The Influence of Autonomy on the relation between Perceived Competence and Self-directed Learning in Firefighters

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Abstract

This study aimed to investigate whether autonomy is a moderator in the relationship between perceived competence and self-directed learning (SDL) in firefighters when they choose additional training. Research suggested that a high degree of competence and autonomy are essential for SDL, which is a key factor influencing the ability of lifelong learning (LLL). Implementing LLL is part of the long-term plan of the fire brigade. In this study, 64 firefighters from Amsterdam-Amstelland were randomly assigned to one of three conditions either a group with one choice, a group with three choices, or a group with seven options of choice. A between-subjects design was executed to compare the degree of self-directed learning between participants of the different groups. The questionnaires that were used for this study, were from previous studies and consisted of seven items on self-directed learning, nine items on perceived competence, and seven items on autonomy. ANOVA analyses were executed. The results indicate there is a significant effect of perceived competence on SDL, no effect of autonomy on self-directed learning, a negative moderating effect of autonomy on the relation between perceived competence and learning self-directed learning, and a questionable relationship between autonomy and perceived autonomy.

Keywords: Self-directed Learning, Competence, Autonomy, Lifelong Learning, Self Determination Theory, Self Regulated Learning, Firefighters, Fire brigade

The Influence of Perceived Competence on the relation between Autonomy and Self-directed

Learning in Firefighters

More and more people equip their homes with green energy sources. In addition, the share of plug-in cars in private ownership has increased from 27 percent at the beginning of 2020 to 36 percent at the beginning of 2021 (Centraal Bureau voor de Statistiek, 2021). These changes also bring new dangers. Hazards for which a sufficient number of first responders in the fire brigade must be trained. However, like many aid organizations, the fire brigade is struggling with a growing staff shortage and preparedness in the service area is therefore becoming increasingly difficult to guarantee. In addition, they have to deal to an increasing extent with these changing circumstances and dangers in their work.

The fire brigade is an organization with a major shortage of practically trained employees. Because the labor market is facing a growing deficit of employees, retaining employees is vital for the existence of the organization (Kyndt, Govaerts, Dochy & Baert, 2011). Nevertheless, organizations are reluctant to invest in training practically skilled workers (Kyndt et al., 2011). One of the measures the fire brigade is taking to compensate for the shortage of personnel is training firefighters so that they can fight an incident with fewer people (Brandweer Amsterdam-Amstelland, personal communication, September 16, 2021). It is therefore important, in addition to the fact that the incidents change, that they continuously develop. The fire brigade is therefore committed to generate a thorough educational vision with development opportunities within the workplace.

Nowadays, in education within the workplace, it often revolves around targeting active and participating professionals. Professionals whose organizations want them to be independently and actively engaged in self-development and to be in control (Hansen, Netteland & Wasson, 2016). Many organizations, therefore, focus on lifelong learning (LLL)

to develop a productive, compliant workforce (Crowther, 2004). Implementing LLL is part of the long-term plan of the fire brigade (Brandweer Amsterdam-Amstelland, personal communication, September 16, 2021).

Theoretical Framework

Lifelong learning

LLL means being competent to learn throughout life, which requires motivation and self-regulation in learning (Thongmak, 2021). Conditions of LLL in the workplace must be met so that employees deliver a higher learning return within a LLL loop. One of the benefits, of organizations that encourage Lifelong Learning experience, is that their employees can better cope with the demands of change (Laal & Salamanti, 2012). Continuous employee development also plays a role in controlling the labor market and increasing participation (Kyndt et al., 2011).

Mbagwu, Chukwuedo and Ogbuanya (2020) describe that in education geared towards personal, professional, and societal development, it is vital that learners are encouraged to become proactive. Likewise, learning takes place in various forms and stages; therefore, the learner is required to diversify the path to learning in order to acquire the necessary information for LLL. A key factor influencing the ability of LLL is whether learners are able to engage in self-directed learning (SDL) (Cheng, Kuo, Lin & Lee-Hsieh, 2010; Mbagwu et al., 2020; Rana, Ardichvili & Polesello, 2016; Thongmak, 2021).

Self-directed learning

SDL is the process where the individual takes the initiative, with or without the assistance of others, to diagnose their learning needs, formulate learning objectives, identify human and material resources for learning, choose and implement appropriate learning strategies and set and evaluate learning outcomes (Cheng et al., 2010; Jossberger, Brand‑Gruwel, Boshuizen & Van de Wiel, 2010; Knowles, 1975). In this process, learners act

autonomously and experience a sense of competence (Schweder & Raufelder, 2021). Tobin (2000) describes that SDL implies that one determines for itself what and how one learns. It is about directing one's learning activities. brocket (2006) mentioned that SDL is about freedom, autonomy, and choice. According to Brockettt (2006), Koivisto (2020) and Morris (2019) Self-directed means that one chooses and subsequently learns from the effects.

Employees who do well in SDL put more energy into tasks and activities without extrinsic stimuli and are, as it were, intrinsically motivated. Intrinsically motivated students are good lifelong learners because they have the desire and passion to learn (Thongmak, 2021). As SDL is an effective method of engaging and educating adult learners (Boyer, Edmondson, Artis & Fleming, 2014), the question arises how best to stimulate SDL. Schweder et al. (2021) name self-determination as the core principle of SDL, which is marked by a high degree of competence and autonomy.

Self Determination Theory

Experiences of the basic psychological needs, part of the Self Determination Theory (SDT), are essential for intrinsic motivation (Brockettt, 2006; Deci et al., 2000; Scott, 2006; Schweder et al., 2021; Thongmak, 2021). Psychological need satisfaction is considered the essential nutrition for the optimal functioning and well-being of individuals (Deci et al., 2000; Van den Broeck, Vansteenkiste, De Witte, Soenens & Lens, 2010). The theory suggests that besides the need for autonomy, people need to feel competent and related to others to become motivated to learn (Deci et al., 2000). The SDT is useful for modeling the effect of organizational factors on employee motivation because employees are more willing to continue using a system when they feel autonomous and competent. Satisfaction of the basic needs significantly stimulates learning (Deci et al., 2000; Thongmak, 2021).

Competence. The need for competence is defined as the inherent desire of individuals to feel effective in interacting with the environment (Deci et al., 2000; Van den Broeck et al.,

2010). Similar constructs come in Bandura's (1989) Self-Efficacy Theory. Specifically, outcome expectations and self-efficacy represent acquired cognitions concerning one's abilities to complete specific future tasks. These aspects are therefore valued positively insofar as they help to achieve desired goals. The need for competence is seen as an innate need. Competency satisfaction refers to a more general, affective experience of effectiveness that comes from mastering a task. Despite the conceptual differences between self-efficacy and the need for competence, they are likely to correlate at an empirical level. Deci et al. (2000) refer to self-efficacy as "perceived competence". Perceived competence involves the belief that you can successfully perform an action or have control over the outcome of something and is seen as essential for the quality of your motivation (Deci et al., 2000).

