

The relation between perceived autonomy support and (in) formal learning when using a PDP: the mediating role of self-direction in learning

Niels van der Baan

Department of Educational Research and Development, Maastricht University, Maastricht, The Netherlands and School of Health Professions Education, Maastricht University, Maastricht, The Netherlands

Christophe Lejeune

Institute for the Analysis of Change in Contemporary and Historical Societies, Université Catholique de Louvain, Louvain-la-Neuve, Belgium

Simon Beusaert

Department of Educational Research and Development, Maastricht University, Maastricht, The Netherlands, and

Isabel Raemdonck

Institute for the Analysis of Change in Contemporary and Historical Societies, Université Catholique de Louvain, Louvain-la-Neuve, Belgium

Abstract

Purpose – To keep up with their changing environment, organizations are investing in continuous skills development of their employees and therefore implement personal development plans (PDPs). However, to be effective, PDPs require employees to show self-direction in learning (SDL). Autonomy-supportive supervisors can foster employees' SDL. Therefore, the purpose of this cross-sectional study is two-fold. First, this study explores the relationship between perceived autonomy support and learning at the workplace. Second, this study investigates the mediating role of SDL when using a PDP.

Design/methodology/approach – Based on data from a convenience sample from employees in various industries ($n = 193$), structural equation modelling was used to investigate the relationships between the different variables.

Findings – First, a positive relationship was found between perceived autonomy support and informal learning activities, but not with formal learning activities. Second, results indicated that SDL when using a PDP mediates the relation between perceived autonomy support and both formal and informal learning



activities at the workplace. These results suggest that a supervisor who is perceived as autonomy supportive can foster employees' SDL when using a PDP and, in turn, support learning at the workplace.

Practical implications – Also, these findings indicate that autonomy-supportive supervisors can encourage the undertaking of learning activities by stimulating SDL when using a PDP.

Originality/value – For a PDP to be effective, a degree of SDL is assumed. To the best of the authors' knowledge, this is the first study to investigate SDL within a PDP setting.

Keywords Workplace learning, Informal learning, Formal learning, Self-directed learning, Personal development plan, Autonomy support

Paper type Research paper

Introduction

Adapting to changing circumstances is the new normal in today's workplaces (Wilson, 2019). To live up to those changes, a competent workforce that continuously updates their skills through learning in the workplace, whether through formal (e.g. training) or informal learning activities (e.g. feedback-seeking from a colleague), is required (Evans and Kersh, 2014). By taking charge of their own skills development in a changing environment, employees not only develop their employability and career but also contribute to the improvement of the company's work processes, services and products, therefore addressing client needs and contributing to its competitiveness on the market (Zeng *et al.*, 2020).

To encourage employee learning, organizations have been investing heavily in Human Capital Management Systems and tools, such as personal development plans (PDPs; Human Resources Research Team, 2021). A PDP is "an assessment tool embedded in a larger assessment cycle of development and appraisal interviews, used to gather and document information about the competences the employee worked on and is planning to further develop" (Eisele *et al.*, 2013, p. 528). PDPs promote workplace learning and have a positive impact on job performance, depending on how it is used and implemented (Abrami *et al.*, 2013; Kicken *et al.*, 2009b; Lejeune *et al.*, 2021). A PDP requires employees to be self-directed in their learning. At the same time, a PDP supports employees in taking the necessary steps in a self-directed learning process (Beausaert *et al.*, 2013; Eisele *et al.*, 2013; Kicken *et al.*, 2009a). Self-directedness in learning (SDL) is thus both a personal characteristic that refers to a tendency to pro-actively seek and initiate learning as well as to a learning process in which learners identify their strengths and weaknesses, set learning goals, plan and execute actions and evaluate and monitor their progress (Stockdale and Brockett, 2011). In addition, SDL allows learners to initiate the learning process and persist in overcoming barriers and setbacks in this learning process (van der Baan *et al.*, 2022). The employee who is self-directed takes the primary responsibility for his own professional learning.

An empowering work environment is needed for both forms of SDL to occur. It is argued that the most critical work environmental factor that affects employees' learning activities is an autonomy-supportive supervisor (Tannenbaum *et al.*, 2010). The concept of autonomy support originates from the self-determination theory (SDT; Ryan and Deci, 1985), which identifies autonomy as one of three fundamental psychological needs. The others being the need for relatedness and the need for competence. The need for autonomy can be considered primary and refers to the feeling of choice and control over their own decisions (Ryan and Deci, 1985; Spence and Oades, 2011). Satisfying the need for autonomy is pivotal for personal and professional development, as it positively affects learning motivation which is the driver for starting a learning process. Previous research has shown that the need for autonomy can be satisfied by a coach or supervisor at the workplace and that autonomy support fosters employees' learning and development (van der Baan, Gast *et al.*, 2022; Noe *et al.*, 2013;

Tannenbaum *et al.*, 2010). However, whether there is a relationship between an autonomy-supportive supervisor and employees' SDL remains unclear. Previous research has shown that the need for autonomy can be satisfied by a coach or supervisor at the workplace and that autonomy support fosters employees' learning and development (van der Baan, Gast *et al.*, 2022; Noe *et al.*, 2013; Tannenbaum *et al.*, 2010). However, how an autonomy-supportive supervisor fosters employees' SDL remains unclear.

