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Perceived Principal's Learning Support and its Relationships with Psychological Needs Satisfaction, Organisational Commitment and Change-Oriented Work Behaviour: A Self-Determination Theory's Perspective

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Abstract

Based on the perspective of Self-Determination Theory (SDT), this research examined the mediating role of teachers' psychological needs satisfaction in explaining the relationships between perceived principal's learning support and teachers' work-related outcomes. Results from a convenience sample of 180 Singapore primary school teachers revealed that perceived principal's learning support directly predicted psychological needs satisfaction (i.e. autonomy, competence and relatedness), change-oriented work behaviour and organisational commitment. Psychological needs satisfaction partially mediated the relationships between perceived principal's learning support and change-oriented work behaviour as well as organisational commitment. The findings could contribute useful insights to teacher education and SDT research and practice.

Keywords: Self-Determination Theory; psychological needs satisfaction; professional learning; organisational commitment; change-oriented work behaviour; Singapore teachers

1. Introduction

Teachers' capability and commitment are key to the success of any school reform (Darling-Hammond, 2005; Heck & Hallinger, 2014; Thoonen, Slegers, Oort, Peetsma, & Geijsel, 2011). With an increasing demand for teachers' active participation in school-based innovations, teachers ought to be lifelong learners to continuously learn and adapt to new educational challenges (in de Wal, den Brok, Hooijer, Martens, & van den Beemt, 2014; Vanblaere & Devos, 2016). In this view, teachers' engagement in continual professional learning not only serves to enrich their knowledge base and enhance their identity and self-efficacy, but also initiates changes in their beliefs, perceptions and ways of thinking and doing things (Geijsel, Slegers, Stoel, & Krüger, 2009).

In the school workplace, school leaders play critical roles in supporting teachers' engagement in professional learning (Lai, Li, & Gong, 2016; Li, Hallinger, & Walker, 2016). From the review of relevant literature, it is observed that school leaders who are supportive of teachers' professional learning frequently give feedback to teachers to help them identify their own development needs, provide teachers with necessary resources (e.g., time, finance and space), encourage teachers to experiment and implement new learning, and create opportunities for teachers to learn and collaborate with peers within and beyond the school (Admiraal, Kruiter, Lockhorst, Schenke, Sligte, Smit, Tigelaar, & de Wit, 2016; Lee & Nie, 2013; Vanblaere & Devos, 2016). It is thus important for empirical studies to use a specific construct of school leaders' learning support, rather than a generic construct of leadership support, to understand how learning-supportive school leaders may affect teachers' professional learning and work effectiveness.

In addition, teacher education research has suggested that teachers' engagement in professional learning may contribute to the fulfilment of teachers' cognitive and affective needs (Lai et al., 2016; Li et al., 2016). However, many previous studies tend to neglect the underlying psychological mechanisms which may essentially explain the impact of school leaders' learning support on teachers' motivational outcomes (Lai et al., 2016; Li et al., 2016). As a result, it is unclear whether school leaders' learning support could directly promote desirable teachers' work-related outcomes or indirectly promote desirable teachers' work-related outcomes via satisfying teachers' cognitive and affective needs. From the perspective of Self-Determination Theory (SDT), psychological needs satisfaction can be explained by the fulfilment of three basic psychological needs: *need for autonomy*, *need for competence* and *need for relatedness* (Van den Broeck, Ferris, Chang, & Rosen, 2016). These three needs encompass cognitive and affective needs and they constitute the nutrients for an individual's proactivity, optimal development, and psychological health (Deci, Olafsen, & Ryan, 2017; Reeve, Ryan, Deci, & Jang, 2008). Hence, it would be meaningful to examine whether school leaders' learning support may indirectly affect teachers' work-related outcomes via satisfaction of the three psychological needs satisfaction.

Therefore, the current study aimed to provide a clearer understanding of perceived school leaders' learning support and its predictive relationships with teachers' psychological needs satisfaction and work-related outcomes. It would examine the mediating role of teachers' psychological needs satisfaction to uncover the motivational mechanisms which may underlie perceived school leaders' learning support and teachers' work-related outcomes. Empirical

findings of this study could contribute to the existing knowledge bases of teacher education, school leadership and SDT.

1.1 Teachers' Psychological Needs Satisfaction

In recent years, there has been an increased interest in understanding psychological needs satisfaction as a motivational construct in teacher education research (Collie, Shapka, Perry, & Martin, 2016; Ebersold, Rahm, & Heise, 2019; Janke, Nitsche, & Dickhäuser, 2015). A number of positive teachers' work-related outcomes (e.g., autonomy-supportive teaching approaches, reduced emotional exhaustion, job satisfaction and teacher commitment) are associated with teachers' psychological needs satisfaction (Holzberger, Philipp, & Kunter, 2014; Klassen, Perry, & Frenzel, 2012). With teachers' job becoming more cognitively and emotionally demanding in the context of educational change, a clearer understanding of teachers' psychological needs would enable more effective school management policy and strategies to be developed to support teachers' psychological functioning and promote their work effectiveness (Collie et al., 2016; Lee & Nie, 2014).

According to SDT, psychological needs satisfaction underpins human motivational processes and is largely dependent on the satisfaction of three basic psychological needs, namely need for autonomy, need for competence and need for relatedness (Deci & Ryan, 2000; Deci et al., 2017). It is important for an individual to develop a sense of control and exercise his/her choice over the types of actions undertaken (i.e., need for autonomy), a sense of effectiveness in his/her actions in carrying out tasks (i.e., need for competence), and a sense of warmth and connectedness when interacting or relating with others (i.e., need for relatedness). SDT posits

that the satisfaction of these needs is essential for individuals to function at their optimum to experience well-being and self-actualisation (Deci et al., 2017).

Although an important aspect of the mechanism behind psychological needs satisfaction is the interdependence of the three psychological needs, the three needs are conceptually different (Deci et al., 2017; Van den Broeck, Ferris, Chang, & Rosen, 2016). However, it is observed that the three dimensions of psychological needs satisfaction are often averaged into an overall needs satisfaction score in quantitative studies (Van den Broeck et al., 2016).