Autonomy. One of the ways to promote self-directed learning is by giving adult learners control of their learning paths (Koivisto, 2020; Thongmak, 2021). Having a choice gives the feeling of autonomy. Learners feel therefore the need to be responsible for their learning (Deci et al., 2004). The need for autonomy represents the inherent desire of individuals to feel voluntary and experience a sense of choice and psychological freedom when performing an activity (Van den Broeck et al., 2010). It is important to understand and promote autonomy in SDL. This enhances the ability of learners to engage in LLL (Ponton & Carr, 2000). Bandura (1989) mentions that autonomy can be seen as an action that takes place completely independent of the environment. Bandura then argued that it is not possible to talk meaningfully about only the concept of autonomy and states that behavior never takes place completely independent of the environment. He connects autonomy to the concept of self-efficacy, which are beliefs regarding to what extent one is competent to deal with (unforeseen) events.

Experiences of the basic psychological needs of autonomy and competence are essential for intrinsic motivation (Brockett, 2006; Deci et al., 2000; Scott, 2006; Thongmak,

2021). Promoting these needs in self-directed learning will enhance the ability of learners to engage in lifelong learning (Ponton et al., 2000). Therefore, this study aims to investigate the influence of perceived competence on self-directed learning in firefighters when choosing additional training in an online learning environment and the possible influence that autonomy has on this relationship. The research question in this study is: *To what extent does perceived competence affect self-directed learning and is this relationship influenced by autonomy in firefighters?*

The following hypotheses are tested:

Perceived competence and self-directed learning

H1: There is a positive relationship between perceived competence and self-directed learning.

Autonomy and self-directed learning

H1: There is a positive relationship between autonomy and self-directed learning.

Perceived competence, self-directed learning and the influence of autonomy

H1: There is a moderating effect of autonomy on the relation between perceived competence and self-directed learning. This means that the score of self-directed learning changes if autonomy is added as a moderator.

Autonomy and perceived autonomy

H1: There is a positive relation between given autonomy and perceived autonomy. This means that perceived autonomy increases if the degree of autonomy given to the participants increases.

This research focuses on several aspects of self-directed learning, namely evaluating learning outcomes, diagnosing matching learning needs and making choices with a certain degree of autonomy. The perceived competence in this study is the employee's view of their competence, rather than professional competence which is commonly measured by others, such as supervisors or colleagues (Van der Burgt et al., 2019). Deci et al. (2000) refer to self-

efficacy as perceived competence, which is used in this research. In this study, autonomy is the degree to which learners are given freedom of choice, with perceived autonomy as a reliability check when choosing additional training. The choice is made to not include relatedness, also part of the SDT, in this study. In previous research, it is concluded that autonomy and competence are more important than relatedness for work and lifelong learning and also that relatedness is difficult to measure in quantitative studies (Van der Burgt et al., 2019).

The relevance of the study is quadruple. First, it provides the fire brigade with the insight if there is a relationship between perceived competence and SDL in firefighters and if autonomy has a positive influence on this possible relationship. This is important knowledge for organizations because SDL is a key component to establish LLL. Second, despite the extensive literature on learning organizations and advocacy for SDL in the workplace, there is a lack of research to identify links between the two concepts or to conduct specific research to promote SDL in the workplace in line with organizational development in the field of LLL (Boyer et al., 2014; Rana et al., 2016). So, this study contributes to the stream of literature that identifies the connections between autonomy, competence, and SDL. Third, it provides an instrument combined with several validated measurement tools for SDL, autonomy and competence specifically developed and tested for firefighters. Fourth, connecting these concepts, this research provides a conceptual framework on which future empirical research could be based.

Method

Research design

This study is an explanatory quantitative survey research where the relationship between three variables is tested. A between-subjects design was executed to compare results on self-directed learning, the dependent variable, for three different groups when choosing additional training. Perceived competence is, in this design, the independent variable. Autonomy, degree dependent per group, is the moderator variable. Perceived autonomy will be a dependent variable to test if the given autonomy per group is matching with the perceived autonomy of participants.

The advantage of using a questionnaire is the possibility to test answers statistically so that statements of general application can be made. It can be delivered in various ways and a much larger target population can be reached than would be possible when using other methods like interviews (Jones, Murphy, Edwards & James, 2008). The disadvantage of this method is the lack of depth and the static nature of the results. Problems can also arise if researchers cannot control the order in which questions are answered and cannot check incomplete questionnaires (Jones et al., 2008). An attempt has been made to overcome these shortcomings through the careful formulation of the questionnaire and a thorough literature study as the basis of the items. Before the experiment was performed it was submitted to and approved by the Ethical Review Board of the Faculty of Social & Behavioral Sciences (FERB).
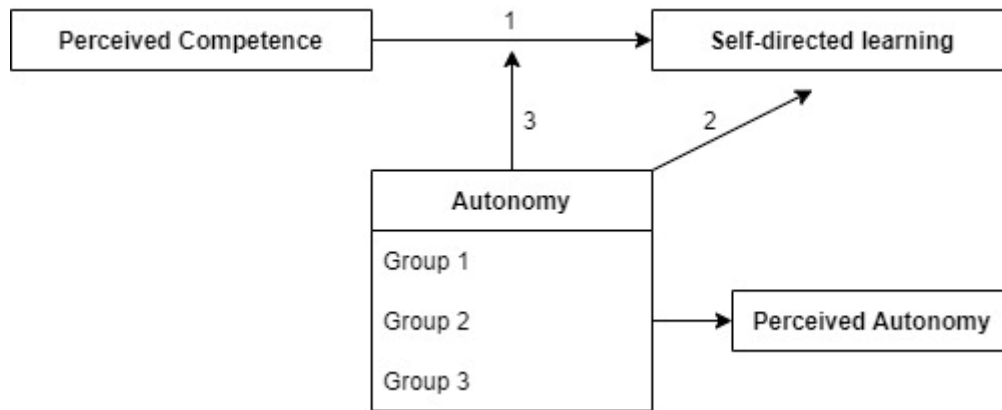
Figure 1. Overview of the examined relations between the incorporated variables.

Participants

A total of 394 professional Firefighters from the Security region Amsterdam-Amstelland were invited to participate in this experiment. When the questionnaire was closed, 105 participants responded of which 66 participants completed the whole questionnaire. 64 participants were useful for data analysis (N= 64). Two participants were removed from the analysis. These participants were outliers in the data. It has been carefully examined what can be done with these data points. It turned out that both participants gave the same score on all 23 items, of which one of the two was completely neutral (score 4 on a 7-point scale). The other participant gave a score of 2 on all items. Probably, both participants did not complete the questionnaire correctly. Because this presented a problem for the assumptions of the analysis, they were therefore not included further (Gosh & Vogt, 2012).

The participants who were invited have all taken part in a professional check-up (profcheck) by the Amsterdam-Amstelland Fire Brigade, the test that was used as the basis for this research. It was decided to let only professional firefighters participate in this study. This is chosen because the volunteers have not yet participated in the profcheck and therefore cannot make a choice for additional training.