Autonomy-supportive supervisors understand and acknowledge "the subordinate's perspective, providing meaningful information in a non-manipulative manner, offering opportunities for choice, and encouraging self-initiation" (Baard *et al.*, 2004, p. 2048). Employees who are given a choice in defining their own learning goals and needs and who are given more autonomy will develop tendencies towards integrated or intrinsic motivation and engage proactively in formal and informal learning activities in the workplace (Beausaert *et al.*, 2011c).

In summary, to cope with the changing environment, organizations invest significantly in the development of their staff. To do so, organizations implement PDPs to foster employees to be self-directed and help them to organize their self-directed learning process. Moreover, autonomy-supportive supervisors allow employees to take up responsibility for their own learning and professional development and, in turn, learn from the learning activities undertaken.

The aim of the present study is two-fold. Firstly, the present study explores the relationship between perceived autonomy support and the undertaking of both formal and informal learning activities. Secondly, the present study researches the mediating role of SDL as a personal characteristic and as a process, when using a PDP in the relationship between autonomy support and the undertaking of formal and informal learning activities. Therefore, the following two research questions are considered:

- RQ1. Does perceived autonomy support relate to the undertaking of both formal and informal learning activities at the workplace?
- RQ2. Does SDL when using a PDP mediate the relationship between perceived autonomy support and the undertaking of formal and informal learning activities?

The present study is innovative in several ways. Firstly, it explores the relationship between autonomy support and SDL in the workplace, which has mostly been studied with students but to a lesser extent with employees (Bell, 2017; Schunk and Zimmerman, 2008). Literature on supervisor support when using a PDP indeed mostly focuses on feedback and coaching (Armstrong and Taylor, 2014). While some have explored how supervisors can support SDL, they did not include autonomy-supportive behaviours from the supervisor (Boyer *et al.*, 2014; Rana *et al.*, 2016). Secondly, the present study takes into account both forms of workplace learning, i.e. formal and informal learning activities, as informal learning accounts for the majority of learning activities at the workplace (Noe *et al.*, 2013; Tannenbaum *et al.*, 2010). Thirdly, although previous research has stressed the importance of SDL in stimulating the undertaking of learning activities at the workplace (Raemdonck *et al.*, 2014), they did not use an integrated model of SDL that includes both SDL as a personal characteristic and as a process (Carré *et al.*, 2010; Stockdale and Brockett, 2011). Finally, the present study aims to nourish future research concerning the conditions needed for sustainable use of PDPs, which puts the employee at the centre of his professional learning and development.

Literature review and hypotheses

Workplace learning

Workplace learning concerns both work-related formal or informal learning activities (Evans and Kersh, 2014). Formal learning encompasses all learning activities that take place within

a formally designated learning context, with activities prescribed by an instructor or syllabus, with predefined learning goals and desired outcomes, and that have a defined beginning and end time (Cerasoli *et al.*, 2017). However, formal learning only represents a small amount of learning in the workplace. Although difficult to quantify, there is a consensus in literature that the majority of learning activities within an organization do occur informally (Cristol and Muller, 2013).

Informal learning entails a learning process that is initiated by the learners themselves. Informal learning assumes that the learner is highly motivated by the intent to develop themselves (Baard *et al.*, 2004; Noe *et al.*, 2013). Informal learning is more implicit, has no clearly defined starting point and occurs on a more continuous but sporadic, unintended basis, often without predefined learning goals or outcomes. It includes learning from oneself – for example, reflecting on ways to improve performance; learning from others – for example, learning from a mentor; and learning from non-interpersonal sources – for example, learning from searching job-related information on the internet (Noe *et al.*, 2013).

Even though it is believed that informal learning is more effective than formal learning, the two are actually complementary, in that formal learning leads to informal learning and conversely (Tannenbaum *et al.*, 2010). It is therefore important that the undertaking of both types of learning activities is supported by a manager or supervisor.

Perceived autonomy support and learning activities. Autonomy support is a concept coming from the SDT (Ryan and Deci, 1985; Gagné and Deci, 2005). Autonomy support in the workplace refers to supervisors' behaviours such as "acknowledging worker perspectives, encouraging self-initiation, offering opportunities for choice and input, communicating in an informational rather than a controlling manner, and avoiding the use of rewards or sanctions to motivate behaviour" (Slemp *et al.*, 2018, p. 707). On the opposite, controlling behaviours refer to neglecting or thwarting employee initiatives and pressuring them into thinking, feeling or behaving in a specific way (Deci *et al.*, 1989). Autonomy support increases the employee's feeling of responsibility, which positively affects self-determined motivation for the undertaking of learning activities (Tannenbaum *et al.*, 2010). For example, Roca and Gagné (2008) found that perceived autonomy support was significantly positively related to motivation factors that ultimately lead to the undertaking of e-learning activities for employees.

Although previous research has established a relation between perceived autonomy support and the undertaking of learning activities, a distinction should be made between formal and informal learning, especially because it is suggested that informal learning necessitates more autonomy from the learner (Noe *et al.*, 2013; Tannenbaum *et al.*, 2010). The present study aims at addressing this gap by studying the effect of perceived autonomy support on both formal and informal learning activities simultaneously.