Conceptually, this is problematic because it is unclear how the latent construct would represent the constructs of the three needs separately. Methodologically, averaging the three dimensions or subscales of psychological needs satisfaction may not adequately capture the unique influence of each need (Sheldon & Niemiec, 2006). There is increased support for the differentiation of the three psychological needs in more recent empirical studies (Van den Broeck et al., 2016).

For example, Van den Broeck et al. (2016) conducted a meta-analysis based on 99 studies with 119 distinct samples and they found that the three different needs had some common antecedents (e.g., self-esteem and efficacy) but also had different antecedents (e.g., openness was related to competence and relatedness but not autonomy). Most importantly, the three different needs showed different relations with different work-related outcomes (e.g., relatedness was related to organisational politics but not autonomy and competence). In the school setting, Collie et al. (2016) reported that all three psychological needs positively predicted well-being among 485 Canadian school teachers but only the perceived autonomy and relatedness with colleagues and students predicted organisational commitment. In another study, Klassen et al. (2012) reported that teachers' relatedness with students had a positive relationship with work

engagement and a negative relationship with emotional exhaustion, whereas relatedness with colleagues was not significantly related to either outcome. In essence, previous research has highlighted a necessity for the differentiation of the three psychological needs in empirical studies so that incremental predictive validity of the three needs could be more clearly demonstrated.

1.2 Perceived School Leaders' Learning Support and Teachers' Psychological Needs Satisfaction

Organisational scholars have contended that external influences from one's workplace can often affect his/her internal states or psychological functioning at work (Bandura, 2001; Boudrias, Gaudreau, Savoie & Morin, 2009; Chiniara & Bentein, 2016). Similarly, SDT research on work motivation has consistently found that workplace conditions that support the psychological needs tend to promote employees' motivation, well-being and performance (Kovjanic, Schuh, & Jonas, 2013; Van den Broeck et al., 2016).

In teacher education research, it has been generally found that when teachers perceive their school leaders to be supportive of their professional needs, they would be more willing to initiate and implement change at the classroom and school levels (Abós, Haerens, Sevil, Aelterman, & García-González, 2018; Admiraal et al., 2016; Collie et al., 2016; Lee & Nie, 2014; Li et al., 2016). For instance, when teachers feel supported by school leaders towards their professional learning, trust could be fostered between school leaders and teachers, which could become a strong motivator for teachers' participation and commitment in school-based innovations (Lai et al., 2016; Li et al., 2016). Likewise, when school leaders analyse teachers' instructional methods and provide them with useful feedback, this could be perceived by teachers

as nurturing their growth and competence (Hall & Lord, 1995; Lee & Nie, 2016; Ovando & Ramirez, 2007). Such a perception may help to enhance teachers' identity and commitment to their schools (Lai et al., 2016; Lee & Nie, 2013, 2014; Leithwood & Jantzi, 1997).

Although the relationship between school leadership support and teachers' psychological needs satisfaction has received increasing attention in recent years (Collie et al., 2016; Klaijnsen, Vermeulen & Martens, 2018), it is surprising that the empirical link between perceived school leaders' *learning* support (specific to teachers' professional learning) and teachers' psychological needs satisfaction remains relatively under-explored. This is largely because the construct of perceived leader's autonomy support is more frequently used rather than a construct of perceived leader's learning support. Often, perceived leader's autonomy support is conceptualised as a set of generic leadership practices associated with psychological needs satisfaction in generic work settings (Collie et al., 2016). Being a generic construct, perceived autonomy support may not necessarily capture the specific learning-supportive practices by which school leaders use to facilitate teachers' professional learning (Li et al., 2016; Louws, Meirink, van Veen, & van Driel, 2017; Power & Goodnough, 2018). As a result, the empirical links between perceived school leaders' learning support and teachers' psychological needs satisfaction (Carson & Chase, 2009; Ovando & Ramirez, 2007) are still limited and poorly understood.

Among the few studies, Ovando and Ramirez (2007) noted that when school leaders supported teachers' learning by providing useful feedback on instructional methods, teachers' competence could be promoted. Likewise, Carson and Chase (2009) reported that teachers' participation in professional learning activities and having a supportive administration could positively influence teachers' perceptions of autonomy, competence, or relatedness, which in

turn could affect teachers' subsequent instructional behaviours. Thus, more studies are needed to develop a clearer understanding of the empirical links between perceived school leaders' learning support and the three dimensions of teachers' psychological needs satisfaction. Such empirical insights would be useful for the design and development of learning-supportive leadership programmes and practices as each psychological need would essentially require different organisational intervention strategies.

For instance, to enhance teachers' need for competence, school leaders could provide teachers with necessary training to help them acquire the knowledge and skills for doing their job well. To enhance teachers' need for autonomy, school leaders could give choice and authority to teachers so that they can make their professional judgement pertaining to their professional practices and development. To enhance teachers' need for relatedness, school leaders could show individualised concern and support by giving teachers regular feedback, fostering collegial partnership and creating opportunities for teachers to interact, learn and collaborate with peers.

Furthermore, school leadership often comprises leaders at different levels of the school management (i.e., principal, vice-principal, head of department, and subject head), which might likely have differential impacts on teachers' psychological needs (Lee & Nie, 2017). It is thus necessary to differentiate the specific level of school leaders in providing learning support to teachers so that appropriate leadership support and interventions could be mapped out more effectively across different levels of school leadership to promote a school culture or climate supportive of teachers' professional learning and work motivation.

In the current study, we would specifically focus on the principal's learning support and defined 'perceived principal's learning support' as teachers' perceptions of their principal's

learning-supportive behaviours, which may include the principal providing teachers with frequent opportunities to develop new skills, helping teachers see areas in which they need more training, suggesting ways to improve teachers' performance as well as coaching them in developing self-directed problem-solving skills (Admiraal et al., 2016; Arnold, Arad, Rhoades, & Drasgow, 2000; Blasé & Blasé, 2000; Geijsel et al., 2009; Hallinger, Lee, & Ko, 2014; Hallinger & Lu, 2014; Konczak, Stelly, & Trusty, 2000; Lee & Nie, 2013; Power & Goodnough, 2018; Thoonen et al., 2011).