Participants were asked which functions they perform concerning the fire brigade. The could select three options in Dutch: Manschap (M) (Firefighter), Chauffeur en

voertuigbedienaar (C) (Driver and vehicle operator) and Bevelvoerder (B) (Commander).

Some of the participants selected more than one function.

Table 1a

Functions distribution

Function	N	%
M	20	31.1
M, C	25	39.1
M, C, B	5	7.8
M, B	5	7.8
C	3	4.7
B	6	9.4

Note: The modal perception is M, C. 9 out of 64 participants indicate not

to run as a firefighter (Manschap).

Table 1b

Specialized function distribution

Function	N	%
M	20	31.3
C	28	43.8
B	16	25.0

Note: When selected only on the specializations, most participants have a

driver and vehicle operator support profile.

Table 2

Years of service distribution

Years of service	N	%
0-2	4	6.3
3-5	6	9.4
5-10	9	14.1
10-15	12	18.8
>15	33	51.6

Note: More than half of the participants have more than 15 years of operational experience.

Almost 70% over 10 years. The median is 15.

Years of service

Figure 1.

All participants agreed with the use of their data for this experiment when accepting

the informed consent (Appendix A). The population was divided into three groups. The

participants were randomly assigned to one of three conditions: the first condition in which

the participant is given one choice of additional training that was made by an expert, the

second condition in which there are three choices between which the participant could

choose, and the third condition in which the participant had seven options to choose from.

Instruments

All variables were measured with items from validated questionnaires. The wording

of the items was adapted to the content of this study (appendix B) and was tested on

reliability based on the factor analysis. This item list is adjusted after de factor analysis. The

original item list is also added (appendix C). The participants are Dutch-speaking and

therefore the instruments were also formulated in Dutch (appendix D). Initially, SDL was

measured with twelve statements, perceived competence with five statements, and perceived

autonomy with seven statements.

A principal component analysis (PCA) was run on a 24-question questionnaire, twelve items for SDL, five items for perceived competence, and seven items for perceived autonomy, that measured SDL in 394 firefighters. Several criteria for the factorability of a correlation were used (Neuendorf, 2019). The suitability of PCA was assessed prior to analysis. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.4. First, all items were observed to correlate at least with one other item at least .4, suggesting reasonable factorability. Second, the overall Kaiser-Meyer-Olkin measure of sample adequacy was 0.83, above the generally recommended value of 0.6 (Kaiser, 1974), and Bartlett's test of sphericity was significant ($\chi2$ (253) = 1307.49, p < .001. Given these general indicators, the factor analysis was considered appropriate for all 24 items.

PCA revealed five components that had eigenvalues greater than one and which explained respectively 36.5%, 21.6%, 8.0%, 5.9%, and 4.8% of the total variance. Visual inspection of the scree plot indicated that three components should be retained (Cattell, 1966). As such, three components were retained. The three-component solution explained 66.1% of the total variance. A Varimax orthogonal rotation was employed to aid interpretability. The rotated solution exhibited a 'simple structure' (Thurstone, 1947). The interpretation of the data was consistent with the personality attributes the questionnaire was designed to measure with strong loadings of perceived autonomy items on Component 1, perceived competence items on Component 2, and self-directed learning items on Component 3. Component loadings and communalities of the rotated solution are presented in Table 7.

The items of perceived autonomy correlate highly with each other, namely between .75 and .93. Items 3_10 and 3_11 from SDL mainly correlated with items of perceived competence, between .52 and .58. The factor analysis also showed that some items of SDL loaded mainly on the same component as the items of perceived competence. The

items (3_1, 3_8, 3_10, and 3_11) were then assessed and fit with the description of competence because they focus on 'being able to'. It was decided that in the further analysis these items will be linked to the second component with the items focused on perceived competence. Item 3_9 of SDL correlated virtually with no other item nor strongly enough with any of the components. The item was further reviewed and it turned out to be unclear because there are two questions asked. The item has therefore been removed. By removing this item, the reliability of the instrument remained the same (Laerd Statistics, 2015). The scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.916. When testing the hypotheses, the dependent variable SDL consisted of seven items, the independent variable perceived competence of nine items and perceived autonomy of seven items.

Self-directed learning. After the conducted factor analysis, the dependent variable SDL was measured with a questionnaire containing seven items. Participants were asked to rate each statement on a 7-point Likert scale ($\alpha = .817$) from 1 (strongly disagree) to 7 (strongly agree). The questionnaire consists of four items adopted from Williamson's (2007) self-rating scale of self-directed learning (SRSSDL), two items based on Williamson (2007) and Cheng et al. (2010), and one item based on Fisher and King (2010). Examples of these items are: I feel responsible for my own development; I feel responsible for identifying my areas of deficit; and I am able to pro-actively set and plan my developmental goals.

Perceived competence. Perceived competence was measured by nine statements on a 7-point Likert scale ($\alpha = .866$) which consist of one item based on Williamson (2007) and Cheng et al. (2010), one item based on Cheng et al. (2010) and Fisher and King (2010), one reversed item based on Khiat (2015), four items of the Perceived Competence Scale (PCS) (Williams, Freedman & Deci, 1998; Williams & Deci, 1996) and one item based on the Basic Psychological Need Satisfaction at Work Scale (Deci et al., 2000; Deci et al., 2001; Ilardi et

al., 1993; Kasser et al., 1992). Examples of these items are: I can evaluate my own performance; I am able to achieve my goals in this course; and I feel I am very capable of making a choice for additional training.

Perceived autonomy. The questionnaire on perceived autonomy was used as a manipulation check to see if the degree of autonomy given to participants in the group matched the degree of autonomy they experienced. Perceived autonomy was measured by seven statements on a 7- point Likert scale ($\alpha = .973$) which consist of one item based on the Learning Climate Questionnaire (LCQ) (Black & Deci, 2000; Williams, Saizow, Ross & Deci, 1997; Williams & Deci, 1996; Williams, Wiener, Markakis, Reeve & Deci, 1994), three items based on Houlfort, Koestner, Joussemet, Nantel-Vivier, and Lekes (2002) and two items based on the Basic Psychological Need Satisfaction at Work Scale (Deci & Ryan, 2000); Deci et al., 2001; Ilardi, Leone, Kasser & Ryan, 1993; Kasser, Davey & Ryan, 1992). One item statement is abstracted from the description of Deci and Ryan (2000) that autonomy is about making choices without being pushed in a particular direction, leading to: "I could make a choice for additional training without feeling pushed in a particular direction". Examples of these items are: I felt I had control to decide; I believe I had a choice; and there was enough opportunity for me to decide.

Procedure

Following the professional check, the participants were asked to indicate which additional training would suit their development points. Participants were randomly assigned to one of three conditions by the program Qualtrics. All conditions receive similar instructions at the start of the experiment and participants were asked if they agree with the informed consent. Then participants were given a case study based on the professional checkup (profcheck) they performed in 2021. In this case study, they were presented with a scoring form of one of the components of the profcheck. In this scoring form was stated that

the participant did not perform sufficiently on this specific component. The participants were

asked to select a follow-up training for this component. Participants in the first group could

select only one option, which was chosen by an expert. Participants in the second group had

three options of choice, including the one option participants in group one had. Participants in

group three had seven options, including the expert choice, to choose from. The case study is

added in appendix D.

