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Self-directedness in work-related learning processes.

Theoretical perspectives and development of a measurement instrument.

Abstract

This book chapter investigates the concept of self-directedness in work-related learning processes and its relationship to other related constructs such as self-regulated learning, personal agency, proactive personality and personal initiative. It also describes the development of an instrument to measure self-directedness in work-related learning processes (SDL-scale) for use with employees having different qualification levels. The SDL-instrument is a 14-item scale which measures and individual's characteristic adaption to steer and take responsibility in diagnosing learning needs and setting goals, choosing and implementing appropriate learning strategies and evaluating and adjusting the learning process. An exploratory study involving 940 low-qualified and high-qualified employees revealed a uni-dimensional structure. A second and third study was conducted in a sample of 408 low-qualified employees and in a sample of 787 low-qualified adult learners joining courses in adult education institutions and confirmed the one-factor structure. Discriminant, convergent and cross-cultural validity was also examined. In a fourth study model fit was compared of the low-qualified and higher qualified group separately and was found invariant across both sample. In each of the samples, both scales showed satisfactory internal consistency.

1. INTRODUCTION

Over the years, the concept of 'self-directedness' has been studied in a variety of domains and disciplines (e.g. educational sciences, human resources management, human resources development, psychology, economics). This widespread interest in self-directedness is explained by the underlying assumption that self-directedness

leads to improved employability and success in terms of labor market outcomes and organisational performance (Guglielmino & Guglielmino, 1994; Jackson, 1996; Van Loo, 2002). Consequently, self-directedness is considered a key characteristic for workers both in relation to work and career as in lifelong learning.

The knowledge economy not only affects the work and career of those who are highly qualified. The change in nature of work and career takes place at every level in an organisation and makes self-directedness in learning an essential part of everyday work practice. Although self-directedness in learning processes has been a focus of research in a variety of domains, there is a lack of research on how low-qualified employees engage in these processes. Long and Morris e.g. conducted a review of the literature in 1995 related to self-directedness in learning processes in business and industry and concluded that in nearly half of the studies business managers only were used as research subjects. Since then, research studies involving lower qualified people have not increased. According to Brookfield (1985) self-directed learning describes the process of learning of the majority culture and neglects many subgroups.

The purpose of this chapter is to conceptualise ‘self-directedness in work-related learning processes’ and to develop a reliable and valid instrument to measure self-directedness in work-related learning processes which is applicable and tested also in low-qualified workers. In this chapter, we first define and characterise ‘self-directedness in work-related learning processes’ and distinguish this concept from other related concepts. We then present a model of self-directedness which served as the basis for the scale construction. Next, the method of scale construction is outlined and four studies are presented to test validity. The chapter concludes with a summary

and discussion of the results, alongside a reflection on the limitations and prospects for future research.

THE CONCEPT OF SELF-DIRECTEDNESS IN WORK-RELATED LEARNING PROCESSES

We define ‘self-directedness in work-related learning processes’ as a *characteristic adaptation* to self-direct work-related learning processes that is to steer and take responsibility in diagnosing learning needs and setting goals, choosing and implementing appropriate learning strategies and evaluating and adjusting the learning process. ‘Learning process’ is defined as a series of *informal and formal work-related learning activities* that result in the achievement of learning-related goals, such as mastering new tasks or updating skills and knowledge. Examples of learning activities are: participation at training, workshops and courses, knowledge sharing among colleagues, looking for information in manuals or professional handbooks, etc.

Self-directedness is characterised by the following features: (a) is changeable, (b) is an active approach, (c) centers on the attainment of the individual’s goals (d) has a long term focus, and (e) is dynamic.

First, in contrast to a personality trait which is determined by biological factors, self-directedness is a *characteristic adaptation*. A characteristic adaptation is a psychological feature that is developed as the person encounters his or her environment, and it reflects the influences of traits, the social environment, and their interaction (McCrae & Costa, 1999, 2003). It is *characteristic* because it reflects the operation of enduring personality traits, and it is an *adaptation* because it is shaped in

response to the demands and opportunities offered by the environment. A characteristic adaptation includes beliefs, attitudes but also behaviour (De Fruyt, Bartels, Van Leeuwen, De Clercq, Decuyper, Mervielde, 2006). It is acquired and can be more easily modified in comparison to a personality trait. A characteristic adaptation varies across cultures, families, and portions of the lifespan. It thus changes over time and across circumstances in response to biological maturation, changes in the environment, or deliberate interventions (McCrae & Costa, 2003). Self-directedness is therefore described as a learned characteristic that is amenable to the educative process and influenced by personal and environmental circumstances (MacKeracher, 2004).

Second, self-directedness encompasses an active approach, in which people actively give direction to current and future learning rather than they respond passively to environmental change. Moreover, an active approach implies that the employee is persistent in overcoming barriers which would prevent the person from carrying out his/her plans. High self-directed people scan their environment more actively for opportunities than low self-directed people. Self-directedness involves self-initiated, deliberate and sustained pursuit of learning activities (Anderson, Ones, Sinangil & Viswesvaran, 2001).

Third, the individual's learning goals can be consistent with the organisational goals but this is not a necessity. Central are the *individual's goals* and the extent to which they are helpful to the individual to retain and improve his/her employability and career. Whether the own goals are as well 'pro-company' goals depends upon the characteristics of the individual's personal learning goals. Self-directedness is thus not

necessarily a pro-organisational concept. Instead, the individual perspective is the main focus.