1.3 Teachers' Psychological Needs Satisfaction and Work-Related Outcomes (in terms of Organisational Commitment and Change-oriented Work Behaviour)

With teachers' work becoming more complex and their work roles more diversified to meet the changing needs of their students, organisational commitment and change-oriented work behaviour are two desirable teachers' work outcomes in the context of educational change (Day, Elliot, & Kington, 2005; Frost, 2012).

Mowday, Steers and Porter (1979) refers to organisational commitment as an individual's willingness to exert considerable effort on behalf of the organisation and a desire to maintain organisational membership due to a strong belief in and acceptance of the organisation's goals and values. Likewise, teachers who are committed to their school tend to accept their school's goals and values, show more willingness to invest effort on behalf of the school, and also value the importance attached to keeping up the membership in the school (Geijsel, Slegers, Leithwood, & Jantzi, 2003; Lee & Nie, 2014; Somech & Bogler, 2002). In the current study, organisational commitment was defined as the relative strength of a teacher's identification with and involvement in his/her school organisation (Lee & Nie, 2014; Mowday et al., 1979).

Although previous studies have explicated the relationship between psychological needs satisfaction and organisational commitment in various research settings, the findings have not been consistent. For instance, Greguras and Diefendorff's (2009) study conducted in Singapore and Van den Broeck, Vansteenkiste, De Witte, Soenens and Lens's (2010) study conducted in Belgium and the Netherlands reported that employees' satisfaction of the needs for autonomy, competence and relatedness were positively related to affective commitment to their organisation. However, Lee and Nie's (2014) study of 304 Singapore teachers reported that teachers' sense of autonomy predicted organisational commitment and job satisfaction but their sense of competence only predicted job satisfaction. In Collie et al.'s (2016) study, Canadian teachers' need for autonomy and need for relatedness with students and colleagues directly predicted organisational commitment. Interestingly, teachers' needs for autonomy and relatedness predicted organisational commitment via identified regulation (autonomous motivation) but less so for the need for competence. Given the inconsistent findings between the three psychological needs and organisational commitment in different research settings, it would be necessary to further clarify the empirical relationships between the three needs and organisational commitment (Van den Broeck et al., 2016) to inform the design of more effective organisational interventions and strategies for improving teacher commitment.

Similarly, school success is increasingly dependent upon teachers' willingness to respond to new challenges and effect change at their work role levels (Heck & Hallinger, 2014; Lee & Nie, 2014), which inevitably requires teachers to continuously learn and innovate in their teaching career. This also highlights the importance for teachers to constantly seek out effective and innovative approaches to improve their teaching quality (Hairon & Dimmock, 2012;

Hallinger & Lu, 2014). In this aspect, teachers' change-oriented behaviour is an important construct which deserves more empirical attention. In the current study, we defined teachers' change-oriented work behaviour as a set of proactive, innovative behaviours or actions directed at initiating and implementing change to improve work practices (Bindl & Parker, 2010; De Jong & Den Hartog, 2007; Frost, 2012; Marinova, Peng, Lorinkova, Van Dyne, & Chiaburu, 2015; Parker, Bindl, & Strauss, 2010) and it is usually driven by personal initiative (Frese & Fay, 2001; Rank, Pace, & Frese, 2004). Teachers' change-oriented work behaviour may include their involvement in idea generation, promotion and implementation of ideas, e.g., introducing new work methods, influencing organisational strategy and learning new skills to cope with future demands (Bindl & Parker, 2010). Essentially, teachers' change-oriented work behaviour is a self-driven, motivated behaviour associated with teachers' perceptions of control and capability (Belschak, & Den Hartog, 2010; Bindl & Parker, 2010; Ghitulescu, 2013).

So far, the direct relationship between teachers' psychological needs satisfaction and change-oriented behaviour is limited. Among the few studies which examined teachers' innovation-related behaviour, Messmann and Mulder (2014) reported that perceived supervisory support directly predicted vocational teachers' involvement in idea generation, idea promotion and reflection but also indirectly predicted opportunity exploration via intrinsic task motivation. Klaijisen et al.'s (2018) study with a sample of teachers in the Netherlands reported that basic psychological need satisfaction predicted both intrinsic motivation and occupational self-efficacy, and that occupational self-efficacy strongly predicted innovative behaviours. These studies, however, did not use the construct of psychological needs satisfaction or differentiate among the three psychological needs to make associations with innovative behaviour, which

limits our understanding of the differential impacts of the three needs on change-oriented work behaviour. Given the positive relations between psychological needs satisfaction and many work outcomes in generic work settings (Deci et al., 2017; Gagné, & Deci, 2005; Van de Broeck et al., 2016), it would be reasonable to infer that when teachers' psychological needs are satisfied, they would likely take more initiative to drive change and implement innovative practices to improve the work processes.

1.4 Teachers' Psychological Needs Satisfaction as a Mediating Variable

According to SDT research in generic workplaces, the influences of work environmental factors on individuals' work motivations and experiences are largely mediated by the satisfaction of the three psychological needs (Chiniara & Bentein, 2016; Kovjanic et al., 2013). Many existing empirical studies in educational settings have examined psychological needs satisfaction as a mediating variable using student samples to understand the differential mediating impacts of the three needs (Chen, 2014; Jang, Reeve, & Deci, 2010; Jang, Reeve, Ryan, & Kim, 2009; Lietaert, Roorda, Laevers, Verschueren, & De Fraine, 2015; Tucker et al., 2002; Vansteenkiste, Sierens, Goossens, Soenens, Dochy, Mouratidis, Aelterman, Haerens, & Beyers, 2012). Comparatively, there are fewer studies which have examined psychological needs satisfaction as a mediating variable in teacher samples. As a result, the differential mediating impacts of the three dimensions of teachers' psychological needs satisfaction is empirically underexplored.