After the case, all participants moved to the same questionnaire.

consisting of seven items about the dependent variable SDL, nine items about the degree of

competence they experience and seven items, as a reliability check, about perceived

autonomy. Afterward, the participants were thanked for their time and effort and given a

short debriefing.

Data analysis

Statistical analyses were conducted using SPSS software (version 28). Before testing

the hypotheses, a factor analysis was conducted. When conducting the moderator analysis,

first the assumptions that apply for one-way ANOVA analysis were tested (Laerd Statistics,

2017). In order to answer the research question, one-way ANOVA analyses were performed

with SDL being the dependent variable, perceived competence as the independent variable,

and the group variable (autonomy) as de moderator with a significance level of 0.05. Also,

perceived autonomy and the group variable (autonomy) were analyzed using a one-way

ANOVA. The p-value, as well as the confidence interval, were used to assess this effect.

Finally, the computed power was calculated using G*Power 3.1.9.7 (Faul, Erdfelder,

Buchner, & Lang, 2009).

Results

Assumptions

A one-way ANOVA was conducted to determine if perceived competence has a positive influence on SDL and if the SDL score was different for groups with different autonomy levels. Participants were classified into three groups: group 1 ($n = 22$) with one option of choice, group 2 ($n = 20$) with three options of choice, and group 3 ($n = 22$) with seven options of choice. There were two outliers in the data, as assessed by inspection of a boxplot. Also, data was not normally distributed in group 1 ($p = .037$). After assessing the origin of the outliers, they were removed. After removal, the data was normally distributed for each group (group 1 is $p = .499$, group 2 is $p = .531$, group 3 is $p = .741$) as assessed by Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p = .344$).

Perceived competence and self-directed learning

The alternative hypothesis is as follows: there is a positive relationship between perceived competence and self-directed learning. This analysis shows that perceived competence has a significant positive influence on self-direct learning, $F(1, 63) = 17.593$, $p < .001$. Therefore, the null hypothesis can be rejected and the alternative hypothesis can be accepted.

Autonomy and self-directed learning

The proposed alternative hypothesis is: there is a positive relationship between autonomy and self-directed learning. Self-directed learning score increased from group 2 ($M = 2.4$, $SD = .65$), to group 1 ($M = 2.5$, $SD = .66$), to group 3 ($M = 2.7$, $SD = .92$) in that order, but the differences between these groups were not statistically significant, $F(2, 61) = 1.569$, $p = .217$. This means there is no significant effect of autonomy on the dependent variable SDL. Therefore, the null hypothesis cannot be rejected.

Perceived competence, self-directed learning, and the influence of autonomy

For the moderation, the alternative hypothesis is: There is a moderating effect of autonomy on the relation between perceived competence and self-directed learning. This means that the score of self-directed learning changes if autonomy is added as a moderator.

The ANOVA analysis does indicate that autonomy has a significant influence on the relationship between perceived competence and SDL, $F(2, 61) = 3.978$, $p < .024$. The relationship between perceived competence and SDL does change. The null hypothesis can be rejected and the alternative hypothesis can be accepted. However, the significance is lower than the significance level of perceived competence and SDL. The moderating effect of autonomy is therefore in a negative way.

The sample size of this investigation accounted for a power of .19, with a small effect size of .16 (Cohen, 1988) according to a posthoc power analysis using the tool G*Power (Faul et al., 2009). As a result, the sample size has a bearing on the statistical power of this study, which is lower than .80.

Autonomy and perceived autonomy

The alternative hypothesis that was tested was: that there is a positive relation between given autonomy and perceived autonomy. This means that perceived autonomy increases if the degree of autonomy given to the participants increases. A one-way ANOVA was conducted to determine if the perceived autonomy was different for the three conditions. This served as a manipulation check. The perceived autonomy score was statistically significantly different between the three groups, $F(2, 61) = 7.711$, $p < .001$. However, further analysis revealed that this was not true for all groups. The perceived autonomy score decreased from group 1 ($M = 4.69$, $SD = 1.96$), to group 2 ($M = 3.25$, $SD = 1.14$), to group 3 ($M = 3.01$, $SD = 1.31$). Tukey post hoc analysis revealed that the mean of perceived autonomy decreases from group 1 to group 2 (-1.43, 95% CI [0.31, 2.57]) and this is

statistically significant (p = .009), as well as the decrease of the perceived autonomy from

group 1 to group 3 (-1.68, 95% CI [0.57, 2.78], p = .002), but the difference between group 2

and group 3 was not statistically significant (0.24, 95% CI [-0.89, 1.37], p = .870), . This

finding is different from the alternative hypothesis formulated in which group 1 would

experience the least autonomy. It is striking in this analysis that group 1 differs from groups 2

and 3. In group 1 there appears to be a significant relationship between autonomy and

experienced autonomy. This is not the case for the other groups. Therefore, the alternative

hypothesis cannot be assumed to be true.

The sample size of this investigation accounted for a power of .94, with a large effect

size of .45 (Cohen, 1988) according to a posthoc power analysis using the tool G*Power

(Faul et al., 2009). As a result, the sample size has no bearing on the statistical power of this

study, which is greater than .80.

Discussion

This study examined the possible moderating effect of autonomy on the relation between perceived competence and self-directed learning in firefighters using explanatory quantitative survey research. Research suggested that a high degree of competence and autonomy are essential for SDL (Schweder et al., 2021). SDL is an effective method of engaging and educating adult learners (Boyer et al., 2014) and a key factor influencing the ability of LLL (Cheng et al., 2010; Mbagwu et al., 2020; Rana et al., 2016; Thongmak, 2021). Implementing LLL is part of the long-term plan of the fire brigade. Continuously development of firefighters is essential for the existence of the organization to cope with the shortage of personnel, in addition to the fact that the incidents change.

It was expected that perceived competence would have a positive influence on SDL (Deci et al., 2000). The second alternative hypothesis was that autonomy would have a positive influence on SDL (Koivisto, 2020; Ponton et al., 2000; Thongmak, 2021). It was also hypothesized that autonomy would have a moderating effect on the relationship between perceived competence and SDL (Bandura, 1989; Schweder et al., 2021). The last alternative hypothesis formulated was the manipulation check, namely: there is a positive relation between given autonomy and perceived autonomy.

Perceived competence and self-directed learning

The results indicate that there was a significant relationship between perceived competence and SDL. A possible explanation for the observed positive relationship between perceived competence and SDL is already discussed in the theoretical framework. Schweder et al. (2021) name a high degree of competence as a core principle of SDL. Perceived competence is seen as essential for the quality of your motivation (Deci et al., 2000). Intrinsically motivated students are good lifelong learners because they have the desire and passion to learn (Thongmak, 2021).