Fourth, self-directedness has a *long term focus*. By self-directing the learning process the employee does not only react to what is currently needed in terms of learning to guarantee his/her employability but reflects and anticipates on problems and opportunities to come in the future. The person chooses to deal with them immediately by initiating learning processes rather than wait until one *must* respond to environmental changes. This long-term perspective is an integral part in self-directing learning processes. Therefore, we speak in terms of self-directedness in learning *processes*. ‘Process’ expresses a course or state of going on, a series of activities, a forward, developmental and continuous movement.

Fifth, self-directedness is characterised by a *dynamic process*. It is an individual’s ongoing functioning in creating constant adaptation to the environment which is expressed in behaviour and regulated by cognitive (beliefs), affective (attitudes), volitional (intentions) and earlier behavioural patterns (see Fishbein & Ajzen, 1975; Ajzen & Fishbein, 2005). A characteristic adaptation is thus a dynamic and interactive network of beliefs, attitudes, intentions and behaviour that allows one to interact meaningfully with the social environment (McCrae & Costa, 2003). Moreover, the behaviour which is expressed encompasses a complex and cyclic process of controlling and actively shaping the learning.

RELATED CONSTRUCTS

The construct of self-directedness in learning processes is developed in adult education literature (Ellinger, 2004; Saks & Leijen, 2014). It is most closely related to, but not synonymous with, self-regulated learning, personal agency, proactive personality and personal initiative.

First, self-directedness in learning processes is connected to self-regulated learning. Self-regulated learning is a concept mostly used in cognitive psychology (Raemdonck, Meurant, Balasse, Jacot & Frenay, 2014). It is only recently, that the term self-regulated learning is being used in the context of professional learning at work in a study by Littlejohn, Milligan, Fontana and Margaryan (2016). Similarly to self-regulated learning, self-directedness in learning processes is also influenced by a combination of internal and external factors that form the foundation and identifies intrinsic motivation for learning as a key competence (Saks & Leijen, 2014). When contrasting, self-regulated learning emphasis more the cognitive and metacognitive components of self-monitoring while self-directedness stresses more the external management and shaping of the environment. Moreover, self-regulated learning is mostly used in scholarly contexts and therefore focuses more on the regulation of a single task or series of tasks to accomplish while self-directedness in learning is more applied in learning outside the context of traditional schools and it involves the management and self-guidance of a learning trajectory as a whole (Raemdonck, Thijssen & Valcke, 2005).

Second, self-directedness in learning processes is also distinguished from personal agency which is a concept developed in philosophy and often applied in social and behavioural sciences. The concept has been translated to the work context by Billett

(2001) and has been defined as *individual's general capacities and dispositions to make intentional choices, initiate actions based on these choices and exercise control over their sense of selves and work environments* (Harteis & Goller, 2014; Eteläpelto, Vähäsantanen, Hökka & Paloniemi, 2013). Self-directedness can be interpreted as a specific instance of agency (focused on learning instead of all kind of choices). Similarly to personal agency, self-directedness in learning processes is guided by the attainment of personal goals, is intentional and based on an active approach by exercising control. Moreover, both concepts strongly emphasise the influence of internal (motivation) and environmental factors (affordances) in the actual exposure of (learning) behaviour and are therefore both situation specific constructs instead of stable dispositions. In conceptual contributions related to both terms, researchers are often less explicit on the (meta)cognitive component in the process. Different in their approach is that personal agency stresses choice and decision making, whereas self-directedness emphasises more the importance of personal responsibility and learning.

Third, proactive personality derives from organisational psychology and is defined as a “relatively stable tendency to effect environmental change” (Bateman & Crant, 1993, p. 103). It is considered a stable disposition to take personal initiative in a broad range of activities and situations (Seibert, Kraimer, & Crant, 2001). Bateman and Crant (1993) defined a person with a prototypical proactive personality as someone who is relatively unconstrained by situational forces and who effects environmental change. Proactive personalities identify opportunities and act on them; they show initiative, take action, and persevere until they bring about meaningful change. Conceptually, self-directedness in learning processes is a related construct but it

shows as well differences. The overlap with proactive personality is that the construct is also goal directed, intentional and based on an active approach.

However, self-directedness in learning processes can be distinguished from a theoretical and empirical point of view. First, while the proactive personality is a broad construct that is oriented towards general intention-action relationships. Self-directedness is a domain-specific characteristic with specific meaning to the learning process. Second, while proactive personality refers to a personal trait which is more or less stable, self-directedness in learning processes refers to a characteristic adaptation which originates in the interaction of basic tendencies and environmental influences. The extent of self-directedness in learning processes is expected to change as environmental conditions and/or employee's work experiences change. Third, while proactive personality in a work-oriented context affects proactive behaviour that usually matches the organisational goals, self-directedness in learning processes is more centered on the individual's objectives and the extent in which the individual succeeds in realising these goals.

The relationship between self-directedness in learning processes and proactive personality is also empirically tested in this contribution. Self-directedness in learning processes should show some overlap with the proactive personality. However, to establish discriminant validity the construct should not correlate too highly with proactive personality ($r \leq .50$).

