Master Thesis

Professional development of AYA-nurses:

A cross-sectional study on self-directed learning, workplace well-being and learning styles

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Abstract

Self-directed learning (SDL) plays a crucial role in specialized nurses' professional development. Because, they have to keep their knowledge and skills up-to-date, in a high demanding and rapidly changing work environment. SDL helps them in coping with these complex job demands in order to maintain professional competence. Specialized nurses involved in the care for young oncology patients are faced with significant stressors that may cause an adverse effect on their professional development, and their well-being at the workplace. Therefore, the relationship between AYA-nurses' SDL and workplace well-being was explored in this study. Subsequently, this study also aimed at exploring the learning needs and preferences of AYA-nurses as self-directed learners by studying their learning styles. This study was conducted in the context of the oncology AYA-nurse profession (i.e., Adolescents and Young Adults). AYA-nurses (n = 33) from national hospitals in the Netherlands participated through validated self-reporting questionnaires. Results showed that SDL was positively related to workplace well-being. Therefore, future research should further explore this meaningful relationship and work towards a common framework that brings together the dimensions of workplace well-being and the dynamic character of SDL. Further, this finding suggests that stimulating SDL behaviour in the professional development of AYA-nurses may positively influence their well-being at the workplace, which might make them more resilient in working with AYA's facing the challenges of the life-threatening illness cancer. No relationship was found between SDL and learning styles. Therefore, we propose further research to focus on learning strategies and activities that best suit nurses as self-directed learners.

Keywords: self-directed learning – well-being – learning styles – oncology nurses – professional development – work experience – educational psychology – positive psychology

Dedication

With love, this master thesis is dedicated to my brother Dennis❤

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Acknowledgement

I would like to start with thanking Eveliene Manten (director of Nationaal AYA 'Jong & Kanker' Zorgnetwerk). Thank you sincerely for giving me the opportunity to start and conduct this project at your organization, that performs important and fantastic work. I hope that this thesis may contribute to the development of future education for AYA-nurses (i.e., Adolescents and Young Adults), and to quality care for AYA's. Furthermore, I would like to thank the AYA-nurses that participated in this study for taking the time to complete the extensive questionnaire, and for their openness. Further, I would also like to thank the following staff of the Nationaal AYA 'Jong & Kanker' Zorgnetwerk for their helpful and pleasant collaboration in organizing and conducting this study: Martine (AYA-nurse, thank you for the opportunity to share and spar with you about ideas), Anneke (secretary, thank you for sending out the questionnaires), and Sophia (coordinator PR & Communication, thank you for promoting this study via various social media for recruitment).

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This study shows how self-directedness (e.g., autonomy) in learning for professional development and well-being (at the workplace) are intertwined. This also applies to what this project means to me. After working part-time on this project, alongside other commitments, for two years, I look back on it with great pleasure. In difficult times it gave me distraction, a sense of meaning, and hope.

13 September 2023, Alieke Kostermans

* The hourglass on the title page stands for the main finding of this study: the relationship between self-directed learning and well-being at the workplace. The lines, triangles and points form connecting networks: these represent the connections between the facets of workplace well-being and the dynamic character of self-directed learning. You can positively influence your life: *"You are in charge to turn the hourglass and take time for your professional development and well-being at the workplace"*.

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1. Introduction

The AYA-nurse profession emerged from a need for age-specific cancer care for AYA's (i.e., Adolescents and Young Adults) (AYA Zorgnetwerk, 2021a). They play an important role in the complex care and guidance of these young people. For specialised nurses it is recognised that they need continued professional development to face the complex challenges of their profession (Ross et al., 2016; Soanes, 2018; Solera-Gómez et al., 2022). An essential part of professional development is that the individual can regulate and direct his/her own learning process (i.e., planning, carrying out and evaluating) according to his/her learning needs and preferable learning strategies, which is called Self-Directed Learning (SDL) (Brockett, 1983; Knowles, 1975; Loeng, 2020; Williamson, 2007). This study investigates the AYA-nurses' SDL behaviour, which is an unexplored area, due to the relatively young existence of the profession, as well as job demands and characteristics that distinguish them from other nurse specializations (Cable & Pettitt, 2018; Soanes, 2018). For example, heavy emotional toll due to working on a daily basis with young people with cancer, and a leading role in the development of this young profession (Cable & Pettitt, 2018; Soanes, 2018). This high demanding work environment that AYA-nurses face daily, can cause a higher risk at stress, low well-being, and impediment of their professional development. Therefore, this study explores the relationship between AYA-nurses SDL and workplace well-being. Besides investigating the relationship between these two phenomena, this study also aims at exploring the learning needs and preferences of AYA-nurses as self-directed learners by studying their learning styles. Following, a more detailed introduction into the possible relationships of SDL with workplace well-being and learning styles.

Specialized nurses involved in the care for young oncology patients are faced with significant stressors that can cause an adverse effect on their well-being at the workplace (Bluebond-Langner et al., 2010; Cargill, 2018; Pontin & Lewis, 2008). *Workplace well-being* distinguishes cognitive, emotional, psychological, social and physical aspects of well-being at the workplace (Butler & Kern, 2016; Seligman, 2011). On the one hand, the specialized nurses' job stressors have a negative effect on their well-being, which impede their professional development (Cargill, 2018). On the other hand, autonomy and self-regulation in professional and personal life have a positive effect on well-being, and professional development (Aranda et al., 2012; Schwappach & Gehring, 2014; Solera-Gómez et al., 2022). In the late 80' Brockett theorized that SDL and well-being both thrive on autonomy, but at this moment there is still a lack of adequate scientific studies of whether SDL is related to workplace well-being. In line

with Brockett, other researchers emphasize the importance of investigating this relationship. They suggest that SDL not only facilitates professional development, but interestingly, that it may also improve the overall well-being at the workplace (Brockett, 2009; Jarden et al., 2019; Teal et al., 2015). What has been studied, is the relationship between constructs of SDL and workplace well-being. They found a positive relation between well-being and learners' engagement, autonomy, and lifelong learning activities (Huppert & So, 2009; Jarden et al., 2019; Teal et al., 2015). Other studies found that nurses with a poor well-being reveal to be more absent, less productive, show decreasing contribution to the organization and one's own professional development (Kun et al., 2017; Laschinger et al., 2011; Pedrazza et al., 2015). This study researches the relationship between SDL and well-being at the workplace, and possible meaningful connections.

Whereas the previous section regarding SDL and well-being is about investigating the relationship between two phenomena, in the subsequent section we want to explore if the self-directed learner can be characterised with certain learning styles. These insights are of interest and relevant for educators and others concerned with the development of education for specialised nurses; education can be tailored to these learning styles preferences, as research revealed that this increases their learning outcomes, and even has a positive effect on their well-being (Coffield et al., 2004; Lown & Hawkins, 2017; Mayfield, 2012). *Learning styles* distinguishes various learning preferences in terms of perceiving, processing, understanding and organizing information (Coffield et al., 2004; Felder & Spurlin, 2005). Several studies have been conducted on the relationship between learning styles and SDL *readiness* (i.e., attitudes, abilities, and personality characteristics that the individual possesses for SDL). These studies found that SDL readiness is related to learning styles, revealing that self-directed learners prefer to be active and practical in problem solving (Adenuga, 1989; Loeng, 2020; Theil, 1984). Whilst other studies found no relationship between SDL and specific learning styles (Canipe, 2001; Golightly, 2019; Long, 1990). However, the relationship between SDL *behaviour* (i.e., an individual's actions in performing SDL activities and strategies) and learning styles has not yet been studied. Studying this relationship may potentially provide different results and more insights into the learning strategies and activities of self-directed learners.

Based on these unexplored relationships in literature, the purpose of this study was to contribute to a broader understanding of the phenomenon SDL in the nursing profession in healthcare. This study was conducted with AYA-nurses working in the national hospitals in the Netherlands. Nurses are trained to become AYA-nurses through an e-learning trajectory, but more continuing education is needed for professional development, and ensuring quality AYA-

care (AYA Zorgnetwerk, 2021a; Soanes, 2018). The Nationaal AYA ‘Jong & Kanker’ Zorgnetwerk that provides the training for AYA-nurses acknowledges the importance of developing more continuing education that takes AYA-nurses’ learning needs and preferences into account. However, current literature does not provide sufficient insights in these aspects. The results of this study may contribute to a better understanding of AYA-nurses’ self-directedness in learning, and its relationship with workplace well-being and learning styles, in addition also possible differences based on work experience are studied. These insights may provide input for the development of continuing education for AYA-nurses' professional development.

2. Theoretical framework

2.1 Gaining insight into self-directed learning in the nursing profession

It is widely acknowledged that SDL plays a crucial role in the professional development of nurses (Cadorin et al., 2011; Loeng, 2020). SDL helps the nurse with organising learning to remain competent (Knowles, 1975; Williamson, 2007). SDL can be described as the process "in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p. 18). This learning approach draws upon the learners' experiences, and is an appropriate approach in stimulating lifelong learning (Morris, 2019). A distinction can be made between SDL readiness and SDL behaviour. The first addresses the attitudes, abilities, and personality characteristics that the individual possesses for SDL, whilst the second addresses the individuals' actions, activities or processes conducted for SDL (Cadorin et al., 2012; Guglielmino, 1977; Itzchakov et al., 2018; Williamson, 2007). Most research has been conducted on SDL readiness, whilst research on SDL behaviour is scarce. However, the latter may provide interesting insights into the phenomenon SDL, because behaviour reflects an individuals' actions that arises from intensions, beliefs and personality (Itzchakov et al., 2018; Williamson, 2007). In other words, having the capacity for SDL does not mean that this is always translated into behaviour in practice. Insights into AYA-nurses SDL behaviour might give input for developing continuing education in a favourable learning environment. In this study we investigate SDL behaviour distinguished in five categories according Williamson (2007), see Table 1.

Table 1.
Description of SDL behaviour dimensions based on Williamson (2007) and (Cadorin et al., 2011)

Dimension	Meaning
Awareness	refers to the learners' understanding of the components that contribute to being self-directed learners, for example identifying learning needs.
Learning strategies	refers to the learners' selection of strategies that are linked to SDL, for example selecting activities for reflection, such as peer feedback, assessment, or expert feedback.
Learning activities	refers to the learners' selection of activities that are linked to SDL, for example use concept mapping for comprehending information.
Evaluation	refers to learners' attributes that support the monitoring and evaluation of their learning activities for SDL, for example reviewing and reflecting on learning activities.
Interpersonal skills	refers to skills and traits for communication and interaction with others, that are considered pre-requisite for SDL, for example sharing knowledge.

Specialized nurses working in healthcare institutions are challenged by the constant developments, such as new technologies and treatment methods, and have to deal with constant rapidly changing contextual conditions (Berings, 2006; Solera-Gómez et al., 2022). For example, with each patient the nurses need to adapt their work process to specific characteristics of the patient (Schwappach & Gehring, 2014; Solera-Gómez et al., 2022). SDL is considered important in addressing these challenges and in coping with these complex job demands in order to maintain professional competence, which on its turn lead to quality care (Berings, 2006; Cadorin et al., 2011; Solera-Gómez et al., 2022). SDL facilitates the adaptation process towards the change (Cadorin et al., 2012; O'Shea, 2003). More specific, in this process SDL allows nurses to be proactive and flexible in problem solving (Bahn, 2007; Cadorin et al., 2012). When it is not possible for nurses to be self-directed in their own learning, they cannot internalize the skills that are necessary to address the challenges in healthcare (Berings, 2006; Cadorin et al., 2012; O'Shea, 2003). Self-directed learners possess the quality critical thinking and the capability to translate knowledge into good practice. Hughes (2005) indicates that having these characteristics lead to better healthcare (Hall, 2005; Joyce, 2000). The knowledge that nurses have to keep up-to-date with is multifaceted, which requires them to select relevant resources through an SDL eclectic approach (Hall, 2005).

Continuing professional development through SDL is beneficial for several purposes, on the one hand it helps reducing work-related stress, while on the other hand it gives the opportunity to enhance nurses' professional competence (Pool, 2015; Solera-Gómez et al., 2022; Wood, 1998). Especially of nurses that work in high intensity settings, such as oncology care, it is expected that they take care of the complex tasks associated with their profession, such as cancer-specific treatments and providing psycho- and social support (Buchsel & Yarbro, 2005; Cable & Pettitt, 2018). This requires a comprehensive and current knowledge base, which is achieved through autonomous functioning and self-directedness in learning (Buchsel & Yarbro, 2005). Multiple studies have shown and confirmed that nurses tend to score high on SDL, but for the specialized nursing profession research is scarce, especially for the oncology nurse profession it is unexplored (e.g., Cadorin et al., 2017; Esplen et al., 2018; Pool, 2015; Williamson, 2007).

Furthermore, in this study, we focus on the possible relationships of SDL with the variables workplace well-being and learning styles to better understand this phenomenon in the context of AYA-nurses' professional development. The following sections elaborate these two variable, and discuss why we investigate them in relation with SDL.