Efficient employee learning leads to higher levels of competence and proficiency (Boyer et al., 2014). Employees who report being more prepared to implement SDL also report greater levels of job satisfaction and productivity (Bromfield-Day, 2000). The link between intention to utilize SDL and performance is dependent on SDL usage behavior (Boyer et al., 2014). This stands to reason because solely being ready or wanting to use SDL should not enhance performance in itself. Attitudes and beliefs (encouragement, perceived competence, locus of control, and motivation) lead to behavioral intentions (— in other words, willingness or preparedness to use SDL), behavioral intentions lead to behaviors (SDL usage), and behaviors lead to outcomes (Boyer et al., 2014).

Autonomy and self-directed learning

No significant direct effect of autonomy on SDL was found. A possible explanation for the lack of an effect between autonomy and SDL could be that self-direction provides opportunities, but it does not guarantee every learner will become autonomous (Yasmin, Naseem & Masso, 2019). Yasmin and Sohail (2018) argue that autonomy in learners requires them to become individuals who can hold an independent opinion. The fire brigade still gives learners little room to be autonomous in their learning process. People are used to a teacher-dominated learning environment and have little experience with autonomy (Yasmin et al., 2018). It is proposed that learners be prepared and motivated to become autonomous learners. This suggests that one should be taught autonomy skills and participate in autonomous learning (Ozer & Yukselir, 2021). Cotterall (1995) asserted that learner beliefs are critical in planning for autonomy because learners' beliefs and attitudes have a significant impact on their learning behavior.

Another possible explanation, according to previous research, is that autonomy stimulates learning when learners work together with their peers and instructors (Garrison & Archer, 2000; Little, 2001). So, individual or independent learning does not

imply that learning occurs without the involvement of supervisors or educators (Ozer et al., 2021). Learners must be sufficiently encouraged to develop an awareness of SDL skills and take responsibility for their learning (Ozer et al., 2021). This would mean that autonomy could be connected to relatedness, which is another basic component of the Self Determination Theory (Deci et al., 2000; Thongmak, 2021). Learning takes place in a social learning environment, in which students and educators interact with each other (Jossberger et al., 2010). In this study, it was chosen not to include relatedness, because in the theoretical framework it is concluded that autonomy and competence are more important than relatedness for work and lifelong learning and also that relatedness is difficult to measure in quantitative studies (Van der Burgt et al., 2019).

Perceived competence, self-directed learning, and the influence of autonomy

The indication that autonomy influences the relation between perceived competence and SDL was significant. However, the significance was lower than the significance level of perceived competence and SDL. The moderating effect of autonomy was thus negative. The significant moderation of autonomy on perceived competence and SDL may be explained by Guay, Boggianom & Vallerand (2001) suggesting that having autonomous supportive educators would lead to intrinsic motivation, which in turn contributes to the formation of perceptions of competence in learners. Learners should also be encouraged towards becoming self-directed by educators. Educators should also guide them in becoming competent in the area. The interaction between learners, educators, and the environment is important for this (Jossberger et al., 2010). Autonomy and competence are essential for intrinsic motivation (Brockett, 2006; Deci et al., 2000; Scott, 2006; Thongmak, 2021). From previous research, it is suggested that motivation provides changes in perceived competence (Guay et al., 2001). A learner's self-efficacy responds positively to experiences that confirm the student's ability to

work autonomously (Henri, Morrell & Scott, 2018). Bandura (1988) connects autonomy to the concept of self-efficacy.

The fact that the moderation is negative because autonomy makes the relation between perceived competence and SDL less significant, may be due to the difference in given and perceived autonomy participants had during this experiment. It could also be because autonomy and self-directed learning have no direct relationship with each other in this study with the explanation for the above hypothesis, that is, that autonomy stimulates learning when learners work together with their peers and instructors (Garrison et al., 2000; Little, 2001).

Another explanation is that extensive study into the relationship between perceived autonomy and performance has produced some surprising outcomes. While most research indicates a positive association between perceived autonomy and performance (Strain, 1999; Yammarino & Dubinsky, 1990), others have found inverse and nonsignificant relationships. These surprising findings could imply the presence of moderating variables impacting the relationship, such as the demand for autonomy (Strain, 1999).

Autonomy and perceived autonomy

The relationship between autonomy and perceived autonomy was not significant in all groups and therefore the alternative hypothesis of this manipulation check cannot be accepted as true. The difference between perceived and given autonomy may be explained by the role of traits (personality) and strategies (autonomy-supportive teaching). This should be investigated as part of the process of comprehending learning autonomy. It is suggested that allowing students to act autonomously and develop self-confidence is critical to assisting them in developing the independence required to succeed in the workplace (Henri et al., 2018).

According to empirical research, students with autonomy-supportive educators not only have more perceived autonomy than students with controlling educators, but they also perform better in terms of student participation, emotional expression, creative thinking, intrinsic motivation, emotional well-being, reasoning skills, academic achievement, and dedication in class (Black & Deci, 2000; Reeve & Jang, 2006).

Schwartz (2014) emphasizes that the more options and choices one has, the less satisfied one will be his decisions. Participants in some studies were given an unlimited choice. This is referred to as autonomous choice in this context (Moller, Deci & Ryan, 2006). Participants in the other studies, on the other hand, were subconsciously compelled to choose one of the possibilities. That is referred to as controlled choice because people may feel compelled to choose that option. People's decisions, like the regulation of behavior, could be controlled by introjects or external contingencies. One could argue that in such a situation, people make behavioral choices or decisions, but they do not have a genuine sense of autonomy or choice (Moller et al., 2006)

Limitations

This research has several limitations. First of all, the decision to sample professional firefighters from one institute may affect the results found. Faculty that agreed to respond to the survey may represent a biased sample (Lingard, 2015). Future research could investigate the relevance of the design outside this safety region by inviting volunteer firefighters or employees from other safety regions.

Secondly, this study used a case study that is the same for all participants. The assessment form that they were shown was therefore not their real assessment. This was chosen because the design would then not be able to achieve anonymity. Rating forms were not shared publicly. In addition, the available time for this research was not sufficient to set up a thorough design so that it can be measured as customization. It is recommended that

further research focuses on these personal assessments so that participants experience actual ownership of the case.

Thirdly, although the ANOVA analysis gave a significant result on the moderation, the analysis had low power. Sufficient power is crucial to ensure that important significant effects are not overlooked and is also vital because power can play a role in the failure to reproduce findings and even increase the likelihood of a false positive discovery (Fraley & Vazire, 2014). Future research could use a larger sample size to increase the power.

Lastly, the degree of autonomy did not correspond with the perceived autonomy participants experienced. In addition, in only one group there was a significant relationship found between autonomy and perceived autonomy. As a result, the alternative proposed hypothesis for the manipulation check must be strongly questioned, despite the significant result. This could be because focusing on only two of the three basic psychological needs of the SDT, as the theoretical underpinning of the research, does not draw sufficient attention to the relationship between participants and teaching staff. Further research can focus on the possible causes of this difference and investigate what role relatedness might play in this case. The amount of need that participants have in terms of autonomy can also be studied.