A fourth related construct is Frese's concept of personal initiative (1997) developed in the domain of organisational psychology. The concept is defined as "a behaviour

syndrome that results in an individual taking an active and self-starting approach to work goals and tasks and persisting in overcoming barriers and setbacks” (Frese et al., 1997, p. 140). The personal initiative personality measure (Fay & Frese, 2001) is found to be similar to the proactive personality measured by Bateman and Crant (1993). Similar to the construct of self-directedness, the concept of personal initiative is an active construct used for describing employees’ (anticipated) reactions to changes. Both constructs are goal-directed and intentional. Moreover, both require a long-term focus to working life. In contrast to the proactive personality, personal initiative is closer to specific behaviours (Frese & Fay, 2001). However, personal initiative refers to general initiative at work and actively dealing with work problems one encounters in an organisational context. Self-directedness specifically refers to learning. An individual’s personal initiative serves pro-company goals while self-directedness not necessarily matches the organisational goals. Personal initiative takes the framework of the organisation as the starting point while self-directedness focuses on the individual’s perspective.

<Insert Table 1 about here>

MODEL FOR SELF-DIRECTEDNESS IN WORK-RELATED LEARNING

PROCESSES

The concept of self-directedness is recognised to be an important component in adult learning (see Knowles, 1990; Brookfield, 1996). However, a lot of confusion and controversy exist in relation to the concept. Various authors categorised self-directed

learning as a *process oriented approach* to learning in which people take the initiative to influence the learning experience and self-direction as a *personal characteristic* (Lounsbury, Levy, Park, Gibson, Smith, 2009; Zhoc & Chen, 2016). In process oriented conceptualisations towards self-directedness, self-directedness points at instructional processes in which people take the primary responsibility in learning situations. The individual controls and shapes the learning process by taking initiative for goal setting, planning, implementing and evaluating the learning process. Conceptualisations in which self-directedness is approached as a personal characteristic of the individual, self-directedness points to an individual's beliefs and attitudes, intentions and behaviour that predispose one to influence the personal learning process (Brockett & Hiemstra, 1991). Self-directed learning is mainly used to describe a process-oriented approach to learning (Lounsbury et al, 2009). Until now, the process descriptions of Tough (1971) and Knowles (1975) are still the most cited in adult education literature on this subject. Both describe a process of self-directedness which is linear in nature which means that the learner follows a predefined set of steps. More recent models are interactive (Stockdale, 2003; Roberson & Merriam, 2005) and reflect a constructivist framework. Following insights from Brockett and Hiemstra (1991) and Garrison (1997) we integrated both views of self-directedness in our definition and conceptualised them as complementary and interrelated.

A comprehensive review of the literature on self-directed learning was conducted in order to develop a conceptual model of self-directedness in learning processes. The model stresses the importance of environmental as well as personal factors for self-directedness. *It emphasises self-directedness as a personal characteristic (i.e.*

characteristic adaptation) but integrates at the same time the process oriented approach. We first discuss the overall model and subsequently focus on the inner part of the circle.

The model of self-directedness presented in Figure 1 represents self-directedness as a characteristic adaptation. The regulatory mechanisms (inner circle) reflect a coherent set of beliefs, attitudes and intentions and behaviour that predispose one to steer and take responsibility for the learning process. They serve as a basis for conceiving goals and plans, exercising freedom of strategy choice, executing plans and using rational reflection (outer circle). The self-directed person is able to invoke this cluster of patterns when steering the learning process (Candy, 1991). Personality traits and the social and physical environment (both outside circle) interact with this cluster of patterns, to shape the characteristic adaptation which in turn regulates the flow of self-directed behaviour (McCrae & Costa, 2003). The person's actual self-directed behaviour (outer circle) is thus a result of a person's characteristic adaptation (inner circle) towards self-directedness which is in turn is a result of personal traits and the environment (outside circle).

The arrows in the circle indicate that self-directedness is characterised by a dynamic process. This dynamic process reflects an individual's ongoing functioning in creating constant adaptation to the environment which is expressed in self-directed behaviour and regulated by cognitive (beliefs), affective (attitudes), volitional (intentions) and earlier behavioural patterns (see Fishbein & Ajzen, 1975; Ajzen & Fishbein, 2005). Self-directedness as characteristic adaptation is thus a dynamic and interactive network of beliefs, attitudes, intentions and behaviour that allows one to interact

meaningfully with the social environment (McCrae & Costa, 2003). Moreover, the self-directed behaviour itself which is expressed encompasses a complex and cyclic process of steering (i.e. controlling and actively shaping the learning process).

<Insert Figure 1 about here>

We have focused on the operation of the system as a whole in order to explain how self-directedness as a characteristic adaptation is related to personal traits, the environment and the actual exposure of self-directedness in learning processes. We focus now on the concept of self-directedness as a coherent network of cognitive (beliefs), affective (attitudes), volitional (intentions) and behavioural patterns.

The network of cognitive, affective, volitional and behavioural patterns which an individual requires to evoke in order to actually self-direct the learning process, relates to beliefs, attitudes, intentions and behaviour which are needed to control and shape the learning in different components of the process. A learning process consists of four main components: goal setting, choosing strategies, executing the strategy, and monitoring and evaluation (see de Jong, 1992; Frese & Zapf, 1994; Knowles, 1975). First, the person diagnoses his needs. Once a goal is established, a person looks for strategies and human and material resources and, when dealing with dynamic systems, anticipates on future outcomes. The strategy choice leads to a plan which is then executed. During plan execution, appropriated strategies are applied and the action is monitored. In case of complexity and negative emotions, the person sticks to the plan. The person evaluates the outcomes and gathers information which helps him to adjust the process (see Knowles, 1975; Frese & Fay, 2001). Unlike Knowles'

conceptualisation of self-directedness (1990), this process is not linear or sequential in nature but cyclic which means that individuals do not necessarily follow a predefined set of steps (Merriam & Caffarella, 1991). However, at least each step will occur in the process. The steps are being constantly redefined during a process of self-direction (visualised with the arrows in the model).