2.2 Workplace well-being

In order for people to professionally develop through SDL, it is assumed that a certain level of well-being is needed, but research is scarce (Awartani & Looney, 2015; Foster et al., 2020; Imus & Burns, 2015; Teal et al., 2015). Well-being is often described as the presence or absence of mental illness. However, since the early 2000s, a new movement has started within psychology called Positive Psychology. In short, where traditional psychology mainly focuses on psychopathologies and curing these mental illnesses, positive psychology focuses on increasing well-being by focusing on contentment, hope, optimism, flow, happiness, human strengths and resilience (Kun et al., 2017). Positive psychology suggests that when there is an absence of mental illness this does not necessarily mean that there is well-being (Keyes, 2005). Hence, many different aspects play a role in achieving well-being. Seligman developed the five dimensions model PERMA, and suggests that well-being consists of "nurturing one or more of the five dimensions" (Kun et al., 2017, p. 57). Kern further developed the model for the context of the workplace, see Table 2 (Butler & Kern, 2016; Watanabe et al., 2018).

Table 2.
Description of the dimensions workplace PERMA model by Butler and Kern (2016)

Acronym	Dimension	Meaning
P	Positive emotions	refers to feelings of happiness, such as satisfied or contentment
E	Engagement	refers to an individuals' psychological involvement to activities or organizations, such as work or hobbies. For example, being absorbed, interested and involved in one's work.
R	Relationships	regards an individuals' social feeling and contentment of being connected, integrated, valued and supported by others in the organization
M	Meaning	refers to an individuals' purpose in one's work and sense/believe that his/her work matters and is valuable.
A	Accomplishment	refers to an individuals' ability to progress one's own development, such as feelings of mastery, working towards goals, and feeling able to complete tasks and daily responsibilities.

2.2.1 Workplace well-being in the nursing profession

Studies have shown that a good workplace well-being has a positive effect on individuals' life satisfaction, continuing learning and social cohesion (Kun et al., 2017; Seligman, 2011). Specially in the nurse profession, it was found that nurses' job satisfaction

increases professional autonomy, organizational commitment and positive relationships with others (i.e., supervisors, colleagues, patients), whilst decreases job stress and burnout (Blegen, 1993; Laschinger et al., 2011; Pedrazza et al., 2015). Especially nurses working with patients suffering the most (e.g., oncological patients, critical care patients) are at higher risk of developing burn-out and stress (Pedrazza et al., 2015). Also, other factors influence the workplace well-being of nurses. For example, research revealed that when nurses are able to establish an emotional relationship with patients, they are less likely to develop burn-out symptoms (Pedrazza et al., 2015). Therefore, they suggest that it is important to help "nurses to establish a positive and warm relationship with patients through touch without being overwhelmed by their suffering", resulting in a better quality of care and well-being for both nurses and patients (Pedrazza et al., 2015, p. 793). Another study looking at age and difference between less experienced (less than five year experience) and experienced nurses, revealed that workplace resilience was lower for the less experienced nurses, as well as for the younger nurses (Foster et al., 2020). This beneficial effect of work experience is also found in Zander et al. (2010), indicating that the more experienced paediatric oncology nurses developed coping mechanism to handle the heavy workload.

Multiple studies indicate that nurses generally score quite well on well-being, as they often tend to have the characteristic traits empathy and altruism. These two are commonly seen and perceived as core nursing values and competences (Bourgault et al., 2015; Foster et al., 2020; Jiménez-López et al., 2016; Li et al., 2021; van der Wath & van Wyk, 2020; Zafarnia et al., 2017). Empathy refers to the nurses' ability to understand patients experiences and emotions and the ability to respond to the patients feelings (Messineo et al., 2021). Empathy is seen as a vital link in building a trusting nurse-patient relationship and when established positively influences job well-being (Adams, 2018; Doyle et al., 2014; Li et al., 2021). Empathy is strongly related to exhibiting altruistic behaviour in which nurses have harmonious interpersonal relationships. On its turn leading to experiencing happiness more often, resulting in higher levels of well-being (Foster et al., 2020; van der Wath & van Wyk, 2020). Whether the outcomes of these studies also apply to oncology AYA-nurses working with adolescents and young adults with cancer is an unexplored area (Soanes, 2018).

2.2.2 Interrelation between self-directed learning and workplace well-being

SDL and workplace well-being are perceived as interdependent (Foster et al., 2020). In an attempt to link SDL and well-being, Teal et al. (2015) developed the Self-Directed Wellness model based on a combination of Seligman's PERMA model and core concepts of self-directed

learning and positive psychology concepts. The goal of this model was to visualize interconnections between SDL and well-being, and insights in how individuals can be guided towards flourishing and becoming self-directed in learning. But empirical evidence for this model is missing.

Several studies have explored relationships between constructs of SDL and well-being. For example, an individual's self-regulatory abilities facilitates experiencing less stress, mildness to others, and more resilience in the face of adversity in the workplace (Foster et al., 2020; Rothstein et al., 2016). More overarching themes between SDL and well-being are positive relationships with others, a sense of autonomy (e.g., locus of control), and professional development (Foster et al., 2020; Ryff, 1989). In the nursing education it was found that a SDL environment leads to feelings of confidence, motivation, locus of control, and self-care (Chien et al., 2002; Robinson & Persky, 2020; Sitzmann & Ely, 2011). There are indications in literature that constructs of SDL (e.g., self-regulation, evaluation) have positive interrelations with workplace well-being constructs (e.g., life satisfaction, positive relationships), but the direct relation between SDL behaviour and workplace well-being has not yet been studied.

2.3 Learning styles

The self-directed learner autonomously selects suitable learning strategies and activities, which might be reflected in certain learning styles. By looking at the learning style of the learner, there is the idea that teachers can adapt and design their teaching and learning interventions around them, so that this increases the learning outcomes (Coffield et al., 2004). In other words, taking the learning styles of individuals into account allows educators to tailor the instruction to the learning needs, because knowledge is better retained and understood on a deeper level when it is presented in a style that matches the learners' learning style (Bastable, 2008; Carrick, 2011; Lown & Hawkins, 2017; Mayfield, 2012). Dickerson (2017) suggests that by examining nurses' learning styles, insights are given on how information is learned and what learning activities best suits nurses' professional development, on its turn leading to improved patient care, increased retention rates and increased nursing competence (Giesbrecht, 2020; Kennedy et al., 2012; Mangold et al., 2018; Vizeshfar & Torabizadeh, 2018).

Learning style is a controversial and much debated topic in the field of Education and Psychology on which opinions differ (Coffield et al., 2004). We choose to perceive learning styles as an individuals' preferred manner of perceiving, processing, understanding and organizing information, represented in the Index of Learning styles (ILS) model of Felder, see Table 3 (Felder & Silverman, 1988). What is essential in the ILS theory and different from

Table 3.

Description of Felder's' Index Of Learning Styles

Learning style	Description and examples of learning strategies
Processing (i.e., regards the learner's preference for obtaining and processing information)	
Active	The learner prefers to actively obtain information and tends to approach learning or problem solving by trying out. Moreover he/she prefers to work in groups, where there is the possibility to ask questions and interact with peers. Examples of learning strategies: being invited in discussions, talking, reflecting.
Reflective	The learner prefers to passively obtain information and tends to approach learning by thinking things through and by searching for interrelations of theoretical concepts preferably presented in abstract information. Further, he/she prefer to work alone or with a single familiar partner. Examples of learning strategies: by watching, listening and recalling.
Perception (i.e., regards the type of information the learner prefers to perceive)	
Sensing	The learner prefers to retrieve information by procedures that are practical and concrete. He/she is focused on step-by-step procedures and facts often leading to clarity, however on the other hand to rigidity and having difficulties handling unexpected complications. Examples of learning strategies: provide the learner with facts, details and procedures, relevant and specific examples, practical applications and evaluate the alternatives.
Intuitive	The learner prefers to obtain information that is abstract. He/she is oriented toward theories and underlying meanings. He/she prefers to work flexible with new innovations and free from routine activities. They think abstractive by using their imagination and intuition. Where he/she can quickly solve problems by divergent thinking, they have less patience and work less careful in long-term projects. Examples of learning strategies: provide the learner with the freedom to discover, find and connect the facts.
Reception (i.e., regards through which sensory channel external information is most effectively perceived by the learner)	
Visual	The learner prefers visual presentation of information. Examples of learning strategies: present information in flow charts/graphs, figures, images, timelines, video, concept maps and demonstrations.
Verbal	The learner prefers words (both written and spoken) for explanation. Examples of learning strategies: present information through summarizing the topic, group work, peer listening and teaching.
Understanding (i.e., regards through which process the learner prefers to learn)	
Sequential	The learner prefers information that is organized and presented in logically sequenced linear steps. By convergent thinking he/she can make inference about the greater picture. Example of learning strategy: present information in step-by-step progression.
Global	The learner prefers information that is organized in a holistic thinking process, which means that they take in information as a whole, without looking for specific relations. The bigger picture creates an overview that allows them to intuitively understand the to-be-learned-content and apply this into practice. Examples of learning strategies: present and explain information as a whole (i.e., show the big picture), explain the context and relevance of the information.

Note. Adapted from Felder and Spurlin (2005)

other theories on learning styles is that it acknowledges that all kinds of factors influence the individual, such as life experience, maturation, and education. Therefore, learning styles are flexible and can change over time by interaction with the environment (Coffield et al., 2004; Felder, 2020). Further, the ILS classifies individual preferences along the four dimensions' bipolar continua, on contrary to other learning styles theories that classify learners as belonging to a few groups (i.e., the combination of sub features form categories of learning styles) (Graf & Lin, 2008).

2.3.1 Learning styles in the nursing profession

Felder's' ILS is partly originated from Myers-Briggs type indicator (MBTI) and Kolb's experiential learning theory. The reason for this combination was to include the (meta)cognitive information processing, personality, psychological, and sensory (i.e., physical perceptual channel) learning styles (Kaliská, 2012). Therefore, this section briefly describes a literature review of Felder's' ILS, including Myers-Briggs MBTI and Kolb's learning model in the context of the nursing profession.

In the *perception* and *processing* of information it was found that nurses are active in problem solving, learn by experiencing, follow step-by-step process and learn from others (Anderson, 1998). A study by Anderson (1998) with Myer-Briggs' MBTI, revealed that for both the novice and the experienced nurse the learning styles sensing, feeling and judging were predominant. Revealing that nurses tend to prefer hands-on activities, careful consider people, feelings, and various points of view, and work on a structured and organized manner (Myers et al., 1998). This was in line with one of the first studies of Kolb's experiential learning theory in the context of the nursing profession. They found that registered nurses in continued education favoured the accommodator learning styles, whilst nurse students revealed diverger style (Huch, 1981; Robinson et al., 2012). Suggesting that nurses engaged in their professional development seem to prefer real-time practice and active experimentation. More studies found that nursing students learned from concrete experiences in which accommodator and diverger were predominant learning styles, revealing that nurses tend to be emotional and empathically engaged with patients (An & Yoo, 2008; Meyers, 2010; Robinson et al., 2012). To conclude, a diversity of findings revealed that across different studies in the nursing profession a variety of dominant learning styles of Kolbs' experiential learning theory were reported, such as diverger (e.g., An & Yoo, 2008; Robinson et al., 2012; Vizeshfar & Torabizadeh, 2018), converging (e.g., McKenna et al., 2018; Rassin et al., 2015), and a balanced or/and multimodal learning style (e.g., Koch et al., 2011; Meyers, 2010; Shinnick & Woo, 2015). Whilst multiple studies

with Felder's ILS revealed a more consistent view of results: nurses prefer sensing over intuitive learning style and a combination of active and reflective learning style (e.g., Brannan et al., 2016; Giesbrecht, 2020; Mangold et al., 2018; McCrow et al., 2014). Similarly, Gonzales et al. (2017) and Simpson (2020) found these results for nursing students, but for nurses working in the professional field they found balanced learning styles. Balanced learning style means that they utilize both learning styles (i.e., no dominant learning style) and are seen as multimodal learners (Gonzales et al., 2017; Lown & Hawkins, 2017).

In the *reception* of information Pena et al. (2021) found in a study with Myer-Briggs learning styles inventory that novice and experienced nurses preferred visual (V) learning style, followed by kinesthetic (K) and auditory (A). Frankel (2009) also found that nurses prefer visual over auditory learning. Whilst, Rassin et al. (2015) found that a majority of the nursing students preferred kinesthetic, indicating that they preferred skills to be demonstrated, and thereafter try themselves by a hands-on experience. However, another study revealed that the majority of nursing students have a combination of VARK learning styles (Meyers, 2010). A study by McCrow et al. (2014) with Felder's' ILS found that nurses in acute care preferred visual over verbal learning style. In line, other studies also found that visual was predominant learning style of nursing students, but nurses working in the professional field revealed balanced learning style on reception of information (Giesbrecht, 2020; Gonzales et al., 2017; Lown & Hawkins, 2017; Simpson, 2020).

In *understanding* information differences were found between graduates and students. Studies with Kolb's' learning theory revealed that nurses in training were accommodators, while nurses working in the profession were converger (Mangold et al., 2018; Rassin et al., 2015; Smith, 2010). In other words, where nurses in training learn by active experimentation (i.e., learn by watching and doing), nurses working in the field are pragmatic in learning (i.e., practical application of ideas) (Mangold et al., 2018). Multiple studies with Felder's' ILS confirm these findings, that nurses score balanced on the learning style understanding (i.e., sequential – global) (Brannan et al., 2016; Giesbrecht, 2020; Gonzales et al., 2017; Lown & Hawkins, 2017; Mangold et al., 2018; McCrow et al., 2014; Simpson, 2020).