The first hypothesis of this study is as follows:

- H1. Perceived autonomy support has a significant positive relation with both formal and informal learning activities; the strongest relation is expected with informal learning.

Self-direction in learning when using a personal development plan

A PDP refers to a document that employees use to identify their learning needs, set themselves development goals and plan their own learning activities (Beausaert *et al.*, 2011a, 2011b). Thus, when using a PDP, a certain degree of SDL is assumed to support the undertaking of learning activities. In contrast to other approaches to learning which are rather externally controlled, SDL requires personal agency and invites learners themselves to set learning goals, identify learning opportunities, choose learning activities and overcome

learning barriers (van der Baan, Raemdonck *et al.*, 2022). In that sense, SDL is self-initiated and starts from learners' needs and intrinsic motivation. SDL finds its roots in adult education and adult learning (Knowles, 1975) and refers to both a learning process as well as a personal characteristic of the learner (Carré *et al.*, 2010; Raemdonck *et al.*, 2012; Stockdale and Brockett, 2011). Brockett and Hiemstra (1991) developed an umbrella model the personal responsibility orientation (PRO) model of SDL (PRO-SDL) which integrates both conceptualisations of SDL. More specifically, PRO-SDL scale (PRO-SDLS) consists of both internal and external subcomponents. The internal subcomponent is best understood as an individual characteristic, termed learner characteristic (LC), including intrinsic motivation and self-efficacy. Intrinsic motivation for learning is autonomous and grounded in goals which are freely chosen. Self-efficacy is defined as the learner's belief in their own ability to complete a task successfully (Bandura, 1977; Stockdale and Brockett, 2011). An individual's level of self-efficacy is important for the approach towards challenging learning tasks and for setting goals to complete these tasks (Boyer *et al.*, 2014).

The external component of SDL is related to the learning process, the teaching-learning transaction (TLT) (Stockdale and Brockett, 2011), including demonstrating initiative and perceived control. Perceived initiative refers to the learner who has the primary responsibility for taking initiative in planning, implementation and evaluation of the learning process. Perceived control is defined as an internal *locus* of control by which learners believe they have control over events affecting them (Boyer *et al.*, 2014).

Various previous studies have found significant positive relationships between SDL and the undertaking of learning activities at the workplace. For example, Lejeune *et al.* (2016) found SDL to be significantly related to the undertaking of learning activities. Moreover, Raemdonck *et al.* (2014) found that SDL significantly contributed to workplace learning. These findings confirm results of earlier research by Gijbels *et al.* (2012). Thus, there is strong evidence that SDL positively relates to the undertaking of learning activities.

However, these studies do not make the distinction between formal and informal learning activities. Including both formal and informal learning, the following hypothesis is presented:

- H2. SDL relates significantly positively to the undertaking of both informal and formal learning activities.

Perceived autonomy support and self-direction in learning when using a personal development plan

To foster employees' SDL when using a PDP, it is of paramount importance to have a supervisor who provides sufficient support. SDL when using a PDP has been studied before in an educational context. In an on-demand educational setting, where students take primary responsibility for their own learning, SDL plays a vital role. On-demand education closely resembles the usage of a PDP because students are expected to decide for themselves which skills they want to develop and which learning trajectories they want to follow (Kicken *et al.*, 2009a). It is suggested that on-demand education can only be successful when students are self-directed learners (Kicken *et al.*, 2009a; Knowles, 1975). In a case study of hairdresser students ($n = 10$) in The Netherlands, the authors have shown that the use of a PDP can support students' SDL skills. In a follow-up study in the same setting, it was found that students who were actively supported in the use of their portfolio developed SDL skills (Kicken *et al.*, 2009a).

In a more recent study in the workplace, Lejeune *et al.* (2016) found that having a motivating supervisor when using a PDP was positively related to SDL. It is important that the supervisor leaves the employee with a certain degree of freedom of choice (Beausaert *et al.*, 2011c; Boyer *et al.*, 2014; A. Evans *et al.*, 2002). Various studies have shown that an

autonomy-supportive supervisor promotes SDL (Baard *et al.*, 2004; Patall *et al.*, 2008; Slemp *et al.*, 2018). In their study, Baard *et al.* (2004) showed that a manager's autonomy support positively relates to the learner's initiative. Moreover, the authors also found that an autonomy-supportive manager fosters self-efficacy, also a characteristic of SDL (Baard *et al.*, 2004). A learner should not only be ready and willing to engage in SDL, but the learner must also feel they are able to plan the learning trajectory independently, again relating to self-efficacy (Bandura, 1977).