The components of the learning process are described on the left-hand side of Table 2. For each component in the process, examples of self-directedness in learning processes are displayed.

<Insert Table 2 about here>

The first component in Table 2 is goal setting. Learning processes are guided by goals and in turn determined by needs (Frese & Fay, 2001). The next component is strategy choice. Possible learning opportunities are examined in the work environment or on the market. Information is collected on possible strategies that can be undertaken and the most suitable strategies are scanned to guide the learning. The individual develops a learning plan which specifies the steps to reach a goal. The third component relates to the execution of the strategy to be followed. The individual takes initiative to actively implement the plan that was set up. The final component in the learning process is monitoring and evaluation. The individual develops his or her own checks and evaluation (Frese & Fay, 2001). Through monitoring, the individual evaluates if he or she is on the right track and if his/her knowledge and skills are still up to date. The individual reflects upon the learning progress. Evaluation of the (interim)outcomes can lead to the adjustment of goals, plans or the execution.

The four components in the learning process will in the construction of the scale (next paragraph) serve as a basis to generate items which reflect an individual's beliefs, attitudes, intentions and behaviour towards each of the components in the learning process. Scale items reflect an individual's beliefs, attitudes, intentions or behaviour that predispose one to steer and take responsibility in goal setting, strategy choice, application of strategies and, monitoring and evaluation.

2. METHOD OF SCALE CONSTRUCTION

Our scale was developed to measure someone's beliefs, intentions, attitudes and behaviour to steer goal setting, strategy choice, strategy execution and the monitoring and evaluation of the learning process. On basis of the literature and existing instruments (Brockett and Hiemstra, 1991; Guglielmino, 1977; Hiemstra (2000); Knowles, 1975; Oddi, 1984; Stockdale, 2003; Straka, 1999, 2000) a large number of items was generated for each component (see Figure 1 and Table 1) to reflect the conceptual model of self-directedness in work-related learning processes (SDL). Respondents were asked to rate each item on a 5-point Likert scale varying from 1= total disagreement to 5 = total agreement. Attention was paid to simple wording and to item content that was understandable to lower-qualified workers as we wanted the instrument to be suitable for employees of different qualification levels. Self-directed learning processes were related to both formal and informal learning contexts. That is, trainings and learning activities which are initiated at the workplace for example by exchange of work experiences between colleagues (e.g.: I regularly take the initiative to exchange job experience with my colleagues). Most of the existing measurement

instruments appear to measure self-directedness in only formal, school- and book oriented learning contexts (Brockett, 1985) which might disadvantage low-qualified employees. A learner may be highly self-directed in informal contexts with emphasis on resources other than books, but paralysed in formal learning contexts (MacKeracher, 2004).

A field trial was set up involving 22 employees. The majority of the participants were low-qualified (i.e. employees having no diploma of secondary education). This led to item deletion due to risk for social desirability and item reformulation because of word difficulty and item complexity. Next, the item pool was reviewed by three educational experts and one expert in the field of human resources management. Following Stockdale (2003) each expert was asked to rate anonymously on a 5-point scale the strength of their agreement (5= strongly agree) or disagreement (1= strongly disagree) as to the representativeness of the items to the model of self-directedness in learning. Most of the item mean ratings pointed to experts' agreement or strong agreement with the representative nature of the item to the model (76.47% of the SDL-items). Finally, the screening process resulted in an item pool of 31 items.

In the presented research, four studies are carried out. The first study is an exploratory analysis to identify the underlying structure of the SDL-items. The second and third study investigates the stability of the scale structure and tests the construct, convergent validity. The fourth and last study is performed to test the invariance of the scales across a low-qualified sample and a high qualified sample. The data was analysed with SPSS and AMOS.

STUDY 1

6.1 Purpose

The first and exploratory analysis was carried out to identify the underlying structure of the SDL-items. Data collected from a sample of low-qualified and high-qualified employees were used for scale construction.

6.2 Sample

A sample of 940 employees was compiled involving employees from 157 organisations in the private and public sector located in Belgium. Three low-qualified employees and three high-qualified employees were selected at random from each organisation. Low-qualified was defined as a person without a secondary education diploma. High-qualified employees obtained at least a diploma of secondary education. The researchers were university students in Educational Sciences, trained to carry out the data collection. The respondents had a mean age of 38 years (range 18 – 60 years; $SD= 9.5$), 46.8% were male and had on average 18 years of work experience (range 6 months- 45 years; $SD= 10.3$).

6.3 Analyses and Results

In order to investigate the underlying structure of the 31 SDL-items, an exploratory principal component analysis was used with oblimin rotation since no orthogonality

across components was assumed. The analyses were performed using listwise deletion¹.

A first exploratory factor analysis was conducted. A combination of methods was used to guide the extraction of components. Initially, the Kaiser-Guttman rule was employed to extract all components with eigenvalues of 1.00 or larger. Eight components were identified using this method with eigenvalues ranging from 5.58 to 1.01, accounting for 49.67% of the common variance. However, this rule is known for overestimating the number of common factors (Neto, Jackson, Somers, 2004). Based on our conceptual model which distinguishes four components in the learning process, we extracted a four-component-structure. However, the component structure did not replicate our conceptual model. Some variables showed relatively high loadings on different components and some components could not be interpreted in a meaningful way. The scree plot was examined for alternative solutions. The scree plot allowed a three, two and a one component solution. The primordial break was observed between the first and the second component.