Practical implications

In a broader sense, this study investigated how to best promote SDL in firefighters so that LLL can be implemented in the fire brigade. The participants' perceived competence and autonomy were assessed. It appears that perceived competence influences SDL, so educators should make sure that their students have a sufficient level of competence to use SDL.

This study also found that giving firefighters more options does not automatically result in a greater sense of autonomy, nor does it improve self-directed learning. As a result, teachers are not required to provide unlimited options in their education. In this case, people have more autonomy with an established option from which they must choose than with the

freedom to choose between different options. Teachers could explore the needs of firefighters in terms of autonomy.

Conclusion

This research has yielded preliminary promising insights into the potential of deploying SDL in the fire brigade, focusing on two basic SDT needs. First, this study found that firefighters' SDL scores are related to their level of perceived competency, and that autonomy has a moderating effect on this relationship. When measuring SDL, possible explanations for these findings were found in the third basic need relatedness, choice paradox, and attitudes, beliefs, and behavior. Although autonomy was found to be a moderator of the relationship between perceived competence and SDL, its impact on SDL remains unclear. This uncertainty has theoretical implications. As SDL becomes more widely implemented, this study enables fire brigade educators to consider both perceived competence and autonomy in fostering SDL and LLL. This was one of the first studies to look into SDL in the fire brigade. The remaining ambiguity highlights the need for additional research.

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Appendix

Appendix A - Informed consent in Dutch

Titel onderzoek: De invloed van ervaren competentie en autonomie op zelfgestuurd leren.

Onderzoeker: Manou Kooreman - Adviseur Bijscholing, Innovatie & Ontwikkeling (afdeling vakbekwaamheid) & masterstudent Onderwijswetenschappen.

Beste collega,

In deze brief wil ik je vragen of je bereid bent deel te nemen aan mijn wetenschappelijk onderzoek. Het onderzoek vindt volledig online plaats. Dit onderzoek is getoetst en goedgekeurd door de Facultaire Ethische Toetsingscommissie (FETC) van de Faculteit Sociale Wetenschappen van de Universiteit Utrecht en voldoet aan de ethische richtlijnen. Meedoen is vrijwillig en je kunt te allen tijde stoppen zonder dat je hiervoor een reden hoeft op te geven. Voordat je beslist of je wilt meedoen aan dit onderzoek, wil ik je hieronder informeren over wat het onderzoek precies inhoudt en welke vragen je kunt verwachten. Lees deze informatie rustig door en neem gerust contact op via het e-mailadres onderaan dit scherm als je vragen hebt.

Opzet/uitvoering van het onderzoek

De vragenlijst start met twee algemene vragen. Je krijgt daarna een casus gebaseerd op een resultaat van de profcheck en een vragenlijst voorgelegd. Als eerste klik je, op basis van de casus, op een bijscholing. Het verschilt per deelnemer hoeveel keuzes je krijgt om uit te kiezen. Daarna krijg je in totaal 24 stellingen die je beoordeelt op een schaal van 1 t/m 7. Het invullen hiervan duurt 10-15 minuten.

Achtergrond onderzoek

Doel: Onderzoeken in hoeverre jouw beeld over je vaardigheden en kennis (ervaren competentie) en de hoeveelheid vrijheid die je krijgt om te kiezen (autonomie) invloed hebben op de hoeveelheid leiding die je neemt in het leerproces.

Wat wordt van jou als participant verwacht?

Als je deel hebt genomen aan de profcheck in 2021, wil ik je vragen om eenmalig deze vragenlijst in te vullen.

Vertrouwelijkheid verwerking gegevens

Voor dit onderzoek maak ik gebruik van het software programma Qualtrics. Dit programma verzamelt de data op anonieme basis en er worden geen ip-adressen

verzameld. Verder worden in de vragenlijst geen direct identificerende gegevens uitgevraagd. Omdat het onderzoek anoniem wordt uitgevoerd betekent dit ook dat je jouw gegevens niet kunt laten verwijderen. Wel kun je uiteraard te allen tijde stoppen met de vragenlijst.

De ruwe data (onderzoeksgegevens) zullen voor minimaal 10 jaar bewaard worden. Dit is volgens de daartoe bestemde richtlijnen van de VSNU.

Geanonimiseerde data van dit onderzoek zullen op termijn opgenomen worden in een open access database. Dit betekent dat ook andere onderzoekers deze data kunnen opvragen voor hun eigen onderzoek.

Vrijwilligheid deelname

Deelname aan dit onderzoek is vrijwillig. Je kunt op elk gewenst moment, zonder opgave van reden en zonder voor jou nadelige gevolgen, stoppen met het onderzoek. Als u na het lezen van deze informatie besluit tot deelname ga je akkoord door middel van het aanvinken van het vakje 'akkoord'. Daarna word je automatisch naar de online omgeving voor het invullen van de vragenlijst of het uitvoeren van het experiment geleid.

Voor vragen kun je terecht bij:

m.kooreman@students.uu.nl of m.kooreman@brandweeraa.nl

Hierbij verklaar ik de informatie met betrekking tot bovenstaand onderzoek gelezen te hebben. Ook kon ik vragen stellen. Mijn vragen zijn goed genoeg beantwoord. Ik had genoeg tijd om te beslissen of ik meedoe.

Ik stem in met:

- Deelname aan het onderzoek.

- Het publiceren of beschikbaar stellen van de voor het onderzoek verzamelde onderzoeksgegevens, onder de voorwaarde dat mijn naam of andere identificerende informatie niet wordt gebruikt.

- Het delen van de onderzoeksgegevens met andere onderzoekers en/of externe organisaties die het doel hebben onderzoek te doen met deze gegevens, zonder enige persoonlijke informatie die mij zou kunnen identificeren (niet aan mij gekoppeld).

- Het gebruik van mijn gegevens voor vervolgonderzoek onder de voorwaarde dat dit vervolgonderzoek qua opzet en doeleinde in lijn ligt met dit onderzoek.

Ik weet dat meedoen vrijwillig is. Ook weet ik dat ik op ieder moment kan beslissen om toch niet mee te doen met het onderzoek en kan stoppen. Ik hoef dan niet te zeggen waarom ik wil stoppen.

Appendix B - Adjusted item list

Table 3a

Self-directed learning tool

Directions: Please read each statement and circle the number that best describes your thoughts and feelings about your own learning. There is no right or wrong answer. 7 = Strongly agree 6 = Agree 5 = Somewhat agree, 4 = Neutral, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree.

Item										Literature
1	I feel responsible for my own development.	7	6	5	4	3	2	1	Williamson (2007)
2	I feel responsible for identifying my areas of deficit.	7	6	5	4	3	2	1	Williamson (2007)
3	I am able to pro-actively set and plan my developmental goals.	7	6	5	4	3	2	1	Cheng et al. (2010); Williamson (2007)
4	I am able to decide the best strategy to reach my developmental goal.	7	6	5	4	3	2	1	Cheng et al. (2010); Williamson (2007)
5	I am able to identify my areas of strength and weakness.	7	6	5	4	3	2	1	Williamson (2007)
6	I am able to identify the areas for further development in whatever I have accomplished.	7	6	5	4	3	2	1	Williamson (2007)
7	I am aware of my own limitations.	7	6	5	4	3	2	1	Fisher & King (2010)

Table 4a

Perceived Competence tool

  Directions: Please read each statement and circle the number that best describes your thoughts and feelings about your own learning. There is no right or wrong answer. 7 = Strongly agree 6 = Agree 5 = Somewhat agree, 4 = Neutral, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree.