To support SDL when using a PDP it is of paramount importance to have an autonomy-supportive supervisor who guides learners in directing their own learning process (Kicken *et al.*, 2009b). This leads to the following hypotheses:

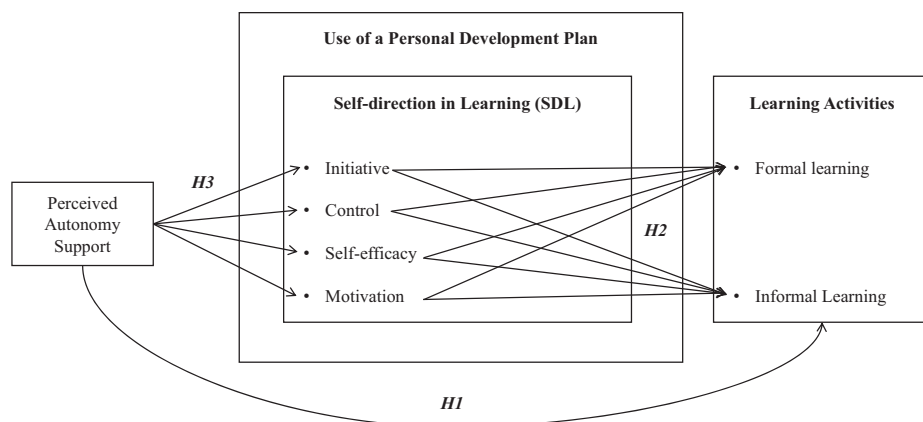
- H3. Perceived autonomy support is significantly positively related to SDL when using a PDP.
- H4. SDL when using a PDP mediates the relationship between perceived autonomy support and (in)formal learning activities at the workplace.

The conceptual model including all hypotheses is presented in Figure 1.

Method

Participants and procedure

To answer our two research questions and test our hypotheses, data were collected with an online questionnaire (in English, Dutch and Indonesian), using a convenience sampling method. The questionnaire was translated and back-translated according to the principles of Hambleton (1994). The questionnaire was sent to individuals in the networks of the researchers. The researchers did not have access to individual organizations and therefore could not use probability sampling by random selection of employees within these organizations. In addition, individuals from a variety of organizations and countries were approached to participate, fostering the generalizability of our results.



Source: Authors' own work

Figure 1. Conceptual model of the relationship between perceived autonomy support, SDL when using a PDP and learning activities

A total of 263 respondents filled in the complete questionnaire. Participants who did not make use of a PDP ($n = 70$) were deleted. These participants answered “no” to the question: “Do you have a personal development plan (also called individual development plan or talent profile) in which the development and performance goals and/or the learning activities undertaken are described?”. As a result, a data set with 193 eligible cases was created. Most of the respondents worked in European countries ($n = 98$) and in Indonesia ($n = 84$). Five respondents worked in the USA and six did not fill in this question. The sample distribution is summarized in [Table 1](#).

Measures. The questionnaire consisted of three main sections, each section measuring a different variable; perceived autonomy support ([Baard et al., 2004](#)), SDL ([Stockdale and Brockett, 2011](#)) and undertaking of learning activities ([Noe et al., 2013](#)). In the questionnaire, a supervisor was defined as the direct manager. Reliability analyses were conducted for all scales. [Table 2](#) gives an overview of the different scales, the reported Cronbach’s alphas and example questions.

Perceived autonomy support. A shortened version (6 items) of the Work Climate Questionnaire (WCQ) of [Baard et al. \(2004\)](#) assessed employee’s perceptions of managers’ autonomy support. These 6 items were put into a question matrix on a seven-point Likert scale, ranging from Strongly Disagree to Strongly Agree. Reliability analysis of the WCQ revealed a Cronbach’s alpha of 0.91.

Self-direction in learning The PRO-SDLS was used to measure SDL based on a PRO ([Stockdale and Brockett, 2011](#)). The PRO-SDLS consists of a set of 25 questions that were put into a matrix and were measured on a five-point Likert scale ranging from Strongly Disagree to Strongly Agree. This questionnaire consisted of the following four scales: demonstrating initiative (6 items), perceived control (6 items), self-efficacy (6 items) and

Table 1. Sample distribution

N	194
<i>Gender</i>	
Male	73
Female	114
Unknown	6
<i>Age (average years)</i>	31.01 (SD = 7.2)
<i>Job function</i>	
Supervisor/Manager	86
Employee	104
Unknown	3
<i>Tenure</i>	
Organisational tenure (average years)	2.45 (SD = 1.26)
Job tenure (average years)	1.91 (SD = 1.07)
<i>Level of education</i>	
Secondary school	18
Professional bachelor	22
Academic bachelor	74
Master	70
Post-graduate	5
Unknown	4

Source: Authors’ own work

Table 2. Overview of different scales, descriptives and Cronbach's alphas

Scale	α	Example question
<i>Perceived autonomy support (WCQ)</i>	0.91	My manager conveyed confidence in my ability to do well at my job
<i>Self-directed learning (SDL)(PRO-SDLS)</i>		
– Demonstrating initiative	0.79	I often use materials I've found on my own to help me in learning
– Perceived control	0.75	I always effectively take responsibility for my own learning
– Self-efficacy	0.83	I am confident in my ability to consistently motivate myself
– Autonomous (intrinsic) motivation	0.79	I complete most of my professional learning activities because I WANT to, not because I HAVE to
<i>Undertaking of learning activities</i>		
– Informal	0.84	Consider the past three months. How often during a typical work week have you engaged in the activities below to learn and help you better perform your job? - Reflecting about how to improve my performance
– Formal	0.68	How many formal learning events have you completed or attended during last year, e.g. classroom training, e-learning modules [including mandatory ones], conference, education...?