The first component in the matrix of the three-component structure yielded items from several components as initially put forward. The second component measured someone's response pattern that could be associated with reverse items or negatively phrased items rather than beliefs, attitudes, intentions or behaviour related to someone's self-directedness in learning processes. The third component could not be interpreted. The three-component structure explained 31.29% of the common variance with eigenvalues of 5.58, 2.38 and 1.74.

¹ The analyses were performed on the total sample. Similar high loadings were found when the data was analysed separately for the low-qualified and the high-qualified group.

The two-component structure explained 25.68% of the total variance and demonstrated an identical pattern. Again, all reverse items were grouped within the same component. It appeared that a one-component model was most representative of employees' responses to the SDL-scale. The SDL-scale was a homogeneous construct instead of a multi-factorial. The one-component model explained 18% of the variances in item responses and contained 16 items which had a factor loading $\geq .450$ (Table 3). The items derived from the different components as initially put forward. No reverse-scoring items were included. The Cronbach alpha of this scale was .82.

<Insert Table 3 about here>

STUDY 2

7.1 Purpose

The second study was carried out in order to investigate the stability of the scale structure. The study was also set up to test the construct and convergent validity.

7.2 Sample

In view of cross validation of the instruments, data was obtained from 408 low-qualified employees of 35 organisations from the energy sector, the chemical and, food and nourishment industry located in Belgium. Per organisations at least 10 employees were selected at random. None of the organisations from the exploratory sample (see Study 1) were included in this sample. The data was collected by the first

author through questionnaire and additional interviews with employees. The average age of the participants was 38.3 years (range 19-63 years, $SD= 9.8$). A majority of participants were male (65%) and had on average 20 years of work experience (range 0.5 – 44 years, $SD= 10.4$). Respondents with missing cases for the SDL-items were removed from the sample ($n= 22$).

7.3 Analyses and Results

A confirmatory factor analysis (CFA) with a one factor structure was used in order to investigate the structure stability of the SDL-scale.

The CFA confirmed the underlying uni-dimensional structure of the SDL-scale (Figure 2). The results show an adequate fit between the hypothesised model and the observed data ($\chi^2= 212.8$, $df= 104$, $\chi^2/df= 2.05$, $p<.001$). The goodness of fit estimates were CFI= .90, GFI=.93 and AGFI= .90. The RMSEA of .052 with a 90% interval of .042 and .062, indicates that the one-factor solution represents an acceptable approximation. Inspection of the modification indices (MI) suggested high error covariances with the pairing of item 33 and item 15, 25, 18 and, item 15 and item 25. These two items were problematic². As a consequence, the model was respecified with item 33 and 15 deleted. This reduced the item set from 16 to 14 and improved the model fit considerably ($\chi^2= 125.8$, $df= 77$, $\chi^2/df= 1.63$, $p<.001$). The goodness of fit estimates were CFI= .95, GFI=.95 and AGFI= .94 and the RMSEA was .041 (with

² Evidence of large MI values with the error terms of item 33 and item 15 was as well found in a CFA performed with the sample in study 1 (total sample, and low-qualified and high-qualified sample separately). We found evidence in this to conclude that these measurement error co-variances represent systematic, rather than random, measurement error in item responses.

a 90% interval of .027 and .053). The Cronbach alpha of the SDL-scale for the second sample was .81.

<Insert Figure 2 about here>

This second study was as well set up in order to (1) examine the relationship of the SDL-scale with the Proactive Personality Scale - short version (Bateman & Grant, 1993), and (2) to examine, the relationship between the scores on the SDL-scale and ratings by *supervisors* on the self-directedness of their employees who have completed the scale and *interview* ratings.

7.3.1 *Discriminant validity: The Relationship of the SDL-scale with the Proactive Personality Scale.*

The proactive personality scale measures a personal disposition toward proactive behaviour. In this study proactive personality is measured using the short version of the Proactive Personality Scale (sPPS – 10 items) as used in a study by Seibert, Kraimer, and Crant (1999). The Dutch version of the unidimensional scale was developed and validated by Pringels and Claes (2001). The measurement model for the sPPS fitted well ($\chi^2= 45.2$, $df= 14$, $\chi^2/df= 3.23$, $p<.001$). The goodness of fit estimates were CFI= .93, GFI=.97 and AGFI= .93 and the RMSEA was .076. The Cronbach's alpha of the sPPS was .74.

Given the fit results, the discriminant validity of the SDL-scale was investigated through examining Pearson correlations with the Proactive Personality Scale. The empirical correlations were .49 ($p<.001$, $N=408$) between the SDL-scale and the

sPPS-scale. As hypothesised, these results suggest that ‘proactive personality’ correlates moderately with self-directedness in learning processes.

7.3.2 *Convergent validity: The Relationship of the SDL-scale with supervisor ratings and interview ratings.*

Participants were rated by their supervisor as to their degree of self-directedness in learning processes. A score was given on a five-point Likert scale. As documented in Table 4, significant positive relationships can be observed between supervisor ratings and self-reports of self-directedness based on the SDL-scores but correlations were relatively low.

<Insert Table 4 about here>

A part of the sample was also rated by the researcher on basis of respondents answers to additional open questions. Based on the conceptual model of self-directedness in learning processes, the researcher gave one score on a five-point Likert scale. This was a general impression given by the researcher after the interview. Results in Table 4 show strong positive correlations between interview ratings and self-reports of self-directedness based on the SDL-scores. Therefore, convergent validity between supervisor ratings and scores from the SDL-scale, and between interview ratings and scores from the SDL-scale was established although relationship between the interview ratings and scores from the SDL-scale were much stronger.