Among the few studies using teacher samples, Klassen et al. (2012) found positive direct positive relationships between teachers' perceived autonomy support and the satisfaction of the three psychological needs. They also found that teachers' relatedness with students had a positive relationship with work engagement and a negative relationship with emotional exhaustion,

whereas relatedness with colleagues was not significantly related to either outcome. Collie et al. (2016) reported that perceived autonomy support predicted all three psychological needs satisfaction, and needs satisfaction in turn predicted teachers' well-being, motivation, job satisfaction and organisational commitment. Hence, Collie et al.'s (2016) study reaffirms the mediating role of psychological needs satisfaction as well as the differential impacts of the three needs on different teachers' work-related outcomes. In another recent study, Ebersold et al. (2019) explored how needs satisfaction affected the relationship between perceived principal's autonomy support and both positive as well as negative aspects of well-being among a sample of teachers. Results from their mediation analyses revealed that satisfaction of the need for autonomy mediated between the principal's autonomy support and positive affect as well as between the principal's autonomy support and life satisfaction.

Given that existing studies tend to use the construct of perceived autonomy support instead of a construct of perceived learning support, the mediating role of teachers' psychological needs satisfaction in the relationships between perceived school leaders' learning support and teachers' work-related outcomes thus deserves greater empirical investigation. As such, the current study aimed to examine the mediating role of teachers' psychological needs satisfaction in terms of the three needs to determine whether perceived school leaders' learning support could affect teachers' organisational commitment and change-oriented work behaviour via the satisfaction of the three psychological needs.

1.5 The Current Study

Based on an extensive review of relevant literature, three research questions and their corresponding hypotheses were formulated to guide the current study.

Research Question 1: *Would perceived principal's learning support predict teachers' psychological needs satisfaction in terms of teachers' needs for autonomy, competence and relatedness?* Previous research has generally recognised the importance of school leaders' support in teachers' professional learning (Abós et al., 2018; Collie et al., 2016; Day & Gu, 2007; Holzberger et al., 2014). From the SDT's perspective, psychological needs satisfaction is a useful concept for understanding teachers' motivational mechanisms in the school workplace (Collie et al., 2016). Given the limited empirical research between perceived school leaders' learning support and the three dimensions of teachers' psychological needs satisfaction (Collie et al., 2016; Klaijnsen et al., 2018), more empirical evidence is needed to establish this link. Hence, we would formulate Hypothesis 1: *Perceived principal's learning support would positively predict teachers' psychological needs satisfaction in terms of competence, autonomy and relatedness.*

Research Question 2: *Would teachers' psychological needs satisfaction (in terms of competence, autonomy and relatedness) predict teachers' organisational commitment and change-oriented work behaviour?* Previous research has reported the positive relations between the three dimensions of psychological needs satisfaction and a number of work-related outcomes in various contexts (e.g., Carson & Chase, 2009; Collie et al., 2016; Klaijnsen et al., 2018; Klassen et al., 2012; Van den Broeck et al., 2016). However, the empirical links between the three dimensions of teachers' psychological needs and organisational commitment as well as change-oriented work behaviour are not always consistent and clear, which thus render further examination. As such, we would formulate Hypothesis 2: *Teachers' psychological needs*

satisfaction (in terms of competence, autonomy and relatedness) would positively predict organisational commitment and change-oriented work behaviour.

Research Question 3: *Would teachers' psychological needs satisfaction (in terms of needs for autonomy, competence and relatedness) mediate between perceived principal's learning support and the two work-related outcomes in terms of organisational commitment as well as change-oriented work behaviour?* So far, we are not aware of any study which has specifically examined the mediating roles of the three psychological needs in relations with perceived principal's learning support and teachers' work-related outcomes. Although the mediating role of teachers' psychological needs satisfaction has been reported in previous studies (Collie et al., 2016; Ebersold et al., 2019), an aggregated construct of psychological needs satisfaction has often been used and only few studies have examined the three dimensions of teachers' psychological needs (i.e., needs for competence, autonomy, and relatedness) as separate mediating variables (Collie et al., 2016; Gagné & Deci, 2005). Thus, we would formulate Hypothesis 3: *Teachers' psychological needs satisfaction (in terms of needs for autonomy, competence and relatedness) would mediate between perceived principal's learning support and the two work-related outcomes in terms of organisational commitment as well as change-oriented work behaviour.*

Taken together, by clarifying the relationships among perceived principal's learning support, psychological needs satisfaction and work-related outcomes, empirical insights from this study could inform the design of school leadership programmes or organisational interventions which are supportive of teachers' professional learning, psychological functioning and work effectiveness.

2. Method

2.1 Sampling design and sample

A convenience sampling design was used to recruit teacher participants for the study. The researchers contacted the potential teacher participants to seek their voluntary participation individually¹. The sample comprised 180 primary school teachers in Singapore. There were 81.3% female participants and 18.8% male participants. There were 67.8% Chinese, 19.8% Malays, 9.0% Indians and 3.4% other minority races. 84.7% of the participants graduated with a Bachelor degree or higher academic qualifications. 93.7% of the participants had worked in their current school for more than 1 year and 80.1% of the participants had more than 3 years of teaching experience. The median number of years of teaching experience among the participants was 7-10 years (24.4%). The median age² among the participants was 31-35 years old (34.4%).

2.2 Measures³

Perceived Principal's Learning Support was measured using four items adapted from a sub-dimension 'Coaching' in Arnold et al.'s (2000) Empowering Leadership Questionnaire as well as a sub-dimension 'Skill Development' in Konczak et al.'s (2000) Leader Empowering Behavior Questionnaire. In the current study, the Cronbach alpha's coefficient of the scale was .86. A confirmatory factor analysis (CFA) was conducted to examine the factorial structure and the one-

¹ Our sampling was designed at individual teacher level because our constructs were all at individual teacher level.

² Age was measured in an ordinal scale: 1) 20 to 25 years 2) 26 to 30 years 3) 31 to 35 years 4) 36 to 40 years 5) 41 to 45 years 6) 46 to 50 years 7) 51 to 55 years 8) above 55 years old. Participants' age ranged from 23 to 60 years old.

³ Refer to Appendix A for the items of each measure used in this study.

factor model showed a good model-data fit: $\chi^2 = 2.11$, $df = 2$, $p = .348$, TLI = .999, CFI = 1.000, RMSEA = .018.