Source: Authors' own work

autonomous (intrinsic) motivation (7 items). All subscales showed high reliability with Cronbach's alpha's of 0.79, 0.71, 0.83 and 0.79, respectively.

Undertaking learning activities [Noe et al. \(2013\)](#) developed 11 questions about undertaking informal and formal learning activities. Nine questions assess different aspects of informal learning. They were measured on a five-point Likert scale ranging from Never to Always. Reliability analysis revealed a Cronbach's alpha of 0.84 for informal learning. The two questions assessing formal learning activities include multiple-choice questions about the time spent on different types of formal learning activities. Reliability analysis of this section revealed a Cronbach's alpha of 0.68.

Data analysis

Normality assumption and descriptive statistics. Before starting the analysis, the normality assumption was checked using the skewness and kurtosis statistics. Skewness and kurtosis of all scales were within the range of a normal distribution ([West et al., 1995](#)). In the preliminary analysis, descriptive statistics and correlations between the different scales under study were calculated.

Structural equation modelling. Structural equation modelling (SEM) was used to test the hypotheses. To test the hypotheses, two different path models were drawn and compared. First, a model assuming a full mediating role of SDL was built. Second, a partial mediation model was tested, including a direct relation between perceived autonomy support and both learning activities. Both models were compared regarding their model fit using the χ^2 difference test ([Schermelleh-Engel et al., 2003](#)). R Statistical Computing version 3.5.1. was used to calculate the p -value of the χ^2 difference test. To describe relationships between

different variables a significance level of 5% was used. The path analysis was conducted in IBM SPSS AMOS, version 24 allowing SEM and simultaneously testing of multiple regression models (Lei and Wu, 2007).

Results

Preliminary analyses

Results of the preliminary analyses, the descriptive statistics of the seven scales and their correlations, are presented in Table 3.

Structural model

To test the hypotheses, a partial and a full mediation model was tested. Both models were compared for the best fit, using several incremental and absolute and relative fit indices (Lei and Wu, 2007).

First, a full mediation model was built (Figure 2). Analysis of the model revealed a good model fit ($\chi^2 = 7.370$; $df = 3$; CFI = 0.987; RMSEA = 0.087).

Second, the fit of the partial mediation model was tested by adding two relations connecting perceived autonomy support with both formal and informal learning. Analysis of the model revealed a better fit ($\chi^2 = 2.2025$, $df = 1$ CFI = 0.997; RMSEA = 0.073; Figure 3).

To compare the model fit of the two models, the χ^2 difference test was calculated. Results of the χ^2 difference test indicated that the models did not significantly differ ($p > 0.05$). However, because of the sample size sensitivity of the χ^2 and a higher CFI and lower RMSEA of the partial mediation model compared to the full mediation model, we decided to use the partial mediation model for hypothesis testing (Lei and Wu, 2007).

Hypotheses testing

H1 suggested that perceived autonomy support has a significant positive relation with both formal and informal learning activities. Perceived autonomy support was significantly positively related to informal learning ($\beta = 0.155$, $p < 0.05$), but it was not related to formal learning. This hypothesis is therefore partially confirmed.

H2 predicted that SDL is significantly positively related to learning activities, both formal and informal learning activities. The relation between all four subcomponents of SDL and (in) formal learning was tested simultaneously. Autonomous (intrinsic) motivation ($\beta = 0.235$, $p < 0.01$) and demonstrating initiative ($\beta = 0.311$, $p < 0.001$) were significantly positively related to formal learning. Self-efficacy and internal locus of control were not related to formal learning. Only demonstrating initiative was significantly positively related to informal learning ($\beta = 0.341$, $p < 0.001$). Internal locus of control, self-efficacy and autonomous (intrinsic) motivation were not related to informal learning. H2 is partially confirmed.

H3 predicted a positive relationship between perceived autonomy support and the four subcomponents of SDL. Perceived autonomy support was significantly positively related to autonomous (intrinsic) motivation ($\beta = 0.188$, $p < 0.01$), internal locus of control ($\beta = 0.157$, $p < 0.05$) and self-efficacy ($\beta = 0.158$, $p < 0.05$). Perceived autonomy was not related to demonstrating initiative. Thus, H3 is partially supported.

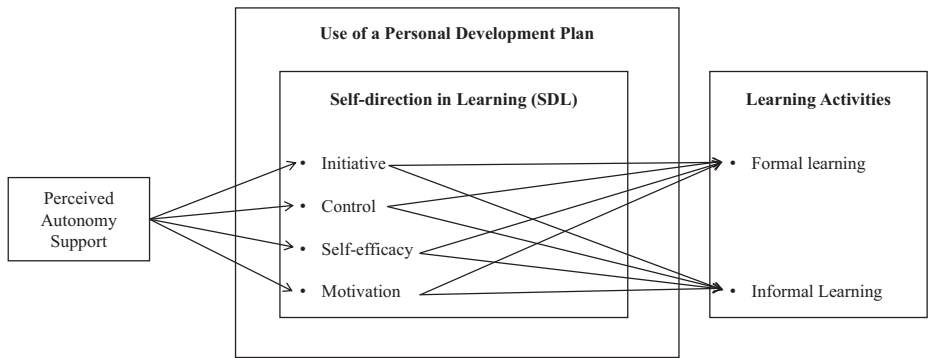
H4 proposed that SDL mediates the relationship between perceived autonomy support and workplace learning. The relationship between autonomy support and both formal and informal learning was tested simultaneously. Perceived autonomy support was only positively related to informal learning ($\beta = 0.155$, $p < 0.05$) and not to formal learning. Partial mediation occurred for the relationship between perceived autonomy support and informal learning. This suggests that there is also a direct relationship between perceived autonomy support and the undertaking of informal learning activities which is not explained by the