3. STUDY 3

8.1 Purpose

The third study aimed to validate the stability of the scale structure in a sample taken in a different country.

8.2 Sample

Data was obtained from 787 low-qualified adult learners of 31 regional adult education center located in the Netherlands. Per regional adult education center low-qualified adult learners were selected at random. In each regional adult education center, teachers were asked to distribute the questionnaire to the participants. The average age of the participants was 56 years (range 17-91 years, $SD= 14.4$) and 29.7% of them were male.

8.3 Analyses and results

A confirmatory factor analysis with a one factor structure was used in order to investigate the structure stability of the SDL-scale. The CFA results evidenced a one-factor structure ($\chi^2= 408.4$, CFI= 0.94, RMSEA= .074). The Cronbach alpha of the SDL-scale was .90.

STUDY 4

9.1 Purpose

In a fourth study, the final 14-item SDL-scale was cross validated building on the data from the first, exploratory study. The analysis was performed to test the invariance of the scale across a low-qualified sample and a high qualified sample.

9.2 Sample

The low-qualified sample consisted of 476 participants. Mean age was 40 years (range 18 – 60 years; $SD=9.1$). 46.9% were male and had an average work experience of 20 years (range 6 months – 45 years; $SD= 10.3$). The high-qualified sample counted 464 participants. The mean age in this sample was 36 years (range 19-58 years; $SD= 9.6$). 46,5% were male and their average years of work experience was 15 years (range 6 months- 42 years, $SD= 9.3$).

9.3 Analyses and Results

A multiple group factor analysis was carried out on the final SDL-scale. As the scale was constructed for use with employees from different qualification levels, a multiple group factor analysis (equal form) was carried out to test the invariance of the scale across low-qualified and higher qualified employees. A valid instrument implies that the one-factor model is applicable to both samples. The results of the hypothesised models are reported in Table 5.

< Insert Table 5 about here>

The RMSEA value of .046 indicated that the one-factor model of the SDL-scale is applicable for the two samples of employees. The χ^2 value for low- and high-qualified employees was 403.314 with 154 degrees of freedom and fit indices were acceptable. Having established the good fit of this model, the invariance of parameters across groups was tested by placing equality constraints. Constraints were specified in AMOS through a labeling mechanism whereby each parameter to be held equal across groups was given a label (Byrne, 2001). In testing for the invariance of this constrained model, its χ^2 value of 418.702 ($df= 167$) was compared with that for the initial model in which no equality constraints were imposed. This comparison yielded a χ^2 difference value of 15.388 with 13 degrees of freedom, which was not statistically significant ($p= .284$). The invariance of the SDL one-factor model was thus established across low-qualified and high-qualified employees.

The SDL proved to be a valid instrument for measuring self-directedness in learning processes in different samples of employees.

DISCUSSION AND CONCLUSIONS

The purpose of this chapter was to develop an instrument based on a theoretical framework specific for self-directedness in work-related learning processes which is also suitable for usage in low-qualified employees. Second, we wanted to examine reliability and validity of this instrument. After an initial item reduction, a fourteen-item SDL-scale was identified measuring one factor. Further investigation of the suggested structure on independent employee samples confirmed the structure stability of the one-component-model. This uni-dimensional structure did not respond to our initial theoretical base although a homogeneous construct was suggested

because of the dynamic nature of the process of self-directedness. Self-directedness is a construct with interrelated parts. It is a dynamic, interactive and regulatory network of beliefs, attitudes, intentions and behaviour which reflects an individual's ongoing function in creating constant adaptation to the environment and is expressed in behaviour linked to goal setting, planning, implementation and evaluation of the learning process. In reality, these different components can hardly be distinguished by participants. Further empirical evidence is needed to fully confirm the uni-dimensional nature of the SDL-scale.

In the development of scales which are also developed for usage in low-qualified adults, it is advisable not to construct reverse-scoring items although this strategy is often advised in the development of Likert scales. In previous studies using Guglielmino's self-directed learning readiness scale problems were detected as well during administration (Sisco as cited in Brockett, 1985) or when interpreting component structures (Field, 1989). In our study, problems occurred when interpreting the component structures. Therefore, we recommend for future studies not to use reverse-scoring items when dealing with a low-qualified research group.

The SDL-scale has proven to be reliable and valid. Analysis of *discriminant* validity confirmed the positive and moderate relation between proactive personality and self-directedness in work-related learning processes. Analysis of *convergent* validity indicated positive significant correlation between self-reports of self-directedness based on the SDL-scores and supervisor-ratings. However, the value of Pearson correlation coefficient - although positive- was not very high. This can be explained by (1) possible participants' systematic overestimation of themselves or (2) possible supervisors' systematic underestimation of their low-qualified employees (e.g.

supervisors who punish active approaches). The results correspond with findings from four other studies conducted in a higher education setting (Barnes & Morris, 2000; Stockdale, 2003). In these studies the relationship evaluated between the instrument developed and professor ratings even failed to detect any significant relationships. However, Crook (as cited in Stockdale, 2003) found that peers were able to predict (in limited situations) self-directedness. Therefore, an interesting avenue for future validation studies would be to obtain a sample of colleague ratings. Parallel to peer students, it is expected that colleagues possess more intimate knowledge as to the self-directed activities of their colleagues and they would be a better source for an independent rating (Stockdale, 2003). In summary, positive findings in this study between the degree of an employee's self-reported self-directedness in learning and an independent rating of this same self-direction in learning by the interviewer indicates promising outcomes to establish convergent validity in future research.