Psychological Needs Satisfaction was measured by a nine-item scale adapted from the 21-item Basic Psychological Needs Satisfaction at Work scale developed by Deci, Ryan, Gagne, Leone, Usunov and Kornazheva (2001). The adapted scale consisted of three dimensions: autonomy (3 items), competence (3 items) and relatedness (3 items). CFA was conducted to examine the factorial structure and three-factor model showed a good model-data fit for the adapted scale: $\chi^2 = 31.806$, $df = 23$, $p = .104$, TLI = .971, CFI = .981, RMSEA = .046. The adapted scale also showed good internal consistency. The Cronbach alpha's coefficients for the three subscales were: autonomy, $\alpha = .75$; competence, $\alpha = .71$; relatedness, $\alpha = .70$.

Organisational Commitment and Change-Oriented Work Behaviour Organisational commitment was measured using eight items adapted from the Organisational Commitment scale developed by Mowday et al. (1979) which measures the degree to which employees are committed, or attached, to their organisation. Change-oriented work behaviour was measured using four items adapted from the Career Futures Inventory developed by Rottinghaus, Day and Borgen (2005) as well as the Foci of Proactive Behaviour developed by Belschak and Den Hartog (2010). The Cronbach alpha's coefficient was .95 for organisational commitment and .84 for change-oriented work behaviour, respectively. CFA was conducted to examine the factorial structure and the two-factor model showed a good model-data fit: $\chi^2 = 105.791$, $df = 51$, $p < .001$, TLI = .957, CFI = .967, RMSEA = .077.

2.3 Data collection

Prior to data collection, ethical approval for the study was obtained from the researchers' affiliated institution. Data was collected using an anonymous paper questionnaire. To encourage teachers' participation, teachers' identity and their school identity were not required in the questionnaire in order to reduce teachers' potential concerns and bias due to authority pressure or social desirability. A cover letter was attached to each questionnaire to explain the intent of the study. Confidentiality of participation was assured and participants' informed consent was sought. Participation was voluntary and no monetary incentive was given. The participants were asked to complete the questionnaire anonymously using a seven-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree). Completed questionnaires were returned in sealed envelopes to the researchers within three weeks of the survey administration.

3. Analyses and Results

3.1 Descriptive statistics and bivariate correlations

Table 1 presents the means, standard deviations and zero-order bivariate correlations of all variables in the current study.

[Insert Table 1 here]

3.2 Path analysis

In the current study, we used path analysis to examine the predictive relationships among the variables of study. Guided by total aggregation model and the content-oriented strategy (Bagozzi, & Edwards, 1998; Landis, Beal, & Tesluk, 2000), all items of each scale were equally

weighted and combined into a single indicator. We created the mean scores as single indicators and observed variables in the path analysis.

Next, path analysis was performed using Mplus to examine the direct and indirect (mediating) relations among the variables of this study. The predictor variable was 'perceived principal's learning support'. The mediating variables were the three dimensions of psychological needs satisfaction: need for relatedness, need for competence and need for autonomy. The criterion variables were change-oriented work behaviour and organisational commitment. The demographic variables, i.e., number of years of teaching experience and number of years working in the current school, served as control variables in our analysis as these two variables were found to correlate with the main variables. The error terms of the mediating variables were allowed to freely correlate among themselves. The error terms of the two criterion variables were also allowed to correlate with each other.

From the path analysis, our model indicated a very good model-data fit, $X^2(12, N=180) = 13.916, p = .306, TLI = .988, CFI = .994, RMSEA = .030$. The path relations and coefficients among the variables are presented in Figure 1. The standardised direct, indirect and total effects⁴ among the variables of study are presented in Table 2.

[Insert Figure 1 here]

[Insert Table 2 here]

⁴ The term 'effects' refers to non-causal, predictive relationships between the variables.

3.3 Relationship between perceived principal's learning support and psychological needs satisfaction dimensions

Hypothesis 1 was fully supported. Teachers' perceived principal's learning support positively and significantly predicted all three dimensions of teachers' psychological needs satisfaction, in terms of needs for relatedness ($\beta = .457, p < .001$), competence ($\beta = .304, p < .001$) and autonomy ($\beta = .511, p < .001$).

3.4 Relationship between psychological needs satisfaction and work outcomes (in terms of organisational commitment and change-oriented work behaviour)

Hypothesis 2 was partially supported. Results indicated that teachers' psychological needs satisfaction in terms of need for relatedness ($\beta = .173, p = .006$) and need for autonomy ($\beta = .343, p < .001$) positively and significantly predicted organisational commitment. However, need for competence did not significantly predict organisational commitment. On the other hand, teachers' psychological needs satisfaction in terms of need for competence ($\beta = .315, p < .001$) and need for autonomy ($\beta = .199, p = .010$) positively and significantly predicted change-oriented work behaviour. However, need for relatedness did not significantly predict change-oriented work behaviour.

3.5 Mediating role of psychological needs satisfaction

Hypothesis 3 was partially supported. Results indicated a direct relationship between perceived principal's learning support and the two work-related outcomes in terms of organisational commitment and change-oriented work behaviour. From the mediation analysis, different dimensions of psychological needs satisfaction mediated the relationships between perceived principal's learning support and the two work-related outcomes. For instance,

perceived principal's learning support indirectly predicted organisational commitment via the needs for relatedness and need for autonomy but not via the need for competence. Perceived principal's learning support indirectly predicted change-oriented work behaviour via the needs for competence and autonomy but not via the need for relatedness. Thus, our results indicated that the three dimensions of psychological needs satisfaction partially mediated the relationships between perceived principal's learning support and the two work-related outcomes in terms of organisational commitment and change-oriented work behaviour.

To further confirm the indirect effects, bootstrapping with 500 bootstrap samples was used for the analysis. Bootstrapping results indicated that the total indirect effect from perceived principal's learning support to organisational commitment was significant at $\beta = .254, p < .001$. The specific indirect effect from perceived principal's learning support to organisational commitment via relatedness was significant at $\beta = .079, p = .011$. The specific indirect effect from perceived principal's learning support to organisational commitment via autonomy was significant at $\beta = .175, p < .001$.

The indirect effect from perceived principal's learning support to change-oriented work behaviour was also significant at $\beta = .197, p < .001$. The specific indirect effect from perceived principal's learning support to change-oriented work behaviour via competence was significant at $\beta = .096, p = .003$. The specific indirect effect from perceived principal's learning support to change-oriented work behaviour via autonomy was significant at $\beta = .102, p = .010$.