2.3.2 Interrelation between self-directed learning and learning styles

The relationship between SDL and learning styles has not yet been extensively researched. Kolb (1984) describes, from a theoretic perspective, that individuals are more self-directed in their learning when they have a wide range of learning strategies that they can adapt

in different situations (Canipe, 2001). To examine whether this relationship exists, Canipe (2001) using Kolb's learning styles inventory and Guglielmino's SDLRS, found no significant relationship. Same findings were found in a correlational study in the nurse profession by Gehan (1998). More recent research revealed the same findings (Golightly, 2019). This might be because the higher the level of SDL readiness, the more an individual has the tools to flexible adapt their learning style (Canipe, 2001; Long, 1990). But other research found a relationship between Kolb's learning styles accommodator and converger and higher levels of self-directed learning readiness (Adenuga, 1989; Loeng, 2020; Theil, 1984). As the learner develops metacognition, he/she becomes aware of his/her own strengths and weaknesses that lead to self-reflection. This provides the learner with insights in the diversity of learning styles, their preferences, and adaptively deploying them in different situations (Coffield et al., 2004; Felder, 2020). However, the relation between SDL behaviour and learning styles has not yet been studied.

2.3 Research question and hypotheses

This section describes the research question of this study, followed by predictions about the expected outcomes for: 1) the three main variables (i.e., self-directed learning, workplace well-being, and learning styles), 2) the relationships between the three main variables, and 3) the relationship between work experience and the three main variables of this study.

The issues from the theoretical framework led to this study's following main research question: *To what extent is there a relationship between AYA-nurses' level of Self-Directed Learning, Learning Styles and Workplace Well-being?*

Research found that specialized nurses, e.g., oncologist-nurses, reveal to be proactive and intrinsically motivated to continue their professional development, because they want to obtain new knowledge to empower themselves, offer best care for patients and further specialize (Esplen et al., 2018; Pool, 2015). This leads to taking responsibility for continued education and learning. On its turn, this requires SDL behaviour to organize and realize these learning situations, such as organizing learning activities around a theme that they find important (Kuiper et al., 2009; Poell & Van der Krogt, 2014). Therefore, the following hypothesis was formulated:

H1: The AYA-nurses will score in the high range category on the level of self-directed learning behaviour.

Multiple studies indicate that nurses generally score quite well on well-being (Bourgault et al., 2015; Foster et al., 2020; Jiménez-López et al., 2016; Li et al., 2021; van der Wath & van Wyk, 2020; Zafarnia et al., 2017). But whether this also applies to specialist nurses (e.g., oncology AYA-nurses) has not yet been investigated (Soanes, 2018). On one hand, AYA-nurses providing care for AYA's with cancer who are in a life threatening situation are exposed to stressors, which might have an adverse effect on their well-being (Cargill, 2018). On the other hand, AYA-nurses have to deal with the provision of more intensive care, which also creates a great sense of belonging and meaning (Soanes, 2018). Therefore, the following hypothesis was formulated:

H2: The AYA-nurses will score higher on workplace well-being compared to the average population.

Specialized nurses tend to solve problems concretely and empirically due to job requirements and demands, that requires for example following protocols. This may suggest that they prefer sensing over intuitive, and visual over verbal learning style (Mangold et al., 2018; McCrow et al., 2014). In addition, it was found that self-regulation and metacognition seems to be higher among specialized nurses who focus on professional development because of their specialization (Kuiper et al., 2009; Pool, 2015). These nurses have the ability to switch between learning styles, and therefore are seen as multimodal learners: which is reflected in the balanced learning styles processing and understanding (Berings, 2006; Gonzales et al., 2017). Therefore, the following hypotheses were formulated:

H3a: The AYA-nurses prefer sensitive over intuitive learning style (i.e., dimension perception).

H3b: The AYA-nurses prefer visual over verbal learning style (i.e., dimension reception).

H3c: The AYA-nurses score balanced on the learning style dimension processing (i.e., global and sequential learning style).

H3d: The AYA-nurses score balanced on the learning style dimension understanding (i.e., active and reflective learning style).

In literature well-being is seen as a prerequisite for learning, because it provides the individual with the capacity to cognitively and ethically develop (Imus & Burns, 2015). But, vice versa learning can also lead to a positive effect on an individuals' well-being. For example, Tsai et al. (2019) conducted an experiment in the nursing education with an life-education

intervention which was drafted for simulated directed-learning. Simulated directed-learning is seen as an SDL education intervention, where the learner explores and practices through real-life simulation, while feedback is provided by educators and peers. In addition, technology is used, and reflection takes place through assessment. They found that the experimental group scored significantly higher on meaning of life, positive beliefs and well-being (e.g., physical and psychological well-being). Therefore, the following hypothesis was formulated:

H4: The AYA-nurses' level of SDL relates positively to workplace well-being.

Research revealed that nurses' SDL behaviour is reflected in certain types of learning activities. For example, Berings (2006) identified that nurses learn: 1) by doing one's regular job, 2) by applying something new in the job, 3) by theory or supervision, 4) through life outside work, 5) by social interaction with colleagues, and 6) by reflection. This was also found by Pool (2015), who revealed that nurses learned through SDL learning activities on the ward, for example work experience, social interaction and consulting media (Pool, 2015). This variation in nurses' selection of learning activities found by Berings (2006) and Pool (2015) are represented in different SDL activities that require the utilization of different learning styles. In other words, the more knowledge nurses have about the different learning strategies, their preferences and insights in their own learning and development (i.e., metacognition) the more options in learning styles they can choose from. Therefore, the following hypothesis was formulated:

H5: The AYA-nurses with balanced learning styles will score higher on SDL compared to the other two learning styles preferences.

Literature found that work experience may influence 1) SDL, 2) learning styles, and 3) workplace well-being. Regarding the first, difference were found in level of SDL between experienced and less experienced nurses. Cadorin et al. (2015) found that nurses with more clinical experience are more self-directed in their learning, because they are faced with complex patient conditions that stimulates them to challenging approaches. Further, Cadorin et al. (2012) found that the specialized nurses scored higher on the level of SDL in comparison to nurses with no further education or specialization. Regarding the second, a recent study found differences in workplace resilience and psychological well-being between experienced and less experienced nurses, in which the latter scored significant lower. Because the more experienced group developed coping mechanism to handle job stressors (Foster et al., 2020). Regarding the third, it was found that work experience leads to a higher level of expertise, which on its turn

lead to a change in a nurses' preference for learning activities and strategies (Benner, 1984; Pool, 2015). Nurses that have followed continued education have gained experience in different learning styles, leading to insights in the diversity of existing learning styles (Cadorin et al., 2012). Therefore, the following final hypotheses were formulated:

H6a: The AYA-nurses with more than three years of work experience score higher on the level of SDL, compared to the novice AYA-nurses (i.e., <3 years of work experience).

H6b: The AYA-nurses with more than three years of work experience score higher on workplace well-being, compared to novice AYA-nurses.

H6c: The AYA-nurses with more than three years of work experience have balanced learning styles.

3. Method

3.1 Research design

The aim for this study was to explore whether there is a relationship between the three variables Self-Directed Learning (SDL), Learning Styles and Workplace Well-being. These were quantitatively measured via three surveys in an exploratory study combined with a correlational nature. With a cross-sectional design, the goal was to observe the three concepts in the natural world without direct interference (Field, 2013). Therefore, the three surveys were conducted at the same time and were prioritized equally. Further, the correlational nature of this study marks an important aspect: ecological validity (Field, 2013). This means that the study output allows for inferences to the real-world and that the variables are not biased by the researcher (Field, 2013). Therefore, we chose an online survey that allowed the AYA-nurses to fill in privately and complete it in between one's work activities.

3.2 Participants

Prior to conducting this study, approval from the Ethics committee of the University of Twente was obtained in order to ensure the quality of this study (file number: 210857). The aim for this study was to investigate whether the AYA-nurses' (i.e., Adolescents and Young Adults) level of SDL is related to workplace well-being and learning styles. Via purposive sampling technique (i.e., non-probability sampling) AYA-nurses working in the national hospitals in the Netherlands were selected. AYA-nurse is a relatively young profession that shares responsibilities for the care of adolescents and young adults (AYA's) with cancer: the specialist physician (i.e., oncologist) is responsible for the anti-cancer treatments in the medical technical part, whereas the AYA-nurse is responsible for the psychosocial part, in addition to the care related to the medical treatment (AYA Zorgnetwerk, 2021b). The AYA-nurses have continued their education and specialized in oncological care. Because of the correlational nature of this study the aim was to thrive for a sample size with a minimum of 30 participants (Delice, 2010; Field, 2013; Hogg et al., 1977). Finally, the total sample size of this study consisted of 33 participants. All participants gave informed consent to participate in this study.

The mean age of the participants was 43.91 (SD = 11.6), varying from 27 to 63 years. The participants' working years as a nurse was 22.88 (SD = 11.94), varying from 6 to 44 years, whilst years working as an oncology nurse with adolescents and young adults was 4.87 (SD = 5.79), varying from 1 to 25 years. In total, 32 females and one male participated in this study.

The largest group of participants completed higher education with 63.6%, followed by a master's degree with 27.3%, and vocational education with 9.1%.

3.3 Measurements

In this study, we examined the AYA-nurses' 1) level of Self-Directed Learning behaviour, 2) level of Workplace Well-being, and 3) Learning Styles. We quantitatively measured the three constructs through self-reporting surveys, which are each described in the following sections.

3.3.1 Self-Directed Learning behaviour by the Self-rating Scale of Self-directed Learning (SRSSDL)

In order to measure the AYA-nurses' level of self-directed learning behaviour, the validated Self-rating Scale of Self-directed Learning (SRSSDL) developed by Williamson (2007) was conducted. The survey included 60 items in total (see Appendix A), which measured five dimensions of self-directed learning (12 items per dimension); 1) Awareness, 2) Learning Strategies, 3) Learning Activities, 4) Evaluation, and 5) Interpersonal Skills. The items were scored on a 5-point Likert rating scale ranging from 1 (never) to 5 (always). An example item of the scale Interpersonal Skills was: "My interaction with others helps me to develop the insight to plan for further learning". Validation research led to classification of the total scores into three categories: scores from 60 to 140 have a low level of SDL, from 141 to 220 a moderate level of SDL, and from 221 to 300 a high level of SDL (Cadorin et al., 2017; Cadorin et al., 2011; Williamson, 2007).

The reliability analysis of the SRSSDL revealed a good internal consistency for the scale Evaluation (α = .72, average IIC[1] = .19). Further, an acceptable internal consistency for scales Awareness (α = .61, average ICC .16, Interpersonal Skills (α = .65, average IIC = .14) and Learning Activities (α = .63, average IIC = .13). Learning Strategies had a low internal consistency (α = .40, average IIC = .05).

[1] IIC = Interitem correlation (average IIC ideally falls in the range of .15—.50 for a good internal consistency) (Briggs & Cheek, 1986; Clark & Watson, 2016).

3.3.2 Workplace Well-being by PERMA-profiler

The AYA-nurses' level of workplace well-being were measured by the validated workplace well-being PERMA-profiler developed by Butler and Kern (2016) (Watanabe et al., 2018). The survey consisted of 23 items (see Appendix B), which measured five dimensions of workplace well-being (three items per scale); 1) Positive emotion, 2) Engagement, 3) Relationships, 4) Meaning, and 5) Accomplishments. Including scales: 6) Overall well-being (1 item), 7) Negative emotion (3 items), 8) Health (3 items), and 9) Loneliness (1 item). The items were scored on an 11-point Likert rating scale ranging from 0 to 11; not at all – completely for items 1, 6, 9, 11, 12, 13, 15, 17, 19, 22, 23; never – always for items 2, 3, 5, 7, 8, 10, 14, 16, 20, 21; and terrible – excellent for items 4 and 18. An example question of the scale Meaning: "In general, to what extent do you feel that what you do at work is valuable and worthwhile?".

The authors have no clear cut off rating scores of what is low or good functioning or flourishing. But validation research of the PERMA-profiler suggests that the interpretation of the scores may be as follows (Butler & Kern, 2016; Kern et al., 2016; Watanabe et al., 2018):

- *Very high functioning = 9 and above (0 to 1 for negative emotion)*
- *High functioning = 8-8.9 (1.1 to 3 for negative emotion)*
- *Normal functioning = 6.5 to 7.9 (3 to 5 for negative emotion)*
- *Sub-optimal functioning = 5 to 6.4 (5.1 to 6.5 for negative emotion)*
- *Languishing = below 5 (above 6.5 for negative emotion)*

The reliability analysis of the Workplace PERMA-profiler revealed a good internal consistency for the scales Positive emotion (α = .85, IIC = .69) and Relationships (α = .69, IIC = .44). Scales Meaning (α = .58, IIC = .37) and Accomplishments (α = .52, IIC = .27) revealed an acceptable alpha, with a good interitem correlation. Whilst for scale Engagement a low alpha was found (α = .32, with a good IIC = .22). Further, a good internal consistency was revealed for scale Overall well-being (16 items, α = .87), and Health (α = .89), whilst an acceptable alpha for Negative emotion (α = .54).