Item										Literature
1	Based on the result of the case, I can identify my developmental needs.	7	6	5	4	3	2	1	Cheng et al. (2010); Williamson (2007)
2	I can evaluate my own performance.	7	6	5	4	3	2	1	Cheng et al. (2010); Fisher & King (2010)
3	Based on the case, I know why I chose this additional training I have enrolled in.	7	6	5	4	3	2	1	Khiat (2015) *Reversed item*
4	I learn from my mistakes.	7	6	5	4	3	2	1	Fisher & King (2010)
5	I feel able to meet the challenge of performing well in this training.	7	6	5	4	3	2	1	Williams et al. (1998); Williams et al. (1996).
6	I am able to achieve my goals in this course.	7	6	5	4	3	2	1	Williams et al. (1998); Williams et al. (1996).
7	I feel confident in my ability to learn this material.	7	6	5	4	3	2	1	Williams et al. (1998); Williams et al. (1996).

Item									Literature
8	I am capable of learning the material in this course.	7	6	5	4	3	2	1	Williams et al. (1998); Williams et al. (1996).
9	I feel I am very capable of making a choice for additional training.	7	6	5	4	3	2	1	Deci et al. (2000); Deci et al. (2001); Ilardi et al. (1993); Kasser et al. (1992)

Table 5a

Perceived Autonomy tool

    Directions: Please read each statement and circle the number that best describes your

thoughts and feelings about your own learning. There is no right or wrong answer. 7 =

Strongly agree 6 = Agree 5 = Somewhat agree, 4 = Neutral, 3 = Somewhat disagree, 2 =

Disagree, 1 = Strongly disagree.

Item										Literature
1	I feel that I was provided with sufficient options to choose from.	7	6	5	4	3	2	1	Black et al. (2000); Williams, et al. (1997); Williams et al. (1996); Williams et al. (1994)
2	I could make a choice for additional training without feeling pushed in a particular direction.	7	6	5	4	3	2	1	Deci et al. (2000)
3	I felt I had control to decide.	7	6	5	4	3	2	1	Houlfort et al. (2002)
4	I believe I had a choice.	7	6	5	4	3	2	1	Houlfort et al. (2002)
5	I felt a sense of personal freedom.	7	6	5	4	3	2	1	Houlfort et al. (2002)
6	I felt I could provide a lot of input in deciding which training to choose.	7	6	5	4	3	2	1	Deci et al. (2000); Deci et al. (2001); Ilardi et al. (1993); Kasser et al. (1992)
7	There was enough opportunity for me to decide.	7	6	5	4	3	2	1	Deci et al. (2000); Deci et al. (2001); Ilardi et al. (1993); Kasser et al. (1992)

Appendix C - Original item list

Table 3b

Self-directed learning tool

   Directions: Please read each statement and circle the number that best describes your thoughts and feelings about your own learning. There is no right or wrong answer. 7 = Strongly agree 6 = Agree 5 = Somewhat agree, 4 = Neutral, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree.

Item										Literature
1	Based on the result of the case, I can identify my developmental needs.	7	6	5	4	3	2	1		Cheng et al. (2010); Williamson (2007)
2	I feel responsible for my own development.	7	6	5	4	3	2	1		Williamson (2007)
3	I feel responsible for identifying my areas of deficit.	7	6	5	4	3	2	1		Williamson (2007)
4	I am able to pro-actively set and plan my developmental goals.	7	6	5	4	3	2	1		Cheng et al. (2010); Williamson (2007)
5	I am able to decide the best strategy to reach my developmental goal.	7	6	5	4	3	2	1		Cheng et al. (2010); Williamson (2007)
6	I am able to identify my areas of strength and weakness.	7	6	5	4	3	2	1		Williamson (2007)
7	I am able to identify the areas for further development in whatever I have accomplished.	7	6	5	4	3	2	1		Williamson (2007)
8	I can evaluate my own performance.	7	6	5	4	3	2	1		Cheng et al. (2010); Fisher & King (2010)

Item									Literature
9	I can see the benefits for my work and/or personal development from following.	7	6	5	4	3	2	1	Khiat (2015)
10	Based on the case, I know why I chose this additional training I have enrolled in.	7	6	5	4	3	2	1	Khiat (2015) *Reversed item*
11	I learn from my mistakes.	7	6	5	4	3	2	1	Fisher & King (2010)
12	I am aware of my own limitations.	7	6	5	4	3	2	1	Fisher & King (2010)

Table 4b

Perceived competence tool

Directions: Please read each statement and circle the number that best describes your thoughts and feelings about your own learning. There is no right or wrong answer. 7 = Strongly agree 6 = Agree 5 = Somewhat agree, 4 = Neutral, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree.

Item										Literature
1	I feel able to meet the challenge of performing well in this training.	7	6	5	4	3	2	1		Williams et al. (1998); Williams et al. (1996).
2	I am able to achieve my goals in this course.	7	6	5	4	3	2	1		Williams et al. (1998); Williams et al. (1996).
3	I feel confident in my ability to learn this material.	7	6	5	4	3	2	1		Williams et al. (1998); Williams et al. (1996).
4	I am capable of learning the material in this course.	7	6	5	4	3	2	1		Williams et al. (1998); Williams et al. (1996).
5	I feel I am very capable of making a choice for additional training.	7	6	5	4	3	2	1		Deci et al. (2000); Deci et al. (2001); Ilardi et al. (1993); Kasser et al. (1992)

Table 5b

Perceived autonomy tool

Directions: Please read each statement and circle the number that best describes your thoughts and feelings about your own learning. There is no right or wrong answer. 7 = Strongly agree 6 = Agree 5 = Somewhat agree, 4 = Neutral, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree.