Table 3. Means, standard deviations and correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age	31.01	7.20	–									
2. Organizational tenure	2.45	1.26	0.64***	–								
3. Job tenure	1.91	1.07	0.48***	0.58**	–							
4. Perceived autonomy support	5.49	1.11	0.12	0.15*	0.09	–						
5. SDL-Initiative	3.75	0.63	0.18*	–0.05	0.02	–0.05	–					
6. SDL-Control	3.59	0.58	0.14	–0.03	0.03	0.16*	0.53**	–				
7. SDL-Self-efficacy	3.79	0.63	0.19**	0.40	0.10	0.16*	0.51**	0.70**	–			
8. SDL-Autonomous (intrinsic) motivation	3.70	0.63	0.15*	0.04	–0.02	0.19**	0.45**	0.43**	0.54**	–		
9. Formal learning	2.87	1.27	–0.02	–0.21**	–0.16*	–0.05	0.29**	0.06	0.04	0.24**	–	
10. Informal learning	3.12	0.72	–0.08	–0.14	–0.04	0.15*	0.38**	0.33**	0.28**	0.15*	0.16*	–

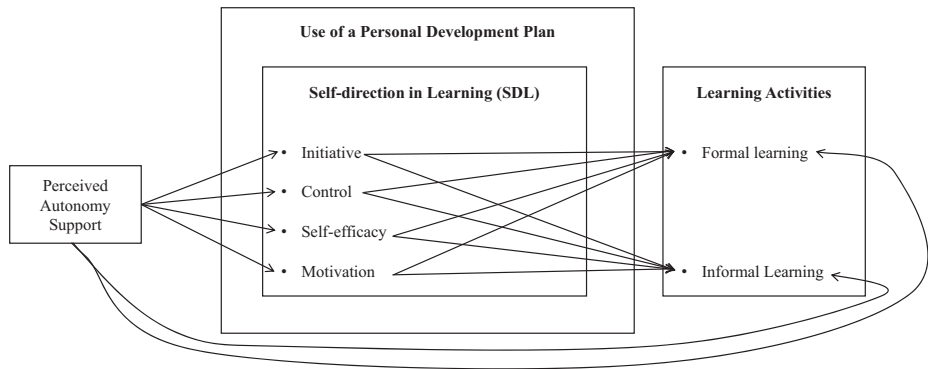
Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Source: Authors' own work



Source: Authors' own work

Figure 2. Full mediation model



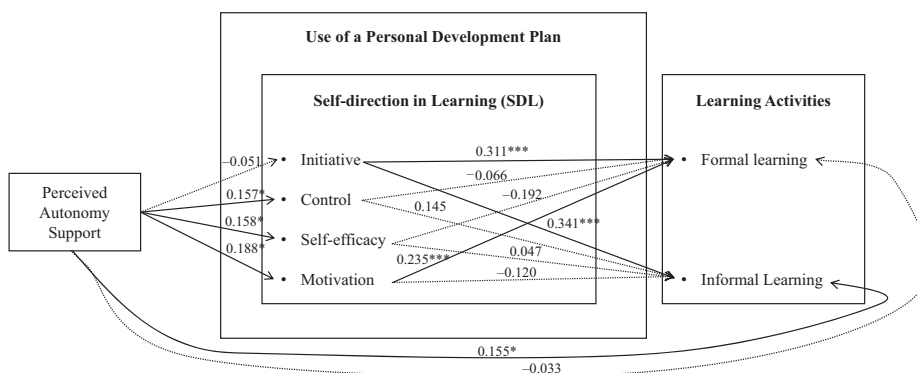
Source: Authors' own work

Figure 3. Partial mediation model

relation between SDL and the undertaking of informal learning activities. Thus, *H4*, which stated that there is a mediation of SDL in the relationship between perceived autonomy support and both learning activities, is partially confirmed. Results are summarized in [Figure 4](#) and [Table 4](#).

Discussion

In the past decennia, many organizations have been implementing PDPs to support their employees' learning and development. However, if these PDP practices are effective or not depends much on how the organization implements and supports the use as well as on employees engage in the PDP practice. This study focuses on both contextual – i.e. autonomy support from supervisor and SDL as a process (TLT), as well as individual characteristics – i.e. SDL as a personal characteristic (LC) and their relationship with employees' undertaking of (in)formal learning activities.