A critical issue in instrument development is the chance to invoke social desirability in certain responses due to e.g. the wording of the scale items. This can be a source of measurement error. We paid attention to social desirability in the wording of the items but did not verify this. As suggested by Stockdale (2003), adding a fake-good scale would allow to check this source of measurement errors in future validation studies.

In this chapter, we presented a model of self-directedness in work-related learning processes. Similar to what Goller and Harteis (this volume) propose in relation to the concept of personal agency, our model was an attempt to integrate the process-oriented approach and personal characteristic approach to self-directedness. Both conceptualisations were distinguished by various authors.

On basis of our conceptual model, the SDL scale was constructed. In the development of this scale, we mainly approached the literature from an adult education perspective. In adult education literature, the ideal adult learner is often described as being self-directed, as having a reservoir of experience that becomes a resource for learning, as being motivated and capable to direct learning processes in response or anticipation to the tasks of their social roles (Knowles, 1975; Mackeracher, 2004). Authors like Merriam (2001), have contested this overgeneralisation that does not necessarily hold true for all adult learners, all learning processes or all learning contexts. With this in mind, we characterised self-directedness as a characteristic adaptation that develops as the learner encounters his or her environment and that reflects the influences of traits, the social environment and their interaction. Similar to Goller and Harteis (this volume) and Evans (this volume), our model of self-directedness in learning stresses the importance of personal as well as environmental factors in the development of self-directedness. The model clearly operates within an individual's social environment. An investigation of the influences of this social environment in future studies may be fruitful and bring further insight into the interaction between individual and contextual factors in the process of self-directing (Stockdale, 2003). Up till now, research paid too little attention to that.

In relation to the main theme of agency at work in this book, self-directedness can be interpreted as an agentic approach towards work-related learning (Goller & Harteis, this volume). It is a specific instance of agency which focuses on learning instead of all kind of choices and actions at work. Therefore, in future validation studies of the SDL scale we recommend to include a human agency measure in order to further

examine the relation between self-directedness and human agency at work and to investigate similarities and differences in the nomological network.

In conclusion, we consider it to be a contribution to the field that the SDL instrument has been developed with low-qualified workers in mind. This study brings in important evidence and knowledge on the self-directedness of low-qualified employees; a group that often is not included in the studies. During scale development, care was taken that scale items were relevant for low-qualified employees. Attention was paid to self-direction in informal learning contexts. The scale proves to be valid and contribute to the conceptualisations of self-directedness in learning processes. One of the strengths in the validation process is that the stability of the factor structure has been tested involving different samples (low and high-qualified employee samples). The SDL-instrument was only used in Dutch-speaking context (Flemish region of Belgium and the Netherlands). Further research must examine whether the factor structure holds well across cultural contexts.

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Table 1

Self-directedness (SDL) and Related Constructs

Related constructs	Similarities with self-directedness	Differences with self-directedness
Self-regulated learning (SRL)	Both influenced by internal and external factors Intrinsic motivation is key	SDL emphasis on external management and shaping of environment and SRL on (meta) cognitive components of self-monitoring Learning outside context of traditional schools and management of learning trajectory (SDL) instead of scholarly contexts and regulation single task (SRL)
Personal agency (PA)	Guided by the attainment of personal goals (not necessarily pro-company goals) Intentional Active approach by exercising control Scope of action is broader than single task (life course in PA or learning trajectory in SDL) Bound up with life course agency Situation specific constructs Influence of internal (motivation) and environmental factors (affordances) in the actual exposure of behaviour. (Meta) cognitive component less developed	Focus on learning (SDL) instead of all kind of choices (PA) SDL emphasis on personal responsibility and PA on choice and decision making
Proactive personality (PP)	Goal directed Intentional Active approach	SDL characteristic adaptation instead of PP personal trait SDL focus on learning while PP is broad construct oriented towards general intention-action relationships. SDL centred on the individual's objectives and PP favours match with organisational goals
Personal initiative (PI)	Active construct used for describing employees (anticipated) reactions to changes Goal-directed Intentional Require long-term focus to working life	SDL focus on learning while PI on general initiative at work and dealing with work problems SDL centred on the employee's goals and PI on pro-company goals

Table 2

Examples of Self-directedness Categorised According to the Components of the Learning Process
(Based on Frese & Fay, 2001)

Components	Self-directedness in learning processes
Goal setting	Anticipate on future learning needs Detect knowledge/skill gaps Diagnose personal learning needs Formulate learning goals
Choosing strategy	Collect information about learning opportunities Select appropriate strategy Develop a learning plan Identify human and material resources for learning
Execute strategy	Express learning interests Networking to create learning opportunities Ask advice to realise learning plan Explore learning market and work environment
Monitoring and evaluation	Reflect on the self as a learner Prioritise learning Overcome complexity and negative emotions Evaluate impact of strategy (result) Register progress Adjust goals, plan, implementation

Table 3

The Component Loadings of the One-component Solution for the SDL-scale (N= 940, only loadings $\geq .450$ are displayed, sorted by size)