4. Discussion

The current study examined perceived principal's learning support and its predictive relationships with psychological needs satisfaction, organisational commitment and change-oriented work behaviour. Several salient points are derived from the findings of this study.

First, our results indicated the presence of direct relations between perceived principal's learning support and organisational commitment as well as change-oriented work behaviour, respectively. Our findings thus reaffirm the importance of school leaders in supporting teachers' professional learning. Principals are heads of their schools and have more positional power within the school hierarchy. They are often able to provide the infrastructure and resource support (e.g., providing space and structured time, and allocating budgets for professional collaborations and knowledge sharing within and outside the school) more easily for the teachers to participate in professional learning (Lee & Nie, 2017). Moreover, if principals are able to interact more with teachers via mentoring relationships or personal coaching (Ebersold et al., 2019), they would be able to influence teachers' perceptions and actions more directly through a closer leader-follower relationship, thereby resulting in a higher degree of teachers' organisational commitment and change-oriented work behaviour. Importantly, our findings not only corroborate with previous studies which reported the empirical link between school leaders' learning support and organisational commitment (Lai et al., 2016; Li et al., 2016; Thoonen et al., 2011) but also further establish an under-explored empirical link between perceived principal's learning support and change-oriented work behaviour. Given the increasingly complex and diversified roles of the teachers in many educational settings, our findings could therefore contribute useful insights for understanding how teachers could be better supported by their

school leaders to participate in professional learning so as to enable teachers to contribute productively and innovatively to their schools (Hairon & Dimmock, 2012).

Second, teachers' psychological needs satisfaction served as a predictor variable as well as a partial mediator variable in this study. Our results indicated the presence of indirect relations between perceived principal's learning support and teachers' work-related outcomes via psychological needs satisfaction. Perceived principal's learning support showed the strongest relationship with teachers' need for autonomy as compared to the other two needs (i.e., competence and relatedness) and subsequently, need for autonomy predicted both organisational commitment and change-oriented work behaviour. Our result also indicated that perceived principal's learning support indirectly predicted organisational commitment via needs for autonomy and relatedness. This finding corroborates with previous studies on teacher samples conducted by Lee and Nie (2014) and Collie et al. (2016). In addition, our results indicated that perceived principal's learning support indirectly predicted change-oriented work behaviour via needs for autonomy and competence. Given that this link has not been extensively explored and reported in the existing research, our finding can thus contribute new insights to inform existing research and practice. Our finding also suggests that school leaders' learning-supportive behaviours may be more important in promoting teachers' need for autonomy which is highly important for teachers to feel committed to their school as well as engage in change-oriented work behaviours. Generally, our findings show that school leaders' learning support is useful for promoting teachers' psychological needs satisfaction. School leaders' learning-supportive behaviours could satisfy teachers' cognitive needs and affective needs, and therefore are more

effective to facilitate teachers' psychological functioning and performance at work (Collie et al., 2016; Kaplan & Madjar, 2017).

Third, unlike many previous studies which examined the construct of psychological needs satisfaction as an aggregated or composite variable (Van den Broeck et al., 2016), our study differentiated the construct of teachers' psychological needs satisfaction into three dimensions (autonomy, competence and relatedness) to examine their relationships with antecedents and consequences. This is in line with previous research which called for the study of the unique influence of each of the three needs in teacher and student samples to better inform research and practice (Carson & Chase, 2009; Collie et al., 2016; Lietaert et al., 2015; Tucker et al., 2002). For instance, teachers' need for autonomy predicted both organisational commitment and change-oriented work behaviour. This suggests that the need for autonomy may be more salient for promoting teachers' organisational commitment and change-oriented work behaviour. This finding is in line with previous research which also highlighted the essential role that autonomy plays in facilitating teachers' organisational commitment (Collie et al., 2016; Lee & Nie, 2014). In practice, the differentiation of the three needs could also enable more specific teacher intervention and leadership strategies to be developed to more effectively promote the three needs among teachers.

Fourth, our study demonstrated the unique importance of each psychological need on different outcome measures. Interestingly in this study, teachers' need for competence was found to predict change-oriented work behaviour but not organisational commitment. This aligns with previous research which indicated that an increase in competence or self-efficacy could lead to proactive behaviours, creative performance and innovative behaviours (Van den Broeck et al.,

2016). However, previous research also reported that satisfaction of the need for competence was related negatively with affective commitment but positively with employees' turnover intentions, such that employees who feel competent may see themselves as having the necessary knowledge, skills, and abilities that are valued by different employers (Fugate, Kinicki, & Ashforth, 2004; Van den Broeck et al., 2016). As a result, these employees may become less committed to their current employer and seek other opportunities elsewhere (Fugate et al., 2004; Van den Broeck et al., 2016). In the school setting, this is supported by Lee and Nie (2014) whose study also reported an insignificant relationship between teachers' sense of competence and organisational commitment. We thus speculated that when teachers' competence increases, more professional choice options tend to open up, which may reduce their commitment to a single organisation.

Fifth, our findings indicated that teachers' need for autonomy and competence may be more important than need for relatedness in promoting teachers' change-oriented behaviour. However, teachers' needs for autonomy and relatedness may be more important than need for competence in promoting organisational commitment. Our findings thus suggest that teachers' psychological experience might be more cognitive in nature with regard to change-oriented work behaviour but more affective in nature with regard to organisational commitment. We may therefore infer that teachers' work-related outcomes which are associated with cognitive needs may be more likely to be explained by the satisfaction of the two needs, i.e., competence and/or autonomy, whereas teachers' work-related outcomes which are associated with affective needs may be more likely to be explained by the satisfaction of the need for relatedness. Our findings share similar patterns with previous studies which reported that teachers' closeness with leaders or colleagues could have positive influence on organisational commitment (Collie et al., 2016;

Lee & Nie, 2014; Van den Broeck et al., 2016). So far, there has been limited research on the empirical link between teachers' psychological need satisfaction (in terms of the three needs) and teachers' change-oriented work behaviour. Future research could further examine this link to develop a better understanding of how teachers' change-oriented work behaviour could be more effectively facilitated.