3.3.3 Learning Styles by Index of Learning Styles (ILS)

The learning styles of the AYA-nurses were measured by the Index of Learning Styles (ILS) developed by Felder and Solomon (n.d.). The ILS measures a set of attributes for learning on four dimensions, which are: 1) Processing (active/reflective), 2) Perception (sensing/intuitive), 3) Reception (visual/verbal), and 4) Understanding (sequential/global). The survey consisted of 44 items (11 items per dimension), with two possible answers, see

Appendix C. Each question was answered with "a or b" (with a value of +1 or -1), e.g. active/reflective dimension; when the learner's preference is active, +1 is added to this dimension, while with a reflective preference the value decreases by -1 (Felder & Soloman, n.d.; Felder & Spurlin, 2005). An example item of the scale Understanding: "When considering a body of information, I am more likely to: a) focus on details and miss the big picture, b) try to understand the big picture before getting into the details". The learning style of the learner is displayed on a scale between -11 and +11 for each dimension. The interpretation of the total score of the dimension is as follows: a score between 1-3 means that the learner is fairly balanced between the two learning styles; a score between 5-7 means that the learner has a moderate preference for one learning style; and a score between 9 – 11 means that the learner has a strong preference for one learning style (Felder & Spurlin, 2005).

The reliability analysis of the ILS revealed a good internal consistency for scales Processing (α = .70, IIC = .17) and Reception (α = .69, IIC = .17). An acceptable internal consistency for scale Perception (α = .52, IIC = .09) and a low consistency for scale Understanding (α = .14, IIC = .02), but with no significant inter-scale correlations. The ILS is seen as an attitude assessment and therefore an alpha of .5 is set as acceptable, in contrast to instruments that measure achievement where the alpha is set at .75 to be acceptable (Felder & Spurlin, 2005; Tuckman & Harper, 2012). Furthermore, the author and further studies on the reliability of the ILS have addressed the relative weakness of the Understanding scale (Zywno, 2003). However, Felder argues that the primary goal of the ILS model was to guide good teaching practice. Therefore, as long as the inter-scale correlation is not significant, the point where the two scales becomes redundant, as cited in Zywno (2003) "lead to separate implications about what constitutes good teaching and therefore the model is acceptable" (Cohen et al., 1996; Felder & Spurlin, 2005; Zywno, 2003, p. 13). Also, the overall analysis from multiple studies indicate a moderate to strong reliability of the ILS. Therefore, no items were deleted from the scale Understanding in order to increase this study's alpha, and also to reduce the risk of scale collapsing (Felder & Spurlin, 2005; Giesbrecht, 2020; Hosford & Siders, 2010; Mangold et al., 2018; Simpson, 2020; Zywno, 2003).

3.4 Procedure

As advance notice, the announcement of this study was placed in the newsletter of the organization Nationaal AYA 'Jong & Kanker' Zorgnetwerk in April 2021. Through an internal e-mail from the organization, the AYA-nurses from the national hospitals in the Netherlands were personally approached to participate in this study, in July 2021. Via a link in the e-mail,

the participants were forwarded to the online questionnaire. The questionnaire was conducted via Qualtrics online survey tool (for smartphone, tablet, and notebook). In order to avoid socially desirable answers, it was addressed that there were no good or wrong answers. The completion time took approximately 30 minutes. The participants gave permission to participate in this study in advance by means of informed consent: at the start page of the questionnaire, the AYA-nurses were informed about the research goals and explanation was given regarding the regulations of confidentiality and anonymity of the data. As a motivational factor to engage in this study, the AYA-nurses were offered an online mindfulness workshop (free of charge). The online mindfulness workshop was specially developed for AYA-nurses by a certified mindfulness trainer. In total, 58 AYA-nurses were approached, of which 33 completed the questionnaire.

4. Results

4.1 AYA-nurses' level of self-directed learning

To test the first hypothesis (1) whether the AYA-nurses score high on the level of self-directed learning, the total scores were inspected via descriptive statistics, see Table 4. Subsequently, the AYA-nurses' total scores were stratified as suggested by Williamson (2007), as follows: 60-140 = *Low*, 141-220 = *Moderate*, and 221-300 = *High*. Results show a high level of self-directedness in learning for AYA-nurses (*M* = 227.39, with min. 210 and max. 254, *SD* = 10.62). More details regarding the dimensions of SDL, see Table 4.

Table 4.
Descriptive statistics for AYA-nurses' total scores on SDL and its dimensions (N = 33)

	Scoring range	*Mean*	*Median*	*SD*	*Minimum*	*Maximum*
Awareness	12 - 60	45.36	45	2.91	40	53
Learning strategies	12 - 60	44.33	44	2.50	37	48
Learning activities	12 - 60	43.55	43	3.36	38	53
Evaluation	12 - 60	47.06	47	2.72	41	55
Interpersonal skills	12 - 60	47.09	47	3.23	42	54
Total score SDL	60 - 300	227.39	227	10.62	210	254

4.2 AYA-nurses' score on workplace well-being

To investigate the AYA-nurses' scores on workplace well-being, the total scores were inspected and stratified as suggested by Butler and Kern (2016), as follows: below 5 = *Languishing*, 5 - 6.4 = *Sub-optimal functioning*, 6.5 – 7.9 = *Normal functioning*, 8 – 8.9 = *High functioning*, and 9 and above = *Very high functioning*. Results showed that AYA-nurses score high (i.e., category high functioning) on workplace well-being (*M* = 8.75, *SD* = .83).

To investigate whether AYA-nurses score higher on workplace well-being compared to the average population (2), the mean scores of the AYA-nurses were compared to the mean scores of Butler and Kern's (2016) large scale study (i.e., representing the average population scores) via a series of one sample t-tests, see Table 5 (Field, 2013). The workplace well-being scores of the AYA-nurses (*M* = 8.75, *SD* = 0.83) were significantly higher than the average (*M* = 7.02) population scores, $t(32) = 12.06$, $p = <.01$, with a large effect size $d = .83$.

A comparison of the mean scores per dimension provide a more detailed view on workplace well-being, see Table 5. These results show that the AYA-nurses' scores on all dimensions of workplace well-being were significantly higher than the average population

scores, with large effect sizes (all p <.001, all d >.83). Except for the dimension negative emotion, here the scores were significantly lower than the average population.

Table 5.
T-test results cf. AYA-nurses and average population scores on workplace well-being

Dimensions of workplace well-being	AYA-nurses[a]		population[b]					
	*M**	*SD*	*M*	*SD*	t	df	*p*	Cohen's *d*
Positive emotion	8.66	1.12	6.69	1.97	10.10	32	<.001	1.12
Engagement	8.22	1.18	7.25	1.71	4.74	32	<.001	1.18
Relationships	8.74	1.19	6.90	2.15	8.85	32	<.001	1.19
Meaning	9.40	0.86	7.06	2.17	15.64	32	<.001	0.86
Accomplishment	8.71	0.84	7.21	1.78	10.23	32	<.001	0.84
Overall well-being	8.75	0.83	7.02	1.66	12.06	32	<.001	0.83
Negative emotion	3.32	1.56	4.46	2.06	-4.18	32	<.001	1.56
Health	8.66	1.54	6.94	2.18	6.39	32	<.001	1.54

Notes. [a] current study's population, [b] average population of Butler and Kern (2016).

4.3 AYA-nurses' learning style preferences

To test the third set of hypotheses (3a, 3b, 3c, and 3d), to investigate what AYA-nurses' learning preferences are on the four learning styles, the scores were stratified as suggested by Felder and Soloman (n.d.). Table 6 gives the frequencies for the four learning styles. Results show that most of the AYA-nurses has a preference for balanced on all four learning styles. Henceforth, the moderate and strong preferences for each dimension were combined for further analysis in this study into one category due to small *n*, namely: *preference for…* (i.e., learning style processing; active, reflective or balanced).

Table 6.
Frequencies of four learning style dimensions in count (n) and percentages (%)

		Processing		Perception		Reception		Understanding	
Preference		Active	Reflective	Sensing	Intuitive	Visual	Verbal	Sequential	Global
Moderate	*n*	11	1	11	1	5	6	6	2
	%	33.3	3	33.3	3	15.2	18.2	18.2	6.1
Strong	*n*	3	1	1	0	2	2	0	0
	%	9.1	3	3	0	6.1	6.1	0	0
Balanced	*n*	17		20		18		25	
	%	51.5		60.6		54.5		75.8	

Note. N = 33

In addition, to examine whether there is a statistically significant difference between the two groups: preference for a 1) learning style (e.g., active or reflective) or a 2) balanced learning style, the statistical measure[2] for differences between percentages of two groups for categorical variables was conducted. As for this study, the confidence interval was set on 95% with a significance α of .05, a calculation greater than the standard *z*-value (1.96) does not support the null hypothesis. Results show a significant difference for the learning style *Understanding*, z = 4.88, whilst the other three learning styles revealed no significant differences (*Processing*, z = 0.24; *Perception*, z = 1.76; *Reception*, z = 0.73).

In order to examine whether there is an association between the four learning styles (i.e., whether AYA-nurses that score balanced on for example learning style *processing* tend to score balanced on all four learning styles), a series of Chi-square tests for independence were conducted. Two combinations revealed a significant association, see Table 7. The learning styles *Perception* and *Understanding* revealed a significant and strong association, $\chi^2(4)$ = 22.832, p = < .001, V = .588. Balanced learners of learning style *Perception* are more likely to score balanced on learning style *Understanding*, and vice versa (n = 18), see Table 7a. Also, the learning styles *Processing* and *Reception* revealed a significant strong association, $\chi^2(4)$ = 14.803, p = .005, V = .47. Active learners of the learning style *Processing* are more likely to score balanced on the *Reception* learning style, whilst balanced learners of the learning style *Processing* are more likely to score visual (n = 7) and balanced (n = 7) on the *Reception* learning style, see Table 7b.

Table 7.
Overview of the Chi-square tests for the four learning styles

	Learning style			
	1	2	3	4
1. Processing	-			
2. Perception	1.54	-		
3. Reception	**14.80**	4.56	-	
4. Understanding	6.52	**22.83**	3.04	-

Note. Significant χ^2 are addressed in bold.

[2] $z = \frac{p_1 - p_2}{s_{p_1} - p_2}$ $s_{p_1} - p_2 = \sqrt{\frac{p1\ x\ q1}{n1} + \frac{p2\ x\ q2}{n2}}$

$p = sample\ size$

$n = population$

Table 7a.
Chi-square association between learning style Perception and Understanding

		Understanding			
Perception		Sequential	Global	Balanced	Total
Sensing	Observed *n*	5	0	7	12
	Expected *n*	2.2	.7	9.1	12
	%	15.2%	0%	21.2%	36.4%
Intuitive	Observed *n*	0	1	0	1
	Expected *n*	.2	.1	.8	1
	%	0%	3%	0%	3%
Balanced	Observed *n*	1	1	18	20
	Expected *n*	3.6	1.2	15.2	20
	%	3%	3%	54.5%	60.6%
Total	Observed *n*	6	2	25	33
	Expected *n*	6	2	25	33
	%	18.2%	6.1%	75.8%	100%

Note. $\chi 2(4) = 14.803$, $p = .005$, $V = .474$

Table 7b.
Chi-square association between learning styles Processing and Reception

		Reception			
Processing		Visual	Verbal	Balanced	Total
Active	Observed *n*	0	3	11	14
	Expected *n*	3	3.4	7.6	14
	%	0%	9.1%	33%	42.4%
Reflective	Observed *n*	0	2	0	2
	Expected *n*	.4	.5	1.1	2
	%	0%	6.1%	0%	6.1%
Balanced	Observed *n*	7	3	7	17
	Expected *n*	3.6	4.1	9.3	17
	%	21.2%	9.1%	21.2%	51.5%
Total	Observed *n*	7	8	18	33
	Expected *n*	7	8	18	33
	%	21.2%	24.2%	54.5%	100%

Note. $\chi 2(4) = 14.803$, $p = .005$, $V = .474$

4.4 Relationship between self-directed learning and workplace well-being

To investigate whether AYA-nurses level of SDL relates positively to workplace well-being (4), a Pearson product-moment correlation was conducted to investigate the possible association, including the strength and direction, see Table 8. A statistically significant moderate positive correlation was found between SDL and workplace well-being ($r = .38$, $n = 33$, $p = .03$). To follow up this result, a standard linear regression was established to study whether the level of SDL could predict the level of workplace well-being, and vice versa. A significant regression equation was found ($F(1, 31) = 5.157$, $p = .03$, $r = .38$), with a medium

Table 8.