		Component I
Item 31	I find learning an important aspect of my working life.	.613
Item 7	I know when I need to learn new things for my job.	.564
Item 27	I like to undertake work-related learning activities on my own initiative.	.560
Item 17	Last year, I learned a lot of new things for my job on my own initiative.	.545
Item 33	I regularly take the initiative to negotiate with a superior about training courses I want to follow.	.524
Item 15	I talk to others about additional courses or about job experiences that can help me to realize my learning plans.	.518
Item 12	The more I learn, the better I understand the world around me.	.510
Item 25	I try to get involved in projects at work because they offer me opportunities to learn.	.490
Item 24	I will never be too old to learn new things for my job.	.489
Item 4	When I want to learn something new that can be useful for my job, I take the initiative.	.488
Item 11	I quiz myself on my newly developed skills and knowledge .	.484
Item 18	I regularly look for information in order to know more about topics in my field of work that interest me.	.483
Item 30	I never give up when I am learning something difficult.	.482
Item 34	When I want to learn something for my job, I always find the time .	.458
Item 6	I strive for exchange of experiences with people who are passionate about their job.	.458
Item 14	I know which steps I have to undertake when I want to learn something new.	.450

Note: Item 33 and 15 were removed in the final SDL-scale

Table 4

Correlations between SDL-scores and Supervisor Ratings and Interview Ratings

		Supervisor rating	Interview rating
SDL-score	Pearson Correlations	.256**	.688**
	Sig. (2-tailed)	.000	.000
	<i>N</i>	391	165

** significant at the .01 level

Table 5

Fit Indices of the One-factor Solution for low-qualified (n=476) and high-qualified employees (n= 464) - Multiple group model

Model	χ^2	df	χ^2/df	$\Delta\chi^2$	Δdf	CFI	GFI	AGFI	RMSEA
SDL one factor (initial model)									
	403.3*	154	2.62	-	-	.88	.94	.92	.042
SDL one factor (constrained model)									
	418.7*	167	2.51	15.39	13	.87	.94	.92	.041

Note: SDL: self-directedness in learning processes; $\Delta\chi^2$: difference in χ^2 values between models; Δdf : difference in number of degrees of freedom between models; CFI: comparative fit index; GFI: goodness-of-fit index; AGFI: adjusted goodness-of-fit index; RMSEA: root mean square of approximation.

*p<.001

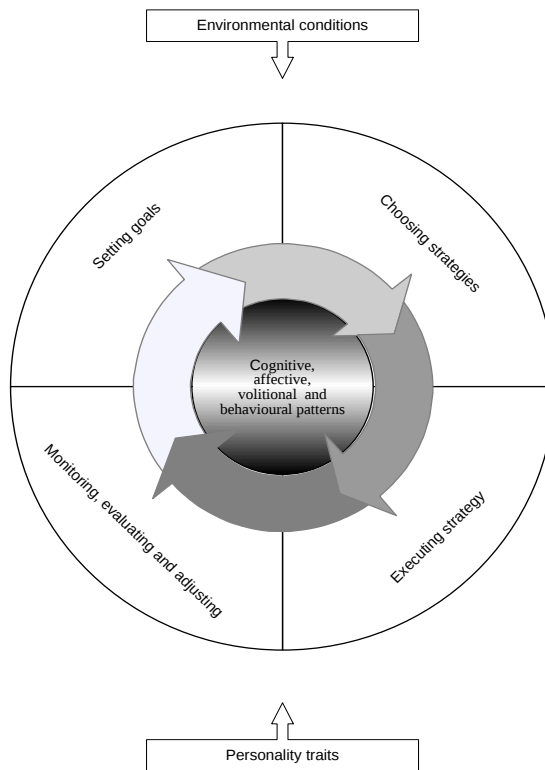


Figure 1. Model of self-directedness in learning processes

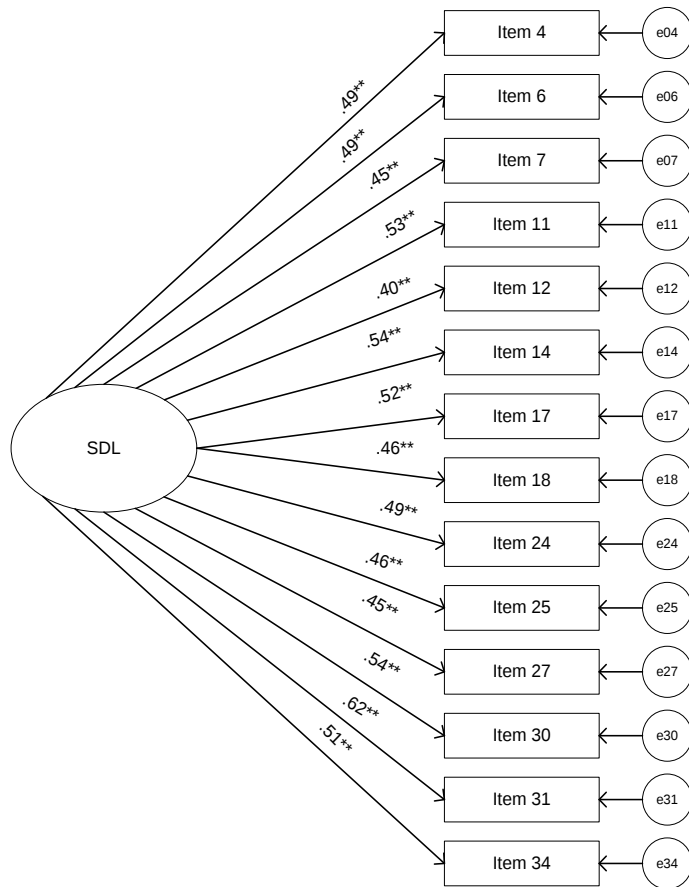


Figure 2. Results of the confirmatory factor analysis: standardised factor loadings of the one-factor model for the SDL-items ($N=408$) ** $p < .001$