4.1 Educational implications

Given the importance of teachers' psychological needs satisfaction on their work-related outcomes, it is crucial that school leaders pay more attention to foster a conducive work climate which can cater to the satisfaction of teachers' needs for autonomy, competence and relatedness. There are a number of ways school leaders can do to facilitate teachers' psychological needs satisfaction.

For instance, when school leaders form mentoring relationships with teachers to give them instructional feedback and advice as well as provide role-modelling and personal coaching to teachers during formal and informal daily work interactions (Admiraal et al., 2016; Lee & Nie, 2013), these learning-supportive practices would likely satisfy teachers' needs for competence and relatedness. When school leaders provide teachers with choice and authority to encourage teachers to exercise their initiative in professional learning and work roles (Messmann & Mulder, 2014), it would likely satisfy teachers' needs for autonomy and competence. When school leaders initiate frequent dialogues and interactions with teachers and encourage teachers to critically reflect on their learning and professional practice during staff meetings, sharing sessions or professional learning communities (Admiraal et al., 2016; Hairon & Dimmock, 2012; Louws et al., 2017), it may likely satisfy teachers' needs for relatedness and competence.

Furthermore, it is important to increase school leaders' awareness that different teachers' work outcomes may be driven by the satisfaction of different needs. For instance, if the school leaders' intention is to enhance teachers' organisational commitment, it would then require the school leaders to not merely focus on increasing teachers' acquisition of knowledge and skills, but also devote more time for personal and professional interactions with teachers to fostering high-quality leader-subordinate relationships. This is because organisational commitment is likely to associate more with affective needs than cognitive needs. On the other hand, relating well with teachers might not be sufficient if school leaders wish to promote teachers' change-oriented work behaviour because change-oriented work behaviour tends to associate more with cognitive needs than affective needs. To promote change-oriented work behaviour, school leaders could try to enhance teachers' needs for autonomy and competence by providing choice and delegating authority to teachers to encourage more self-directed decision-making so as to increase teachers' agency and capability to contribute productively to school-based innovations.

Generally, satisfying all three needs of teachers would likely enhance teachers' well-being and effectiveness. Through the use of a variety of learning-supportive practices which cater to teachers' cognitive and affective needs, school leaders could promote teachers' overall psychological needs satisfaction to encourage teachers to make positive contributions in their work roles.

4.2 Limitations and suggestions for future studies

Despite its noteworthy contributions, this study has limitations which render attention in interpretation.

First, the sample used was a convenience sample of primary school teachers in Singapore. The small sample size may not be able to represent the population of all school teachers in Singapore. Future research may consider a bigger sample size and random sampling for better generalisation of results.

Second, given that this study used a convenience sampling design and an anonymous questionnaire for data collection, it was not known which schools the teachers worked at. As it was not able to control for nesting, nested data collection was not possible. As a result, the data collected was analysed at the individual teacher level. Future research may consider using both school-level and teacher-level stratified sampling designs to enable the collection of nested data for multi-level data analysis.

Third, this study used a cross-sectional data set and self-report data collected at one point in time. The relationships among the research variables were therefore predictive rather than causal. Although collecting all data from the same respondents may raise the possibility of single-source bias or common method bias which may pose a potential threat to internal validity, some researchers have found that using self-report data from one source does not necessarily inflate common method correlations and observed relationships (Conway & Lance, 2010; Lance, Dawson, Birkelbach & Hoffman, 2010). As an anonymous questionnaire was used in this study, it could serve to protect the respondents' identity and reduce social desirability or evaluation apprehension, which thereby reduces common method bias (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Nevertheless, future studies may consider using multi-source, multi-point data from different research approaches such as longitudinal or experimental studies to further affirm the relationships among the research variables.

Fourth, the sample of teachers was recruited from the Singapore educational context. As such, it cannot account for any cultural differences which may exist in other samples of teachers from a different culture or country. Even though SDT has positioned itself as a universal theory of needs (Deci & Ryan, 2000), organisational scholars have also pointed out that collectivistic cultures tend to value social relations and group membership more than individualistic cultures (Oyserman, Coon, & Kimmelmeier, 2002; Van den Broeck et al., 2016). As it is beyond the current study to examine whether cultural difference may play a part in teachers' psychological needs satisfaction and affect their perceptions towards principal's learning support, it would be interesting and valuable for future researchers to conduct cross-cultural studies to determine if teachers from collectivistic cultures may gain more from the satisfaction of the need for relatedness in comparison with teachers from individualistic cultures.

5. Conclusion

Professional learning is instrumental to teachers' growth and effectiveness. School leaders' learning support is crucial to teachers' engagement in professional learning and can have positive impacts on teachers' psychological needs satisfaction and work outcomes. This study provides a clearer understanding of the psychological mechanisms which underlie the relationship between perceived school leaders' learning support and the three dimensions of teachers' psychological need satisfaction. It also highlights the unique influence of each of the three psychological needs with teacher outcome variables, which is useful for understanding teachers' psychological needs satisfaction as a motivational construct. In general, it is imperative to facilitate teachers' satisfaction of the three needs in the school workplace to enable them to contribute productively and innovatively to school success. Empirically, findings of this study

could contribute to extend the knowledge bases of teacher education, school leadership and SDT.

On a practical note, findings of this study could provide useful insights for the design of more effective school interventions and learning-supportive leadership practices to promote teachers' professional learning and work effectiveness.

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Appendix A. Items used in the Study

Perceived Principal's Learning Support

1. My principal helps me see areas in which I need more training.
2. My principal suggests ways to improve my performance.
3. My principal provides me with frequent opportunities to develop new skills.
4. My principal teaches me how to solve problems on my own.

Basic Psychological Needs Satisfaction

1. I am free to express my ideas and opinions on the job. (Autonomy)
2. My feelings are taken into consideration at work. (Autonomy)
3. I feel like I can pretty much be myself at work. (Autonomy)

4. I do not feel very competent when I am at work. (Competence)
5. People at work tell me I am good at what I do. (Competence)
6. When I am working I often do not feel very capable. (Competence)

7. I really like the people I work with. (Relatedness)
8. I get along with people at work. (Relatedness)
9. People at work are pretty friendly towards me. (Relatedness)

Change-Oriented Work Behaviour

1. I welcome job and organisational changes.
2. I seek out new ways of doing my work.
3. I am able to adapt to changing circumstances at work.
4. I share new ideas/knowledge with my colleagues.