Means, standard deviations and correlation matrix for continuous variables Self-directed learning and Workplace well-being (N = 33)

Variable	*M*	*SD*	*Correlations*														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Self-directed learning																	
1. Awareness	45.36	2.91	--														
2. Learning strategies	44.33	2.50	.47[b]	--													
3. Learning activities	43.55	3.36	.59[b]	.17	--												
4. Interpersonal skills	47.06	2.72	.23	.34	.13	--											
5. Evaluation	47.09	3.23	.62[b]	.34	.58[b]	.42[a]	--										
6. Total score SDL*	227.39	10.62	.82[b]	.61[b]	.73[b]	.57[b]	.85[b]	--									
Workplace well-being																	
7. Meaning	9.40	.86	.01	-.24	.198	.14	.26	.12	--								
8. Accomplishments	8.71	.84	.30	-.09	.35[a]	.34	.37[a]	.37[a]	.60[b]	--							
9. Engagement	8.22	1.18	.23	.04	.43[a]	.14	.45[b]	.38[a]	.41[a]	.37[a]	--						
10. Positive emotion	8.66	1.12	.18	-.01	.40[a]	.14	.39[a]	.33	.39[a]	.63[b]	.61[b]	--					
11. Relationships	8.74	1.19	.16	.05	.09	.30	.35[a]	.27	.32	.54[b]	.44[a]	.67[b]	--				
12. Total score workplace well-being**	8.75	.83	.23	-.06	.40[a]	.23	.46[b]	.38[a]	.65[b]	.78[b]	.75[b]	.89[b]	.78[b]	--			
13. Negative emotion	3.32	1.56	-.166	.03	-.35[a]	-.11	-.37[a]	-.29	-.28	-.37[a]	-.37[a]	-.70	-.29	-.54[b]	--		
14. Physical health	8.66	1.54	.054	-.11	.06	.05	.24	.10	.39[a]	.52[b]	.34	.60[b]	.37[a]	.57[b]	-.55[b]	--	
15. Loneliness	4.12	3.12	.012	.15	.02	-.38[a]	-.13	-.09	-.28	-.42[a]	-.34	-.64[b]	-.54[b]	-.58[b]	.46[b]	-.36[a]	--

Notes. [a] $p < .05$, [b] $p < .01$. * the total sum of variables 1, 2, 3, 4 and 5. ** the average score of variables 7, 8, 9, 10 and 11.

effect size of R^2 = .143 (Cohen, 1988; Cohen, 1992). AYA-nurses' score on SDL increases 4.855 for each increase on unit score of workplace well-being, and AYA-nurses' score on workplace well-being increases 0.029 for each increase on unit score SDL.

For a more detailed view on the relationship between the constructs of SDL and workplace well-being, a series of Pearson product-moment correlations was conducted. Results show statistically significant positive correlations between the dimensions of SDL and workplace well-being, see Table 8.

4.5 Relationship between self-directed learning and learning styles

To examine whether AYA-nurses' level of SDL was higher for the balanced learning style preference compared to the other two learning styles preferences (5), a series of non-parametric Kruskal-Wallis tests was conducted to investigate possible differences between the conditions of learning styles on the total scores of SDL. Results showed that there were no significant differences between the three conditions of each learning style and the total scores of SDL, see Table 9.

Table 9.
Results Kruskal-Wallis tests for the four learning styles on self-directed learning (N = 33)

Learning styles	*n*	*Mean Rank*	*H**	df	*p*
Processing					
Active	14	16.96	.006	2	.997
Reflective	2	17.50			
Balanced	17	16.97			
Perception					
Sensing	12	14.71	2.876	2	.237
Intuitive	1	31			
Balanced	20	17.68			
Reception					
Visual	7	23.14	3.989	2	.136
Verbal	8	17.13			
Balanced	18	14.56			
Understanding					
Sequential	6	13.17	2.424	2	.298
Global	2	25.25			
Balanced	25	17.26			

Note. * Kruskal-Wallis H statistic

4.7 Relationship between work experience and self-directed learning, learning styles, and workplace well-being

To test the last set of hypotheses (6a, 6b, and 6c), groups were formed based on years of work experience. The number of years of work experience in working with adolescents and young adults with cancer were divided into three categories based on Benner's Novice to Expert theory (Benner, 2004; Benner et al., 1992): AYA-nurses with null to three years of work experience were called *junior*, three to six years of work experience were named *medior*, and the last group with work experience of seven years and more were named *senior*, see Table 10. Two analyses of variance (ANOVA's) and a Chi-square test for independence were conducted to examine differences between the junior, medior and senior groups on the scores of SDL, workplace well-being, and the four learning style.

Table 10.
Descriptive statistics for work experience categories and age (N = 33)

		Years of work experience		*Age**	
Category	*n*	*Mean*	*SD*	*Mean*	*SD*
Junior (<3)	18	1.21	.776	38.33	11.204
Medior (3-6)	8	4.63	.744	52.13	5.842
Senior (>7)	7	14.57	5.127	48.86	10.415

Note. *One-way ANOVA revealed that the junior group consisted of participants that are significantly younger than the two groups with more work experience, $F(2,27) = 6.305$, $p = .005$.

The first ANOVA revealed that there was no significant difference in AYA-nurses' SDL scores between the three groups of work experience ($F(2,30) = 1.917$, $p = .165$). Also, the dimensions of SDL revealed no significant difference (6a).

The second ANOVA was conducted to test whether AYA-nurses with more than three years of work experience score higher on workplace well-being (6b). It was revealed that there were no significant differences in total workplace well-being scores between the three groups of work experience ($F(2,30) = 2.538$, $p = .096$). But, since differences between the groups may be found at the dimensions of workplace well-being, we also examined these. Two dimensions of workplace well-being revealed significant differences with large effect sizes, which were *accomplishment* ($F(2,30) = 9.912$, $\eta^2 = .398$, $p < .001$) and *engagement* ($F(2,27) = 4.039$, $\eta^2 = .212$, $p = .028$). A series of pairwise comparisons via post-hoc Bonferroni correction revealed a significant difference in *accomplishment* score, in which the junior group ($M = 8.24$, $SD = .703$) scored significantly lower than the medior ($M = 9.42$, $SD = .556$, $p = .001$) and senior (M

= 9.10, *SD* = 713, *p* = .024) groups. There was no statistically significant difference between the senior and medior groups. Furthermore, a series of pairwise comparisons revealed a significant difference in *engagement* scores, in which the senior group (*M* = 7.33, *SD* = .861) scored significantly lower than the medior group (*M* = 8.92, *SD* = .812, *p* = .024). There was no statistically significant difference between the junior and medior groups.

A series of Chi-square tests showed no significant associations between three categories of work experience and the four learning styles categories (6c): processing ($\chi^2(4) = 1.63$, $p = .80$), perception ($\chi^2(4) = 2.51$, $p = .64$), reception ($\chi^2(4) = 1.07$, $p = .90$), and, understanding ($\chi^2(4) = 1.46$, $p = .83$).

5. Discussion

At the beginning of this thesis the importance of researching the relationship of self-directed learning (SDL) with workplace well-being, and learning styles was emphasized. We found that SDL and workplace well-being are positively related, whereas no relation was found between SDL and learning styles. According to the literature, the synergy between learning and well-being is important, and is considered reciprocal (Awartani & Looney, 2015; Foster et al., 2020; Teal et al., 2015). On the one hand, well-being serves as a fundament for learning, which allows the individual to face new experiences that lead to motivation and self-esteem, whilst on the other hand learning also improves well-being (Awartani & Looney, 2015). For example, in education for children this is addressed by differentiation in instruction, which means that the teacher is sensitive to individual learning differences (Coffield et al., 2004; Tomlinson et al., 2003). Children scored better with differentiated instruction on learning outcomes, which led to a positive learning experience, in turn created feelings of satisfaction, joy, self-esteem and trust (Awartani & Looney, 2015; Tomlinson et al., 2003). In this line, although we have a different context and population, our study found that there is a positive reciprocal relationship between learning and well-being. We analyse this meaningful and interesting relationship (i.e., between SDL and workplace well-being) more deeply in the following section. Followed by a discussion of the absent relation between SDL and learning styles, and the outcomes related to work experience. These sections include a discussion of practical and theoretical implications. In the last section, we describe this study's limitations and suggestions for future research.

5.1 Relationship between SDL and workplace well-being

Our study results showed that AYA-nurses score high on the level of SDL behaviour, as well as on the level of workplace well-being. These results match the findings of Cadorin et al. (2011) and Foster et al. (2020), revealing that SDL as well as a well-being at the workplace play an important role in the professional development of nurses, and even lead to quality healthcare. Most interestingly, our study found that there is a positive bi-directional relationship, more specifically, the AYA-nurses' well-being at the workplace tends to rise with the increasing levels of SDL. This result implies that SDL contain elements that contribute to improving well-being at the workplace, which is in line with Jarden et al. (2019), who found that autonomy in learning is a potential strengthener for well-being. Therefore, we propose that stimulating SDL behaviour in the professional development of AYA-nurses may positively influence their well-being at the workplace, which may make them more resilient in working

with adolescents and young adults facing the challenges of the life-threatening illness cancer. Several points are raised in literature that contribute to stimulating SDL behaviour. For example, providing guidance in selecting SDL activities and strategies that suit the nurses' learning needs. Choice is an important aspect of SDL, however, current's extensive possibilities (e.g., internet) may lead to choice-overload, which even negatively affects well-being (Brockett, 2006; Loeng, 2020). Therefore, self-directed learners need some guidance in selecting relevant resources (Loeng, 2020). This is where managers and educators have an important role to play (Loeng, 2020). Another example, is using a student-centered approach instead of a teacher-centered approach. In contrast to teacher-centered traditional instruction, where knowledge is transmitted directly by the teacher, the student-centered approach focusses on making meaning and creating a learning environment where knowledge is co-constructed by students and teacher (McCombs & Whistler, 1997).

What can our findings contribute to the theoretical Self-Directed Wellness model of Teal et al. (2015)? Based on current studies' results, we suggest adding SDL behavioural concepts to the model, as it is now merely built from sub-constructs and theories of SDL. The Self-Directed Wellness model makes conceptual connections between SDL and well-being (i.e., eye of the flower represent the PERMA well-being construct, whilst the petals represent SDL constructs, example flower see Figure 1) (see Teal et al., 2015). We found significant relationships between constructs of SDL and workplace well-being. For example, between *accomplishment* and SDL constructs *evaluation* and *learning activities*, which are currently not addressed in the model (an example of including these to the model, see Figure 1). This may provide more detail on how SDL can positively influence well-being. It would be useful if future research delves further into specifying SDL behaviour that is related to PERMA well-being constructs, this might give insights and guidance for supporting individuals to flourish and become self-directed in their professional development. For example, we found that SDL concept *evaluation* is positively related to all PERMA dimensions (except for the dimension *meaning*), but this may manifest in different SDL behaviour for each PERMA dimension. For example, for *accomplishment* asking colleagues for feedback, while for *engagement* selecting interesting and relevant activities for monitoring and reflecting the learning progress.

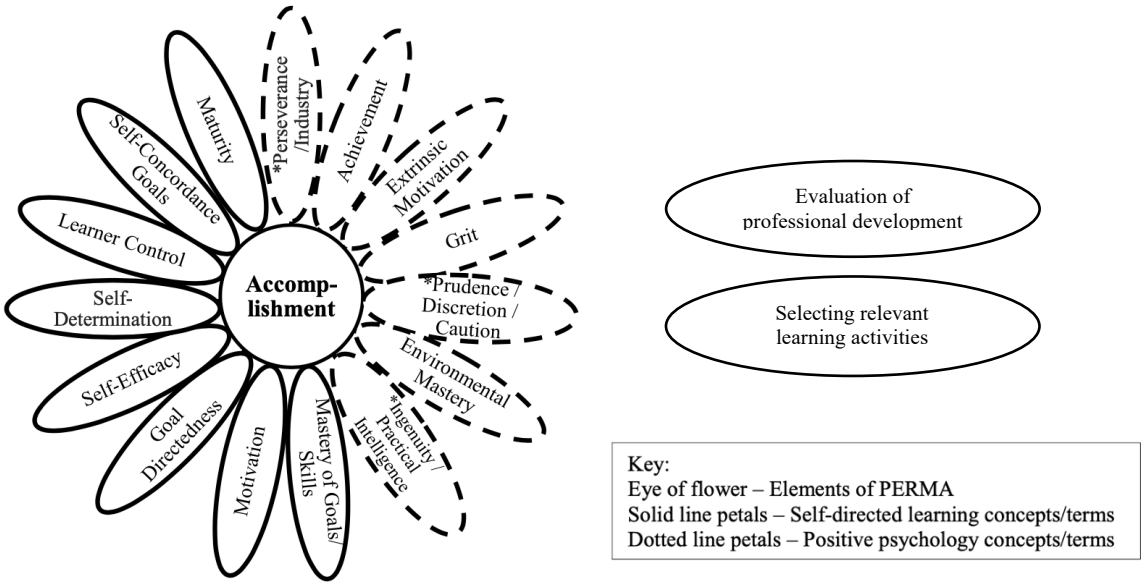

Figure 1. Flower of well-being construct *accomplishment* according Teal et al. (2015), adding two petals with SDL behaviour constructs *evaluation* and *learning activities* based on current study.