Note: The solid lines indicate a significant relationship. The dashed lines indicate a non-significant relationship; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors' own work

Figure 4. Partial mediation model with standardized estimates

Table 4. Overview of research questions, hypotheses and main findings

Research question	Hypothesis	Results
1. Does perceived autonomy support relate to the undertaking of both formal and informal learning activities at the workplace?	H1. Perceived autonomy support has a significant positive relation with both formal and informal learning activities	Partially confirmed
2. Does SDL when using a PDP mediate the relationship between perceived autonomy support and the undertaking of formal and informal learning activities?	H2. SDL relates significantly positively to the undertaking of both informal and formal learning activities H3. Perceived autonomy support is significantly positively related to all four subcomponents (i.e. motivation, control, self-efficacy, initiative) of SDL when using a PDP H4. SDL when using a PDP mediates the relationship between perceived autonomy support and learning activities at the workplace	Partially confirmed Partially confirmed Partially confirmed

Source: Authors' own work

H1 on the relationship between perceived autonomy support and formal and informal learning was only partially supported. Results indicated a significant positive relationship between perceived autonomy support and informal learning, but not between perceived autonomy support and formal learning. A supervisor's autonomy-supportive behaviour encourages employees' self-initiative and provides opportunities for choice (Baard *et al.*, 2004; Slemp *et al.*, 2018). It can be argued that informal learning requires more autonomy from the learner than formal learning does (Noe *et al.*, 2013). Perceived autonomy support did not show a significant relationship with formal learning activities. Formal learning activities in the workplace are more externally controlled (Tannenbaum *et al.*, 2010), and it might be possible

that to engage in formal learning activities, positive perceptions of an autonomy-supportive supervisor are less needed. Also, the trainer facilitating formal learning events might address this need, and thus not necessarily the supervisor.

Regarding *H2* on the relationship between subcomponents of SDL when using a PDP and formal and informal learning activities, results indicated a significant positive relation between SDL when using a PDP and both learning activities. These results are in line with research conducted by [Lejeune et al. \(2016\)](#) who found that SDL was related to undertaking learning activities at the workplace of employees. Furthermore, these results are also supported by the study of [Raemdonck et al. \(2014\)](#) and [Gijbels et al. \(2012\)](#) who showed that SDL of employees was significantly positively related to workplace learning. However, it should be noted that the present study did not find significant positive relations between all subcomponents of SDL and (in)formal learning. Only initiative was significantly positively related to both learning activities, partially confirming *H2*.

Interestingly, autonomous intrinsic motivation, as part of SDL, was significantly positively related to formal learning, but not to informal learning. Intrinsic motivation is inherently autonomous and although informal learning is largely dependent on the learner's motivation, it can be argued that for an individual to engage in informal learning organisation-related factors might be playing a more determining role than person-related characteristics such as motivation ([Gagné and Deci, 2005](#); [Noe et al., 2013](#)). Also, informal learning is inherently connected to the execution of work tasks and therefore often happens unconsciously and is not identified as a learning activity by the employee. In contrast, the undertaking of formal learning activities happens more consciously and is thus easily considered as learning and when undertaken it appeals more on intrinsic motivation. This implies a plea for more explicit support for informal learning from the supervisor.

In addition, this study yielded insignificant results regarding the relationships between self-efficacy as a subcomponent of SDL and both formal and informal learning activities. This result is in line with the study of [Noe et al. \(2013\)](#) who found that self-efficacy explained a significant amount of variance in informal learning only when it was combined with other personality characteristics, such as personality traits (e.g., emotional stability and openness to experience) and zest, suggesting that self-efficacy alone is not sufficient in supporting informal learning.

The present study also found insignificant results regarding the relationships between control as a subcomponent of SDL and both formal and informal learning. This result contradicts the findings of [Ouweneel et al. \(2009\)](#) who found that perceived control and autonomy are significantly positively related to informal learning activities. One possible explanation for this is that the previous study of [Ouweneel et al. \(2009\)](#) was conducted among managers, not employees, while the present study took both groups into account. Having control over one's own learning trajectory might be more important for managers than for subordinate employees. It would be interesting for future research to compare these two groups.

Concerning *H3* on the relation between perceived autonomy support and SDL when using a PDP, partial support was found. A significant positive relationship was found between perceived autonomy support and SDL. More specifically, significant positive relations were found between perceived autonomy support and intrinsic motivation, self-efficacy and control, but not with initiative. This is interesting because, according to [Brockett and Hiemstra \(1991\)](#), the initiative, as part of SDL, reflects proactive behaviour, assuming control over and initiative for the learning process. While the present study found a significant positive relation between perceived autonomy support and control, it did not find such a relation with initiative. Although various studies have found that employees who perceive high levels of supervisor support are more likely to participate in training and learning activities, some studies indicate supervisor support is not always welcomed. It is possible that, for an employee to self-initiate learning

activities, other work environment factors are needed, such as peer support and job characteristics such as job demands (Gijbels *et al.*, 2010; Jungert *et al.*, 2021). Finally, the fact that perceived autonomy support was not related to initiative might be explained by the relatively short job ($M = 2.45$) and organizational tenure ($M = 1.91$) in the sample. It is possible that giving too much autonomy to new employees might be detrimental to their initiative because they do not know yet what to do given their short experience in the job or organization (Takeuchi *et al.*, 2021). The relationship between autonomy support and initiative in this case might take the shape of an inverted U, in that too much autonomy support might be detrimental for employees' initiative. In addition, the mean score of perceived autonomy support in our sample was relatively high, indicating that indeed much autonomy support was perceived by the employees in our sample.

