s results confirmed not only that PST is advantageous to job satisfaction and organizational commitment, but that principals tend to perform more frequently the specific activities, *Evaluating significance* and *Adopting a multidimensional view* that enhance organizational qualities. These findings suggest that developing the ability to perform at the systems level may help principals meet the complexity of today’s school leadership successfully, promoting school organizational outcomes.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

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**References**


## Appendix. Principal system thinking questionnaire

Regarding each of the following behaviors, please indicate to what extent it characterizes your principal:

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decisions made by the principal are based on the school’s policy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal tends to involve teachers in decision-making processes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal usually tries to figure out how various events have led to each other.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal engages in dialogue with those holding outlooks on education that differ from his/her own.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal attempts to identify repetitive patterns in the information at hand.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal tends to suggest solutions that affect the entire work environment, rather than just specific details.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>At meetings and discussions, the principal tries to present most points of view.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal tends to take unexpected occurrences into account.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal spots small events that are nevertheless meaningful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal explains decision-making processes in accordance with the school’s goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal tends to take different points of view into consideration when deciding on various matters.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When making decisions the principal is aware that his assumptions may be incorrect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal takes into account that the effects of a certain action may vary in different situations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>During decision-making, the principal tends to view the entire picture before examining its details.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal tries to understand how certain components of the school affect the way other components in it function.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal functions well also in ambiguous situations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The principal acts with the understanding that small changes can bring about significant results.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>