Interesting findings of this study when looking more closely at the relationship between the constructs of SDL and well-being are that AYA-nurses with high levels of SDL tend to have high feelings of accomplishment and engagement at the workplace. This might imply that the self-directed AYA-nurses feel involved in their work and professionally develop through achievements, such as reaching learning goals by following continuing education (Butler & Kern, 2016). Further, AYA-nurses with high levels of workplace well-being revealed to utilize learning activities that are self-directed in nature, and in addition, evaluate these learning activities through monitoring. On its turn, this autonomy in the learning process revealed to be related to experiencing positive emotions and positive relationships. While negative emotions in the workplace, such as anxiety, sadness, and anger, are experienced less by AYA-nurses that perform and monitor SDL learning activities. In addition, it was found that the higher the AYA-nurses score on interpersonal skills, the less they experience loneliness in their work. Based on these findings, it might be suggested that the AYA-nurses require collaboration and relationships with others (i.e., feeling connected, supported and valued by others in the organization) for their professional development, and in order to be autonomous in their learning process (Butler & Kern, 2016). This study's finding matches the findings of Pool (2015) and Oshodi et al. (2019), who indicated that nurses gain knowledge and skills mainly through social interaction and collaboration both on-the-job and off-the-job, which shapes their practices (Berings, 2006). In line with Oshodi et al. (2019), our study showed that collaboration and interaction allows nurses to evaluate the areas where professional development is needed,

and in addition take autonomy in their learning process. A recent experimental study confirmed this finding by addressing the importance of incorporating social interaction in the nursing education (Edwards et al., 2017). The first group received an education intervention that was built on social interaction; a 3.5 day program that was coproduced with patients, caretakers and health professionals concerning the impact of cancer as a life changing condition, whilst the second group received a 2 day program by a lecturer with limited interaction (Edwards et al., 2017; Soanes, 2018). The experimental group conducted an active processing learning style, whereas that of the second group was passive. The results showed that the experimental group revealed a higher confidential and positive attitude in supporting patients in cancer care (Soanes, 2018). In line with these findings, our study suggests that it is important to see social interaction as a great learning potential in the nursing education.

AYA-nurse is often perceived as an isolating role, because it is a profession that is not centralized, but spread over different national hospitals. An opportunity for facilitating and optimizing knowledge sharing and cooperation between AYA-nurses working at different hospitals in the Netherlands is by establishing a Community of practice (CoP). A CoP can be described as a social network where people in a professional context come together around a common topic, passion or interest and regularly interact on- and offline with a focus on knowledge management, innovation, learning and social networking (Cable & Pettitt, 2018; Hara & Hew, 2007; Vollenbroek, 2019). A CoP combines self-directed and collaborative learning and facilitates sharing best practices and expertise. For example, through virtual meetings on a forum, theme sessions and workshops (e.g., new treatment methods, professional development, complex cases, emotional impact of the profession, self-care activities for well-being etc.). Six factors were identified that sustain knowledge sharing among nurses through a community of practice, for more information see Hara and Hew (2007).

We would like to make a remark regarding our finding of the AYA-nurses' high score on well-being at the workplace. It is a phenomenon that is seen more often in research in the nursing profession, although underneath this phenomenon several reasons indicate the importance of paying preventive attention to workplace well-being (Bourgault et al., 2015; Foster et al., 2020; Jiménez-López et al., 2016; Li et al., 2021; van der Wath & van Wyk, 2020; Zafarnia et al., 2017). Our study showed that AYA-nurses find their work very meaningful and experience a high level of well-being at the workplace. These high scores are more often found in the nursing profession, as they tend to exhibit empathic and altruistic behaviour, leading to harmonious interpersonal relationships, resulting in experiencing happiness and high levels of well-being (Bourgault et al., 2015; Foster et al., 2020; Jiménez-López et al., 2016; Li et al.,

2021; van der Wath & van Wyk, 2020; Zafarnia et al., 2017). But, on the other hand, their altruistic behaviour may cause that they do not always take care of their own well-being, while their professional duties put a high demand on them. For example, AYA-nurses' daily work environment, working with adolescents and young adults with a life threating illness, has a great emotional and mental impact, consequently the risk of ill-being is lurking (Cable & Pettitt, 2018; Soanes, 2018). As Jackson et al. (2007, p. 4) and Taylor et al. (2020, p. 2) describe "nurses bear witness to all sorts of situations and experiences that go beyond the norms of everyday life", which is associated with a higher risk at empathic distress resulting in reduced resilience, fatigue and burnout, which consequently leads to lower quality healthcare (Taylor et al., 2020). Therefore, a healthy and supportive work environment is important for preventive purposes. Well-being at the workplace can be maintained and improved through a series of self-care practices and self-compassion interventions (Taylor et al., 2020). For example, research by Orellana-Rios et al. (2018) showed that an on the job mindfulness course had a positive influence on nurses' interpersonal relationships, and showed that nurses were better able at coping with stress. Because the current study showed that there is a relation between workplace well-being and SDL, an approach could be to actively and regularly debate with the AYA-nurses about their workplace well-being and professional development, and guide them in selecting suitable SDL learning activities for their career path (Pool, 2015). The AYA-nurses revealed to be self-directed learners, which means that they have the capacity to understand their own learning strengths, limitations and needs (i.e., meta-cognition). This allows them to take control over their development (Rothstein et al., 2016). On its turn, the opportunity to freely define and make autonomous decisions about their own career path as an AYA-nurse may increase their resilience in the workplace (Foster et al., 2020), as opposite to a highly controlled work environment that is more likely to impede development and a well psychological functioning (Pool, 2015).

5.2 Is there no interaction between SDL and learning styles?

The results of this study showed that the AYA-nurses have high levels of SDL, and that most of the AYA-nurses have balanced learning styles. However, the results of this study did not reveal a significant relation between SDL and balanced learning styles. An explanation for this might be partly due to the result that all AYA-nurses in this study scored high on SDL with small differences in scores. The individual scores were closer together, therefore not enough distinction could be made on the scores of SDL between the learning styles (Field, 2013). Future research might include a large-scale study with a heterogenous group regarding levels of SDL,

to examine whether a relationship could be found between high levels of SDL and balanced learning styles.

Another explanation could be that the results of this study do not substantiate the proposition on which learning styles are based, i.e., that the learner has only one learning style preference. Although we assume, as Felder indicates, that a person's learning style is flexible and can change over time, this study's results might show that learning styles are quite flexible and even can change multiple times per learning situation. A study by Hutto (2009) using Kolb's learning styles inventory and SDL propensity, found that the self-directed learners did not demonstrate the learning style balance. They found that the learning context and the to-be-learned content determines the preferred learning style (Hutto, 2009; Kolb, 1984). This could also be an explanation for the results of this study. Literature states that self-directed learners possess metacognition, meaning that they have insights into the diversity of learning styles, and their learning style preferences and capabilities (Loeng, 2020; Robotham, 1995). Therefore, they are able at adaptively selecting and deploying an appropriate learning style from a range of styles according to the demands of a learning situation (Coffield et al., 2004; Felder, 2020; Loeng, 2020; Robotham, 1995). For example knowledge acquisition may require an intuitive learning style that seeks information about theories and underlying meanings, whilst the extension of nursing roles may require a sensitive learning style that is practical and follows a step-by-step procedure (Felder, 1996; Gould et al., 2007; Pool, 2015). Along these lines, what appears to be a preference for a specific learning style may rather be an adaptation technique (Hutto, 2009). More specific to this study, the schematic sketch of the learning context in which the statements of the ILS questionnaire were formulated may have led the AYA-nurses to adapt their learning styles to the demands of the learning situation, and to what they have learned lead to success. Interesting, Robotham (1995) already suggested in the 90's that self-directed learning is the ultimate learning style (Loeng, 2020).

Results of this study showed that a balanced learning style was found dominant in all four learning styles (i.e., how they process, percept, recept and understand information). Therefore, it could be assumed that the AYA-nurses tend to be multimodal learners, which means that they utilize multiple learning styles through different learning strategies and activities in their learning process (Gonzales et al., 2017). But the second dominant learning styles pattern was active, sensing and sequential. Therefore, we advise to include hands-on learning experiences in a collaborative learning environment in education for AYA-nurse. In this learning environment, it is important to use clarity given by well-established work methods, with a logical step structure (Felder & Soloman, n.d.). Both visual and verbal instructions were

indicated as second preference, therefore, Mayer's modality principle can be considered, which states that humans learn best from visuals and spoken words than from visuals and printed words (see Mayer & Fiorella, 2014).

5.3 Work experience, what does it reveal?

Contrary to our expectations, results showed that AYA-nurses with more than three years of work experience do not score higher on the level of SDL, compared to novice AYA-nurses. The novice and experienced AYA-nurses that participated in this study have already gained experience in continuing education for their current specialization, which possibly may have caused no difference on the level of SDL (Benner, 1984; Mangold et al., 2018). Whilst we found no relation, other studies did show a relation between work experience and SDL. They found that nurses with more clinical experiences are exposed to practical complex learning situations, and to solve these requires self-directedness in their learning (Cadorin et al., 2015).

We found no differences between the novice and experienced AYA-nurses regarding the level of well-being at the workplace. But differences were found on two constructs of workplace well-being; work experience influenced the extent to which *accomplishment* and *engagement* were experienced at the workplace. It was found that the AYA-nurses with less than three years of work experience scored significantly lower on *accomplishment*. This might be because of novice nurses' lack of experience, and as a result having less feelings of mastery and achievement, for example time management (Benner, 1984). The group with more than six years of work experience as an AYA-nurse revealed to score lower on *engagement*. Similar results were also found by Pool (2015) and De Lange et al. (2010), they suggest that this might be caused by the experienced nurses' feeling that they have learned enough, and as a result are less involved and participate less in formal learning activities for professional development. Also, Gould et al. (2007) found that specialized experienced nurses often perceive a lack of courses that meet their needs, for example regarding degree of difficulty and complexity (Pool, 2015), which could explain this study's finding that experienced AYA-nurses score lower on *engagement* compared to the novice AYA-nurses. Therefore, it seems that the more clinical work experience and growth in competence development, the less the need for intensive learning and a higher need for social interaction to exchange complex knowledge (Pool, 2015; Takase, 2013). The differences between novice and experienced AYA-nurses on *accomplishment* and *engagement* may suggest that their learning needs are different. For example, the inexperienced novice nurses are in the process of forming a professional identity, by focusing on career paths and how to pursue them, whilst the more experienced nurses have

a greater need for specialization and more complex challenges (Daley, 1999; Pool, 2015; Wood, 1998). This leads to a different need in learning activities, such as complex case discussions for the more experienced AYA-nurses, whilst the novice AYA-nurse might benefit more from a buddy system or peer program in which tacit knowledge and experience is exchanged (Lammintakanen & Kivinen, 2012). The latter is of importance for health care organizations to maintain valuable knowledge and extensive experience from nurses who might leave the field, for example for another career or due to retirement (Lammintakanen & Kivinen, 2012).

In addition, we found no relation between work experience and learning styles. This might be caused by the result that the majority of the AYA-nurses scored balanced on all four learning styles, as a result the other learning style categories did not have enough participants to provide a reliable variation in score (Field, 2013). Although our study found no relationship, other studies did reveal a relation between work experience and learning styles (McCrow et al., 2014). For example, Daley (1999) and Pool (2015) found that novice nurses appear to have a preference for formal education, whilst the more experienced nurses prefer a pragmatic approach in workplace setting. Researchers explain these differences in learning styles that through work experience a nurse reaches a higher level of expertise (Benner, 1984; Pool, 2015). This professional growth leads to a change in learning needs, and to different learning style preferences (Benner, 1984; Pool, 2015).

5.4 Limitations and future research

This study has a potential methodological limitation regarding sampling that somewhat may have biased the results. The AYA-nurses were approached via voluntary response sampling, which might have caused that the more pro-active AYA-nurses are over-represented within the sample. The respondent group was quite diverse in terms of age and years of work experience, but AYA-nurses who are less interested in professional development may have not responded. The second potential limitation regards the use of self-reporting. There is a difference between what people say they do or what they actually do (Argyris & Schon, 1974). However, the results of the constructs in this study (i.e., SDL, workplace well-being and learning styles) were in line with other studies within the nursing profession that also included other methods of measurement (e.g., Cadorin et al., 2017; Foster et al., 2020; Mangold et al., 2018; Pool, 2015).

The results of this study, in which a relation between SDL and workplace well-being, and the lack of a relation between SDL and learning styles were found, invites for thoughts for future research about what factors more may be related and contribute to SDL in the nursing

profession. For example, the results of this study showed that novice and more experienced AYA-nurses are self-directed learners, and that the majority score balanced on the different learning styles. However, by contrast, Pool (2015) found that learning activities and strategies were different for novice and experienced nurses. It would be interesting to investigate the influence of work experience on nurses' learning strategies.

A remark regarding the interesting relationship between SDL and workplace well-being, is that we cannot imply a causal relation (i.e., cause-and-effect relationship). This could be interesting for future research to investigate (e.g., experimental studies), in order to discover what educational SDL activities and strategies are effective and improve well-being at the workplace.