Results of the present study confirmed *H4*, indicating that SDL when using a PDP mediated the relationship between perceived autonomy support and the undertaking of learning activities at the workplace. More specifically, SDL when using a PDP only partly mediated the relationship, since a direct relationship was found between perceived autonomy support and undertaking informal learning activities at the workplace.

In summary, results indicate a significant positive relation between perceived autonomy support and the undertaking of informal learning activities by employees, but not with formal learning. Next, when making use of a PDP, having autonomy support of a supervisor, leads to more SDL and thus more (in)formal learning. To answer our first research question (Does perceived autonomy support relate to the undertaking of both formal and informal learning activities at the workplace?), perceived autonomy support only relates to the undertaking of informal learning activities at the workplace. To answer our second research question (Does SDL when using a PDP mediate the relationship between perceived autonomy?), SDL mediates the relationship between perceived autonomy support and undertaking learning activities at the workplace. More specifically, the relationship between direct supervisor autonomy support and informal learning is partially mediated by SDL when using a PDP, while for formal learning we observe a full mediation. The possibilities for offering autonomy support are wider than only through SDL within a PDP practice. A supervisor can have an impact on the learning potential of the workplace and thus foster employees' informal learning through autonomy support in different ways. These autonomy-supportive actions might be less diverse concerning formal learning activities, which might explain why we observe a full mediation through SDL for formal learning, but a partial mediation through SDL for informal learning.

Limitations and direction for future research

This study has a few limitations which could be taken into account by future research. Firstly, the present study only relied on self-reported data, which is prone to biases (Donaldson and Grant-Vallone, 2002). For example, employees who self-rate their participation in learning activities could want to picture themselves as more eager to learn. Moreover, informal learning often occurs unconsciously and it may be difficult for an employee to rate their own informal learning activities (Tannenbaum *et al.*, 2010). Therefore, future research should make use of more objective data, such as manager, or peer ratings in addition to the employee's self-reported data.

Secondly, the present study made use of a convenient sampling method (Cohen *et al.*, 2011). With several control questions, respondents indicated if they made use of a PDP. Organizations use different terminology when using a PDP, for example, performance dialogue or learning portfolio (Beausaert *et al.*, 2011c). This may be confusing for participants, and they may indicate that they do not use a PDP, despite the fact that they use a PDP at the workplace. Further studies should make use of other, non-probability, sampling methods and only include employees from organizations that have implemented a PDP or compare both groups.

Although the present study identified perceived autonomy support and SDL when using a PDP as supporting factors for learning at the workplace, not all variables used in this study had a positive relationship with learning activities. This sample included respondents from various industries from different cultural regions in the world (for example, Indonesia and Europe). It would therefore be interesting to compare and study these different industries and cultural regions – autonomy support can be perceived differently depending on countries [e.g. India is more hierarchical, with a high power distance (Khatri, 2009)]. Moreover, in these different industries and cultural regions, other contextual factors when using a PDP and other supervisor behaviours might also play a role in stimulating learning at the workplace. To identify other supervisor behaviours and other supporting factors when using a PDP for learning at the workplace, future research should employ a qualitative-method approach to gain better understanding of the other contextual factors and supervisor behaviours that can play a role.

At last, the present research is a cross-sectional study. Although the present study identified an autonomy-supportive supervisor and SDL when using a PDP as supporting conditions for learning at the workplace, to truly establish causal relationships future research should follow a longitudinal design (Cohen *et al.*, 2011). However, the present study is the first study to research the mediating role of SDL when using a PDP in the relationship between perceived autonomy support and (in)formal learning. Given the exploratory nature of this research, a cross-sectional study is an important first step.

Practical implications

This study showed that subcomponents of SDL when using a PDP have a significant positive relationship with the undertaking of both formal and informal learning activities at the workplace. Therefore, managers and supervisors should pay considerable attention to the implementation of a PDP. A PDP should be implemented in such a way that SDL, in particular the motivation and initiative subcomponents, are fostered when using this tool. The present study also found that employees' perceptions of an autonomy-supportive supervisor can be effective in fostering SDL when using a PDP, specifically the motivation, self-efficacy and control subcomponents. To foster SDL, the supervisor should allow the employee a certain degree of freedom when filling in the PDP. Within an organization, SDL brings about numerous benefits. For example, supporting SDL in the workplace can help employees to engage in lifelong learning.

Moreover, a supervisor or manager who is perceived as autonomy-supportive encourages employees to engage in informal learning activities at the workplace. It is thus worthwhile to invest in leadership development programs that encourage autonomy-supportive behaviours in managers and supervisors. Autonomy-supportive behaviours include encouraging employee self-responsibility, taking the employee's perspective in developmental discussions and communicating in an assertive but non-controlling way. could enhance the effectiveness of managers skills. Furthermore, organizations and HRD departments should implement a carefully designed PDP to stimulate learning at the workplace, with special attention to SDL within this practice.

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Corresponding author

Niels van der Baan can be contacted at: n.vanderbaan@maastrichtuniversity.nl