Organisational Commitment

1. I am proud to tell others I am part of this school.
2. For me, this is the best of all possible schools for which to work.
3. This school really inspires the very best in me in the way of job performance.
4. I talk up this school to my friends as a great school to work for.
5. I find that my values and the school's values are very similar.
6. I am extremely glad that I chose this school to work for over others I was considering at the time I joined.
7. I would accept almost any type of job assignment in order to keep working for this school.
8. I really care about the fate of this school.

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Table 1. Means, standard deviations and zero-order bivariate correlations among the variables of study ($N = 180$)

Variables	<i>M</i>	<i>SD</i>	Bivariate Correlations						
			1	2	3	4	5	6	
1. Perceived principal's learning support	4.67	1.04	1						
2. Need for relatedness	5.65	.72	.457**	1					
3. Need for competence	5.20	1.02	.303**	.463**	1				
4. Need for autonomy	4.80	1.08	.512**	.451**	.395**	1			
5. Organisational commitment	4.83	1.25	.581**	.474**	.348**	.588**	1		
6. Change-oriented work behaviour	5.76	.78	.367**	.296**	.453**	.431**	.406**	1	

Note. ** denotes bivariate correlation was significant at $p < .01$.

Running head: PERCEIVED PRINCIPAL'S LEARNING SUPPORT AND PSYCHOLOGICAL NEEDS SATISFACTION

Table 2. Standardised direct, indirect and total effects among the variables of study

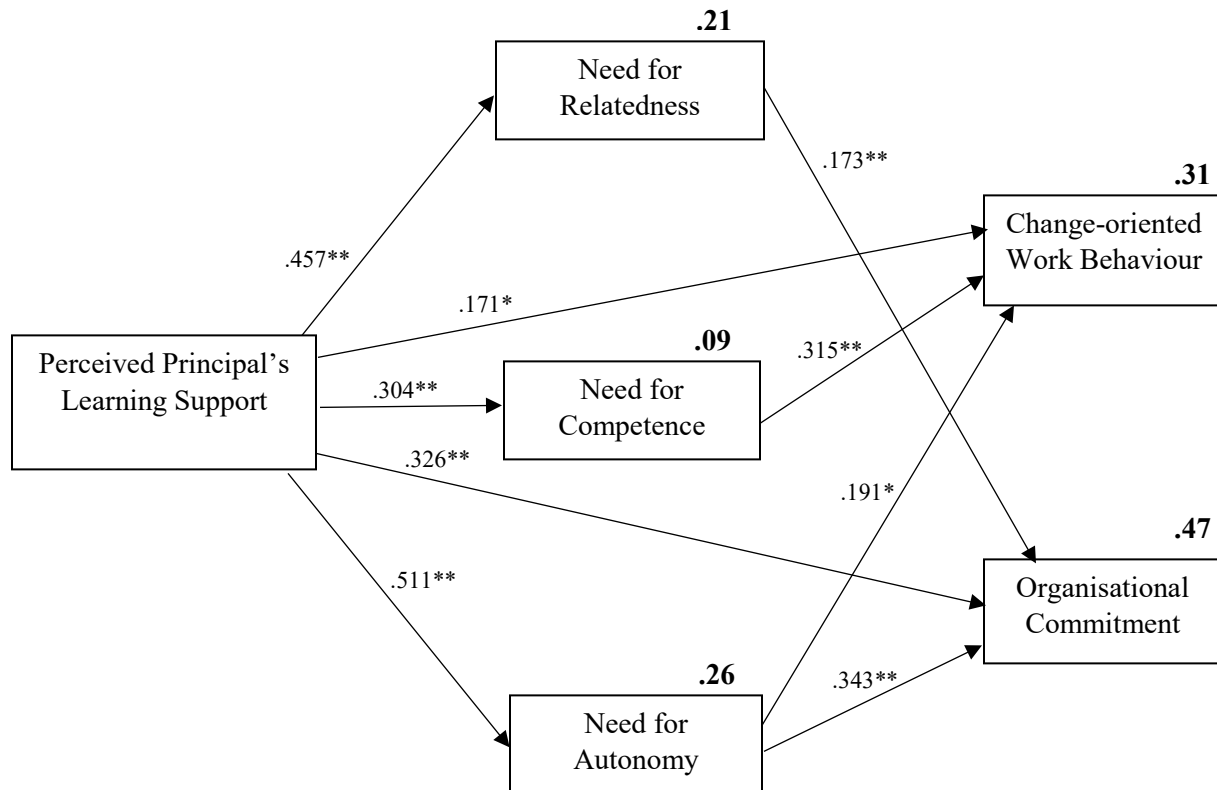
Predictor	Criterion variable	Direct effect	Indirect effect	Total effect
1. Perceived principal's learning support	Need for relatedness	.457	-	.457
	Need for competence	.304	-	.304
	Need for autonomy	.511	-	.511
	Organisational commitment	.326	.254	.580
	Change-oriented work behaviour	.171	.197	.368
2. Need for relatedness	Organisational commitment	.173	-	.173
	Change-oriented work behaviour	-	-	-
3. Need for competence	Organisational commitment	-	-	-
	Change-oriented work behaviour	.315	-	.315
4. Need for autonomy	Organisational commitment	.343	-	.343
	Change-oriented work behaviour	.191	-	.191

Running head: PERCEIVED PRINCIPAL'S LEARNING SUPPORT AND PSYCHOLOGICAL NEEDS SATISFACTION

Predictor variable:

Mediating variables:

Criterion variables:



Note.

* denotes predictive relationship was significant at $p < .05$.

** denotes predictive relationship was significant at $p < .01$.

Figure 1. The path analysis results for the direct and indirect (mediating) relations among perceived principal's learning support, three dimensions of psychological needs satisfaction, change-oriented work behaviour and organisational commitment