Further, the results of this study invite to consider whether future research should focus on learning styles, or rather more on learning strategies and activities. The goal of understanding the learning styles of AYA-nurses was to characterize the learner and examine whether certain learning styles could be found in relation to SDL. On its turn, these insights would provide input for optimizing learning in continuing education for nurses through differentiated instruction, for example matching instruction style and learner style (Coffield et al., 2004; Felder, 2020). Research suggests that matching styles increase knowledge gains, and even lead to a better well-being (Anderson, 1998; Pena et al., 2021). However, the results of this study showed that AYA-nurses utilize multiple learning strategies based on balanced learning styles. Therefore, this study proposes that it is more productive to research what learning strategies are effective, and, importantly, fit the learning needs of AYA-nurses as self-directed learners. A literature and a case study by Salyers et al. (2014) took a step in that direction. They reviewed foundational literature of contemporary e-learning and elaborated on these results in a case study for continuing education in the context of working nurses. They described the importance of the teaching strategy scaffolding in combination with an interactive learning strategy in the form of e-learning. Scaffolding is an instructional intervention that is self-directed in nature, and enables the learner to pace his or her learning, in which extra stepwise support is given when the learning progress stagnates (Salyers et al., 2014). This case study has been implemented and studied in education for nursing students. They found that, while it did not lead to significant differences in learning outcomes, students were more satisfied with the course and reported increased self-regulation. On its turn, student nurses expressed that they experienced this as beneficial, for example flexibility in scheduling, greater independence and self-pacing in relation to the content (Salyers et al., 2010). This makes them more resilient in facing the challenges they pursue in a nursing career. Thus far, this framework

has not yet been implemented in continuing education for nurses working in the professional field. Our study, in which a relationship was found between SDL and workplace well-being, suggests that this is an important next step for research. Follow-up studies can build on our finding by designing educational interventions that are self-directed in nature and measure their effects on professional development and well-being at the workplace.

5.5 Conclusion

This study showed that there is a relationship between AYA-nurses' SDL and well-being at the workplace. Therefore, we propose to further explore this meaningful relationship through a cross-fertilization between education and positive psychology, and subsequently, work towards a common framework that brings together the dimensions of workplace well-being and the dynamic character of self-directed learning. This study's finding suggests that stimulating SDL behaviour in the professional development of nurses may positively influence their well-being at the workplace, which may make them more resilient in working with adolescents and young adults facing the challenges of the life-threatening illness cancer. On its turn, this may positively affect the quality of AYA-care. Further, this study showed that there was no relationship between SDL and learning styles. Therefore, we suggest that AYA-nurses as self-directed learners are multimodal learners that flexibly can adapt their learning styles to the demands of the learning situation. What is important here is to provide guidance in the wide range of educational methods available that best suit their learning needs. This study proposes further research to focus on developing learning strategies and activities that best suit nurses as self-directed learners.

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Appendix A. Self-rating Scale of Self-directed Learning (SRSSDL)

Table A.
Self-rating Scale of Self-directed Learning (SRSSDL) (Williamson, 2007; Cadorin, Bortoluzzi & Palese, 2013)

Items	English	Dutch
1.	**Awareness**	
1.1	I identify my learning needs	Ik identificeer mijn eigen leerbehoeften
1.2	I am able to select the best method for my own learning	Ik ben in staat om de leermethode die het best bij mij past te kiezen
1.3	I consider teachers as facilitators of learning rather than providing information only	Ik beschouw docenten als facilitators van leren, in plaats van dat zij alleen informatie verstrekken
1.4	I keep up to date with the range of learning resources available	Ik ben altijd op de hoogte van het huidige aanbod aan leermiddelen
1.5	I am responsible for my learning process	Ik ben verantwoordelijk voor mijn eigen leerproces
1.6	I am responsible for identifying the areas I need training in	Ik ben zelf verantwoordelijk voor het identificeren van de gebieden waarin ik bijscholing nodig heb
1.7	I am able to maintain my motivation for learning over time	Ik kan langere tijd gemotiveerd blijven om te leren
1.8	I am able to plan and define my learning goals	Ik ben in staat om mijn leerdoelen te plannen en te definiëren
1.9	I have a break during long periods of work	Gedurende mijn werk neem ik voldoende pauze
1.10	I need to keep my learning routine separate from my other commitments	Ik moet mijn professionele ontwikkeling gescheiden houden van mijn andere werk verplichtingen
1.11	I relate my experience with new information	Ik koppel nieuwe informatie aan mijn ervaringen
1.12	I feel that I am learning despite not being instructed by a lecturer	Ook als ik niet geïnstrueerd word door een docent, heb ik toch het gevoel dat ik leer
2	**Learning Strategies**	

2.1	I take part in group discussions	Ik neem deel aan groepsdiscussies
2.2	I find the support of my peers very effective	Ik vind de steun van medestudenten bij het leren van nieuwe dingen effectief
2.3	I find role play is a useful technique for complex learning	Ik vind dat rollenspel een goede methode is om complexe situaties te oefenen
2.4	I find interactive didactic sessions are more effective than listening to lectures	Ik vind interactieve leersessies effectiever dan luisteren naar lezingen
2.5	I think simulation is an effective didactic technique	Ik denk dat het nabootsen van de situatie in een leeromgeving (simulatie) een goede methode is om nieuwe dingen te leren
2.6	I think case studies are an effective didactic technique	Ik vind dat het werken met casestudies een goede methode is om nieuwe dingen te leren
2.7	I am internally motivated to develop and improve my learning method	Ik ben gemotiveerd om de manier waarop ik nieuwe dingen leer te ontwikkelen en te verbeteren
2.8	I consider problems as challenges	Ik beschouw problemen als uitdagingen
2.9	I organize my self-learning activities in order to develop an ongoing learning approach in my life	Ik zorg er zelf voor dat ik activiteiten voor mijn professionele ontwikkeling volg, zodat ik blijf leren als professional
2.10	I think conceptual maps are an effective didactic technique	Ik vind dat mindmaps een goede methode is om nieuwe dingen te leren
2.11	I find modern educational interactive technology enhances my learning process	Ik vind dat technologie (ICT) die gebruikt wordt om het onderwijs interactief te maken mijn leerproces verbetert/ mij helpt in het leren
2.12	I am able to identify my learning strategies	Ik weet wat voor mij de beste manieren zijn om te leren
3	**Learning activities**	
3.1	I go back over and revise my new lessons	Ik kijk regelmatig terug naar wat ik geleerd heb en kijk of dit nog klopt
3.2	I identify the important points when reading a chapter or an article	Ik identificeer de belangrijke punten als ik een hoofdstuk of een artikel lees

3.3	I use the conceptual map as a useful method for understanding a wide range of information	Ik gebruik mindmap als methode om nieuwe informatie te begrijpen
3.4	1 am able to use information technology effectively	Ik ben in staat om technologie (ICT) effectief te gebruiken
3.5	My concentration and my attention increase when I read a complex study content	Mijn concentratie en mijn aandacht nemen toe als ik een complexe studie-teksten lees
3.6	I make notes or summarize all my ideas, thoughts and new learning	Ik maak aantekeningen en vat al mijn ideeën, gedachten en wat ik nieuw geleerd heb
3.7	I enjoy exploring information even beyond the prescribed aims of the course	Ik vind het leuk om op zoek te gaan naar extra informatie ook al is het geen onderdeel van de cursus
3.8	I am able to relate knowledge with practice	Ik ben in staat om kennis te relateren aan de praktijk
3.9	I raise relevant question(s) in teaching-learning sessions	Ik stel relevante vragen in onderwijsleersessies, zoals bijscholing of symposia
3.10	I am able to analyse and critically reflect on new ideas, information or any learning experiences	Ik ben in staat om nieuwe ideeën, informatie of leerervaringen te analyseren en er kritisch op te reflecteren
3.11	I keep an open mind to points of view different from my own	Ik sta open voor gezichtspunten van anderen, die verschillen van die van mij
3.12	I prefer to take any break in between any learning task	Ik vind het prettig om tijdens welke leertaak dan ook pauzes te nemen
4	**Evaluation**	
4.1	I self-assess before I get feedback from instructors	Ik beoordeel eerst mijzelf voor ik feedback krijg van docenten
4.2	In what I have achieved I identify areas for further development	In wat ik tot nu toe bereikt heb identificeer ik de gebieden waar ik mij verder in wil ontwikkelen
4.3	I am able to assess my learning progress	Ik ben in staat mijn eigen voortgang tijdens het leren te beoordelen
4.4	I am able to identify my areas of strength and weakness	Ik ben in staat mijn sterke en zwakke punten te identificeren
4.5	I appreciate when my work can be peer reviewed	Ik waardeer het wanneer mijn werk door collega’s wordt beoordeeld
4.6	I find both success and failure inspire me to further learning	Zowel succes als mislukking inspireren mij om verder te leren

4.7	I appreciate any criticism as a basis for improving my learning	Ik waardeer alle kritiek om mijn leerproces te verbeteren
4.8	I am able to assess the achievement of my learning objectives	Ik ben in staat om te beoordelen of ik mijn leerdoelen heb behaald
4.9	I check my portfolio to review my progress	Ik houd zelf mijn ontwikkeling en voortgang bij (bijvoorbeeld in een portfolio)
4.10	I review and reflect on my learning activities	Ik reflecteer mijn leeractiviteiten
4.11	New learning is challenging for me	Het leren van nieuwe dingen voor mijn werk vind ik uitdagend
4.12	I am motivated by other people's success	Ik word gemotiveerd van succes van anderen
5	**Interpersonal skills**	
5.1	I intend to learn more about other cultures and languages I am frequently exposed to	Ik ben van plan meer te leren over andere culturen en talen waarmee ik regelmatig in aanraking kom
5.2	I am able to define my role within a group	Ik ben in staat om mijn rol binnen een groep te definiëren
5.3	My interaction with others helps me to develop the insight to plan for further learning	Interactie met anderen helpt me in mijn ideeën om mij verder te ontwikkelen
5.4	I make use of any opportunities that come my way	Ik maak gebruik van alle kansen die op mijn pad komen
5.5	I feel the need to share information with others	Ik voel de behoefte om informatie met anderen te delen
5.6	I maintain good inter-personal relationships with others	Ik onderhoud goede relaties met anderen
5.7	I find it easy to work in collaboration with others	Ik vind het makkelijk om met anderen samen te werken
5.8	My verbal communication is effective	Mijn verbale communicatie is effectief
5.9	I find it necessary to create interdisciplinary relations in order to maintain social harmony	Ik vind het nodig om interdisciplinaire relaties te creëren om de sociale harmonie te behouden
5.10	1 am able to express my ideas effectively in writing	Ik kan mijn ideeën duidelijk schriftelijk uitdrukken
5.11	I am able to express my ideas freely	Ik kan mijn ideeën vrijelijk uiten
5.12	I find it challenging to pursue learning in a culturally diverse milieu	Ik vind het een uitdaging om te leren in een omgeving waarin diverse culturen samenkomen

Note. 5-point scale, 5 = Always 4 = Often 3 = Sometimes 2 =Seldom 1 = Never

Appendix B. The Workplace PERMA Profiler

Table B.
The Workplace PERMA Profiler (Butler & Kern, 2016; Watanabe et al., 2018)

Items	English	Dutch	Label	Response anchors
1.	To what extent is your work purposeful and meaningful?	In hoeverre is jouw werk doelgericht en betekenisvol?	M1	Helemaal niet – Helemaal
2.	How often do you feel you are making progress towards accomplishing your work-related goals?	Hoe vaak heb je het gevoel dat je voortuitgang boekt bij het bereiken van jouw werk gerelateerde doelen?	A1	Nooit – Altijd
3.	At work, how often do you become absorbed in what you are doing?	Hoe vaak word je op je werk volledig in beslag genomen door wat je doet?	E1	Nooit – Altijd
4.	In general, how would you say your health is?	Hoe zou je in het algemeen zeggen dat jouw gezondheid is?	H1	Vreselijk - Uitstekend
5.	At work, how often do you feel joyful?	Hoe vaak voel je je blij op het werk?	P1	Nooit – Altijd
6.	To what extent do you receive help and support from co-workers when you need it?	In hoeverre krijg je hulp en ondersteuning van collega's wanneer je die nodig hebt?	R1	Helemaal niet – Helemaal
7.	At work, how often do you feel anxious?	Hoe vaak voel je je angstig op het werk?	N1	Nooit – Altijd
8.	How often do you achieve the important work goals you have set for yourself?	Hoe vaak behaal je de doelen die je belangrijk vindt voor je werk en die je voor jezelf opgesteld hebt?	A2	Nooit – Altijd
9.	In general, to what extent do you feel that what you do at work is valuable and worthwhile?	In hoeverre vind je over het algemeen dat wat je op het werk doet waardevol en de moeite waard is?	M2	Helemaal niet – Helemaal
10.	At work, how often do you feel positive?	Hoe vaak voel je je positief op het werk?	P2	Nooit – Altijd
11.	To what extent do you feel excited and interested in your work?	In hoeverre voel je je enthousiast en geïnteresseerd in je werk?	E2	Helemaal niet – Helemaal
12.	How lonely do you feel at work?	Hoe eenzaam voel je je op het werk?	Lon	Helemaal niet – Helemaal

13.	How satisfied are you with your current physical health?	Hoe tevreden ben je met je huidige fysieke gezondheid?	H2	Helemaal niet – Helemaal
14.	At work, how often do you feel angry?	Hoe vaak voel je je boos op het werk?	N2	Nooit – Altijd
15.	To what extent do you feel appreciated by your coworkers?	In hoeverre voel je je gewaardeerd door jouw collega's?	R2	Helemaal niet – Helemaal
16.	How often are you able to handle your work-related responsibilities?	Hoe vaak kun je jouw werk-gerelateerde verantwoordelijkheden aan?	A3	Nooit – Altijd
17.	To what extent do you generally feel that you have a sense of direction in your work?	In hoeverre heb je het gevoel dat je richting hebt in je werk?	M3	Helemaal niet – Helemaal
18.	Compared to others of your same age and sex, how is your health?	Hoe is het met jouw gezondheid in vergelijking met anderen van dezelfde leeftijd en hetzelfde geslacht?	H3	Vreselijk - Uitstekend
19.	How satisfied are you with your professional relationships?	Hoe tevreden ben je met de relaties die je hebt met betrekking tot je werk?	R3	Helemaal niet – Helemaal
20.	At work, how often do you feel sad?	Hoe vaak voel je je verdrietig op het werk?	N3	Nooit – Altijd
21.	At work, how often do you lose track of time while doing something you enjoy?	Hoe vaak verlies je op het werk de tijd uit het oog terwijl je met iets bezig bent dat je leuk vindt?	E3	Nooit – Altijd
22.	At work, to what extent do you feel contented?	In hoeverre voel je je tevreden op het werk?	P3	Helemaal niet – Helemaal
23.	Taking all things together, how happy would you say you are with your work?	Alles bij elkaar, hoe gelukkig zou je zeggen dat je bent met jouw werk?	Hap	Helemaal niet – Helemaal

Note. 11-point scale, ranging from 0 to 10 (with only end points labelled)

Appendix C. The Index of Learning Styles (ILS)

Table C.