Item										Literature
1	I feel that I was provided with sufficient options to choose from.	7	6	5	4	3	2	1		Black et al. (2000); Williams, et al. (1997); Williams et al. (1996); Williams et al. (1994)
2	I could make a choice for additional training without feeling pushed in a particular direction.	7	6	5	4	3	2	1		Deci et al. (2000)
3	I felt I had control to decide.	7	6	5	4	3	2	1		Houlfort et al. (2002)
4	I believe I had a choice.	7	6	5	4	3	2	1		Houlfort et al. (2002)
5	I felt a sense of personal freedom.	7	6	5	4	3	2	1		Houlfort et al. (2002)
6	I felt I could provide a lot of input in deciding which training to choose.	7	6	5	4	3	2	1		Deci et al. (2000); Deci et al. (2001); Ilardi et al. (1993); Kasser et al. (1992)
7	There was enough opportunity for me to decide.	7	6	5	4	3	2	1		Deci et al. (2000); Deci et al. (2001); Ilardi et al. (1993); Kasser et al. (1992)

Appendix E – Case study in Dutch

PROFCHECK VAKBEKWAAMHEID 2021 (Brand)
Risicogericht afleggen (RGA)

Table 6a

Case study in Dutch

	Criteria	Voldoende	Aandachtspunt(en)
1.	Bouwt op de juiste wijze de eerste straal met een lengte van 3 bundels op en sluit deze aan op een Y stuk		**X -** Je hebt de slangen niet op de juiste wijze van binnen naar buiten gekoppeld, maar de twee buitenste gekoppeld.
2.	Voert op de juiste wijze een Transitional Attack uit		**X -** De straalpijp was niet geheel open (voorbij de lepel).
3.	Pakt de lage druk straal op de juiste wijze in	**X**	
4.	Benoemt de 5 getoonde materialen bij hun naam	**X**	
5.	Geeft op de getoonde foto`s aan welk aflegsysteem hierop van toepassing is	**X**	

Cesuur: Van de 5 criteria moeten er 4 met een voldoende behaald zijn (80%).

Group 1:

Hierboven zie je een ingevuld beoordelingsformulier. Stel je even voor dat dit jouw formulier

is op het onderdeel Risicogericht Afleggen (RGA). Op basis van deze beoordeling heb je dit

onderdeel niet gehaald, daarom ga je een bijscholing volgen. Hieronder is een optie voor je

geselecteerd passend bij het onderwerp RGA. Klik op de bijscholing die je gaat volgen.

- o Dagdeel oefenen in de praktijk met RGA op het Bocas.

Group 2:

Hierboven zie je een ingevuld beoordelingsformulier. Stel je even voor dat dit jouw formulier

is op het onderdeel Risicogericht Afleggen (RGA). Op basis van deze beoordeling heb je dit

onderdeel niet gehaald, daarom ga je een bijscholing volgen. Hieronder is een optie voor je geselecteerd passend bij het onderwerp RGA. Klik op de bijscholing die je gaat volgen.

- o Dagdeel oefenen in de praktijk met RGA op het Bocas.

- o ELO module volgen van 30 minuten over RGA.

- o Dagdeel theorieles over RGA door een docent op het Bocas.

Group 3:

Hierboven zie je een ingevuld beoordelingsformulier. Stel je even voor dat dit jouw formulier is op het onderdeel Risicogericht Afleggen (RGA). Op basis van deze beoordeling heb je dit onderdeel niet gehaald, daarom ga je een bijscholing volgen. Hieronder is een optie voor je geselecteerd passend bij het onderwerp RGA. Klik op de bijscholing die je gaat volgen.

- o Dagdeel oefenen in de praktijk met RGA op het Bocas.

- o ELO module volgen van 30 minuten over RGA.

- o Dagdeel theorieles over RGA door een docent op het Bocas.

- o Aan de slag met casussen over RGA.

- o Een online quiz over de soorten aflegsystemen.

- o Een VR module volgen over brandbestrijding.

- o Een leerfilm bekijken op de kazerne over RGA.

Appendix F – Case study in English

PROFCHECK PROFESSIONAL COMPETENCE 2021 (Fire)

(RGA)

Table 6b

Case study in English

Criteria	Sufficient	Point(s) of attention
1. Correctly builds up the first beam with a length of 3 bundles and connects it to a Y piece		**X -** You have not properly coupled the hoses from the inside out, but the two outer ones have been linked.
2. Performs a Transitional Attack correctly		**X -** The nozzle was not completely open (beyond the spoon).
3. Packs the low pressure jet correctly	**X**	
4. Names the 5 materials shown by their name	**X**	
5. Indicates on the photos shown which storage system applies to this	**X**	

Caesura: Of the 5 criteria, 4 must have been passed (80%).

Group 1:

Above you will see a completed assessment form. Imagine for a moment that this is your

form on (RGA) section. Based on this assessment, you have not passed this component,

which is why you will follow a further training course. Below is an option selected for you

that fits the subject of RGA. Click on the training you are going to follow.

  o   Half day practice in practice with RGA at the regional training center (Bocas).

Group 2:

Above you will see a completed assessment form. Imagine for a moment that this is your

form on the Risk-based Travel (RGA) section. Based on this assessment, you have not passed

this component, which is why you will follow a further training course. Below is an option

selected for you that fits the subject of RGA. Click on the training you are going to follow.

- Half day practice in practice with RGA at the regional training center (Bocas).

- E-learning module follow 30 minutes over RGA.

- Half day theory lesson about RGA by a teacher at the regional training center (Bocas).

Group 3:

Above you will see a completed assessment form. Imagine for a moment that this is your

form on the (RGA) section. Based on this assessment, you have not passed this component,

which is why you will follow a further training course. Below is an option selected for you

that fits the subject of RGA. Click on the training you are going to follow.

- Half day practice in practice with RGA at the regional training center (Bocas).

- E-learning module follow 30 minutes over RGA.

- Half day theory lesson about RGA by a teacher at the regional training center (Bocas).

- Analyze cases about RGA.

- An online quiz about the types of storage systems.

- Follow a VR module on firefighting.

- Watch a learning film at the barracks about RGA.

Tables

Table 1a

Functions distribution

Function	N	%
M	20	31.1
M, C	25	39.1
M, C, B	5	7.8
M, B	5	7.8
C	3	4.7
B	6	9.4

Note: The modal perception is M, C. 9 out of 64 participants indicate not

to run as firefighter (Manschap).

Table 1b

Specialized function distribution

Function	N	%
M	20	31.3
C	28	43.8
B	16	25.0

Note: When selected only on the specializations, most participants have a

driver and vehicle operator support profile.

Table 2

Years of service distribution

Years of service	N	%
0-2	4	6.3
3-5	6	9.4
5-10	9	14.1
10-15	12	18.8
>15	33	51.6

Note: More than half of the participants have more than 15 years of operational experience.

Almost 70% over 10 years. The median is 15.

Table 7

Rotated Component Matrix

Rotated Component Matrix			
	Component		
	1	2	3
SDL1_Vraag3_2	-.067	.252	.593
SDL2_Vraag3_3	.019	.526	.569
SDL3_Vraag3_4	.273	.055	.769
SDL4_Vraag3_5	.152	.030	.860
SDL5_Vraag3_6	.109	.305	.681
SDL6_Vraag3_7	.093	.355	.578
SDL7_Vraag3_12	.067	.375	.529
C1_Vraag3_1	.199	.464	.294
C2_Vraag3_8	.083	.406	.367
C3_Vraag3_10	.249	.671	.271
C4_Vraag3_11	-.089	.616	.358
C5_Vraag4_1	.221	.853	.095
C6_Vraag4_2	.235	.695	.072
C7_Vraag4_3	-.075	.866	.195
C8_Vraag4_4	-.124	.845	.175
C9_Vraag4_5	.092	.721	.229
A1_Vraag5_1	.897	.042	.093
A2_Vraag5_2	.941	.008	.073
A3_Vraag5_3	.929	.147	.073
A4_Vraag5_4	.943	.020	.096