The Index of Learning Styles (in English and Dutch) (Felder & Silverman, 1988; Felder & Soloman, 1997)

Item	Statement	Answer options	Dimension*
1	I understand something better after I	try it out think it through	1
1	Ik begrijp iets beter nadat ik	het uitprobeert heb erover nagedacht heb	1
2	I would rather be considered	realistic innovative	2
2	Ik wordt liever als	realistisch innovatief	2
3	When I think about what I did yesterday, I am most likely to get	a picture words	3
3	Als ik denk aan wat ik gisteren heb gedaan, komen er	beelden in mij op woorden in mij op	3
4	I tend to	understand details of a subject but may be fuzzy about its overall structure. understand the overall structure but may be fuzzy about the details	4
4	Over het algemeen richt ik mij meer op	de details en minder op de algehele structuur de algehele structuur en minder op de details	4
5	When I am learning something new, it helps me to	talk about it think about it	1
5	Wanneer ik iets nieuws leer, helpt het mij om	hierover te praten hierover na te denken	1
6	If I were a teacher, I would rather teach a course	that deals with facts and real life situations that deals with ideas and theories	2
6	Als ik een leraar was, zou ik eerder een cursus geven	die gaat over feiten en situaties uit het echte leven die gaat over ideeën en theorieën	2

7	I prefer to get new information in	pictures, diagrams, graphs, or maps	3
		written directions or verbal information	
7	Ik krijg het liefst informatie aangeboden via	afbeeldingen, diagrammen, grafieken of kaarten	3
		schriftelijke aanwijzingen of mondelinge informatie	
8	Once I understand	all the parts, I understand the whole thing	4
		the whole thing, I see how the parts fit	
8	Zodra ik	alle onderdelen begrijp, begrijp ik het geheel	4
		het geheel begrijp, zie ik hoe de onderdelen passen	
9	In a study group working on difficult material, I am more likely to	jump in and contribute ideas	1
		sit back and listen	
9	Als we in een studiegroep werken aan een moeilijke opdracht, is het waarschijnlijker dat ik	me erin meng en ideeën bijdraag	1
		zit en luister	
10	I find it easier to	to learn facts	2
		to learn concepts	
10	Ik vind het gemakkelijker	om feiten te leren	2
		om concepten te leren	
11	In a book with lots of pictures and charts, I am likely to	look over the pictures and charts carefully	3
		focus on the written text	
11	In een boek met veel plaatjes en grafieken, zal ik	de plaatjes en grafieken zorgvuldig bekijken	3
		mij concentreren op de geschreven tekst	
12	When I solve math problems	I usually work my way to the solutions one step at a time	4
		I often just see the solutions but then have to struggle to figure out the steps to get to them.	
12	Als ik een wiskundige probleem oplos	werk ik meestal stap voor stap naar de oplossing	4
		zie ik vaak direct de oplossing, maar dan moet ik vervolgens mijn best doen om te bedenken om de tussenstappen zijn om tot een oplossing te komen	
13	In classes I have taken	I have usually gotten to know many of the students	1
		I have rarely gotten to know many of the students	
13	In de cursussen die ik heb gevolgd, heb ik meestal	meestal veel van de andere studenten leren kennen	1
		de andere studenten bijna nooit leren kennen	

14	In reading nonfiction, I prefer	something that teaches me new facts or tells me how to do something	2
		something that gives me new ideas to think about	
14	Als ik non-fictie lees, geef ik de voorkeur aan	iets dat me nieuwe feiten leert of me vertelt hoe ik iets moet doen	2
		iets dat me nieuwe ideeën geeft om over na te denken	
15	I like teachers	who put a lot of diagrams on the board	3
		who spend a lot of time explaining	
15	Ik hou van leraren	die veel diagrammen/afbeeldingen op het bord zetten	3
		die veel tijd besteden aan het uitleggen	
16	When I'm analyzing a story or a novel	I think of the incidents and try to put them together to figure out the themes	4
		I know just what the themes are when I finish reading and then I have to go back and find the incidents that demonstrate them	
16	Als ik een verhaal of een roman analyseer	denk ik aan de gebeurtenissen en probeer ze samen te voegen om de thema's te achterhalen	4
		weet ik precies wat de thema's zijn als ik klaar ben met lezen en dan moet ik terug om de gebeurtenissen te identificeren die dat aan tonen	
17	When I start a homework problem, I am more likely	to start working on the solution immediately	1
		try to fully understand the problem first	
17	Wanneer ik aan een huiswerkprobleem begin, is de kans groter dat ik	direct begin aan de oplossing	1
		eerst het probleem volledig probeer te begrijpen	
18	I prefer the idea of	certainty	2
		theory	
18	Ik geef de voorkeur aan het idee van	zekerheid	2
		theorie	
19	I remember best	what I see	3
		what I hear	
19	Ik herinner me het beste	wat ik zie	3
		wat ik hoor	
20	It is more important to me that an instructor	lay out the material in clear sequential steps	4
		give me an overall picture and relate the material to other subjects	

20	Ik vind het belangrijker dat een docent	het stof in duidelijke opeenvolgende stappen uitlegt	4
		een totaalbeeld geeft en de stof relateert aan andere onderwerpen	
21	I prefer to study	in a study group	1
		alone	
21	Ik studeer liever	in een studiegroep	1
		alleen	
22	I am more likely to be considered	careful about the details of my work	2
		creative about how to do my work	
22	Ik zal eerder gezien worden als iemand die	voorzichtig omgaat met de details van zijn/haar werk	2
		creatief omgaat met zijn/haar werk	
23	When I get directions to a new place, I prefer	a map	3
		written instructions	
23	Als ik een routebeschrijving krijg, geef ik de voorkeur aan	een kaart	3
		schriftelijke instructies	
24	I learn	at a fairly regular pace. If I study hard, I'll "get it"	4
		in fits and starts. I'll be totally confused and then suddenly it all "clicks"	
24	Ik leer	in een redelijk regelmatig tempo. Als ik hard studeer, dan komt het wel goed	4
		in vlagen. Ik kan het ene moment totaal in de war zijn en dat het daarna opeens allemaal duidelijk wordt	
25	I would rather first	try things out	1
		think about how I'm going to do it	
25	Ik zou eerder eerst	iets uitproberen	1
		erover nadenken hoe ik het ga doen	
26	When I am reading for enjoyment, I like writers to	clearly say what they mean	2
		say things in creative, interesting ways	

26	Als ik voor mijn plezier lees, hou ik van schrijvers die	duidelijk zeggen wat ze bedoelen dingen op creatieve, interessante manieren vertellen	2
27	When I see a diagram or sketch in class, I am most likely to remember	the picture what the instructor said about it	3
27	Als ik in de les een diagram of schets zie, zal ik waarschijnlijk	het plaatje herinneren herinneren wat de docent erover zei	3
28	When considering a body of information, I am more likely to	focus on details and miss the big picture try to understand the big picture before getting into the details	4
28	Als ik mij in een grote hoeveelheid informatie verdiep	focus ik meer op de details, waardoor ik het grote geheel niet zie probeer ik het grote geheel te begrijpen voordat ik op de details inga	4
29	I more easily remember	something I have done something I have thought a lot about	1
29	Ik kan gemakkelijker iets herinneren	wat ik heb gedaan waar ik veel over heb nagedacht	1
30	When I have to perform a task, I prefer to	master one way of doing it come up with new ways of doing it	2
30	Als ik een taak moet uitvoeren, doe ik dat het liefst	door het op één manier goed onder de knie te krijgen door nieuwe manieren te bedenken om het te doen	2
31	When someone is showing me data, I prefer	charts or graphs text summarizing the results	3
31	Als iemand mij gegevens laat zien, geef ik de voorkeur aan	grafieken of afbeeldingen een tekst waarin de resultaten worden samengevat	3
32	When writing a paper, I am more likely to	work on (think about or write) the beginning of the paper and progress forward work on (think about or write) different parts of the paper and then order them	4
32	Als ik een stuk tekst schrijf, dan	begin ik bij het begin en werk van daaruit verder	4

		begin ik bij de verschillende delen en orden deze daarna	
33	When I have to work on a group project, I first want to	have “group brainstorming” where everyone contributes ideas	1
		brainstorm individually and then come together as a group to compare ideas	
33	Als ik aan een groepsproject moet werken, wil ik graag eerst	een "groepsbrainstorming" waar iedereen ideeën inbrengt	1
		dat iedereen voor zichzelf brainstormt en vervolgens samen komen als een groep om ideeën te vergelijken	
34	I consider it high praise to call someone	sensible	2
		imaginative	
34	Ik vat het positief op als iemand	verstandig genoemd wordt	2
		creatief genoemd wordt	
35	When I meet people at a party, I am more likely to remember	what they looked like	3
		what they said about themselves	
35	Als ik mensen ontmoet op een feest, zal ik me eerder herinneren	hoe ze eruit zagen	3
		wat ze over zichzelf vertelden	
36	When I am learning a new subject, I prefer to	stay focused on that subject, learning as much about it as I can	4
		try to make connections between that subject and related subjects	
36	Als ik een nieuw onderwerp leer, doe ik dat liever	a) mij te verdiepen in dat onderwerp en er zoveel mogelijk over te leren	4
		b) door te proberen om verbanden te leggen tussen dat onderwerp en aanverwante onderwerpen	
37	I am more likely to be considered	outgoing	1
		reserved	
37	Ik zal eerder als iemand worden gezien die	open is	1
		gereserveerd is	
38	I prefer courses that emphasize	concrete material (facts, data)	2
		abstract material (concepts, theories)	

38	Ik geef de voorkeur aan cursussen die uitleg geven aan de hand van	concreet materiaal (feiten, gegevens) abstract materiaal (concepten, theorieën)	2
39	For entertainment, I would rather	watch television read a book	3
39	Voor vermaak ga ik liever	televisie kijken een boek lezen	3
40	Some teachers start their lectures with an outline of what they will cover. Such outlines are	somewhat helpful to me very helpful to me	4
40	Sommige docenten beginnen hun lessen met een overzicht van wat ze gaan behandelen. Dat	helpt mij een beetje helpt mij heel erg	4
41	The idea of doing homework in groups, with one grade for the entire group	appeals to me does not appeal to me	1
41	Het idee om in groepjes huiswerk te maken, met één cijfer voor de hele groep	spreekt mij aan spreekt mij niet aan	1
42	When I am doing long calculations	I tend to repeat all my steps and check my work carefully I find checking my work tiresome and have to force myself to do it	2
42	Als ik lange berekeningen maak	heb ik de neiging om al mijn stappen te herhalen en mijn werk zorgvuldig te controleren vind ik het controleren van mijn werk vervelend en moet mezelf ertoe dwingen	2
43	I tend to picture places I have been	easily and fairly accurately with difficulty and without much detail	3
43	De plaatsen waar ik ben geweest kan ik mij	gemakkelijk en redelijk nauwkeurig voorstellen met moeite en zonder veel detail voorstellen	3
44	When solving problems in a group, I would be more likely to	think of the steps in the solution process think of possible consequences or application of the solution in a wide range of areas	4

44	Als we in een groep een probleem op moeten lossen, denk ik eerder aan	de stappen in het oplossingsproces de mogelijke gevolgen of toepassing van de oplossing op andere gebieden	4

Note. *Dimension: 1 = processing (active/reflective), 2 = perception (sensing/intuitive), 3 = reception (visual/verbal), 4 = understanding (sequential/global).