

# The Effect of a Brief Growth Mindset Intervention on Employees' Mindsets and Approach to Challenge

Iris Hodenius (s4555155)

Radboud University

Master's thesis

Behavior Change

dr. Pieterneel Dijkstra

05-07-2019

Word count: 6995

## **Abstract**

The goal of this study was to test a brief mindset intervention that included key components of previously successful interventions and could be disseminated in a work environment. An intervention was designed to enhance employees' growth mindset, approach to challenge, and learning motivation. Effectiveness of the growth mindset intervention was investigated using a total of 105 employees between 20 and 60 years of age who attended a job-related course provided online or in classroom sessions. Employees who were exposed to the growth mindset intervention (experimental condition) were compared to employees who were exposed to a control intervention (control condition). Participants were randomly assigned to either the experimental or the control condition. No significant differences were found between conditions with regards to the degree of growth mindset, approach to challenge, and learning motivation. These results do not support the expected effectiveness of the implemented growth mindset intervention.

*Keywords:* growth mindset intervention, employees, challenge, learning motivation

## **The Effect of a Brief Growth Mindset Intervention on Employees' Mindsets and Approach to Challenge**

Many organizations strive to build a lifelong learning culture in order to motivate their employees to continue to develop the skills needed for good performance (Van Dellen, 2011). Lifelong learning refers to the activities during one's lifetime that improve knowledge, abilities, and competence from a personal, civil, social and/or employment perspective. Organizations try to create a lifelong learning culture through various methods such as offering self-directed learning opportunities, which means the employees themselves can decide what they want to learn, or by offering talent programs in which they can develop within a different job area than their own (Van der Krogt, 1995).

A lifelong learning culture is favorable because it can be helpful in binding employees to the organization, and in securing and improving their potencies (Van Dellen, 2011). Additionally, employees who are constantly developing form a valuable basis for an organization's market position. In the current rapidly changing information era, companies are constantly challenged to keep up with or become more successful than their competitors. By embracing a lifelong learning culture, organizations believe they can develop engaged employees who are more effective and who perform better (AACSB, 2018).

In the current paper it is proposed that employees' mindsets can help with establishing a lifelong learning culture within an organization by enhancing their learning motivation and interest for learning opportunities.

According to Dweck (2006) there are two kinds of mindsets that influence the way individuals interpret and respond to events they experience: a fixed mindset and a growth mindset. A person holding a fixed mindset believes that personal characteristics, such as intelligence, ability, and personality, are largely fixed entities, thus difficult to change or develop. One holding a growth mindset believes that such personal characteristics are relatively malleable, and thus can be changed and developed.

Besides beliefs about malleability of personal characteristics, people with a growth mindset often pursue different goals than people with a fixed mindset. People with a growth mindset are more likely to strive for increasing competence (learning goals), whereas people with a fixed mindset are concerned with gaining favorable judgments of their competence (performance goals; Burnette, O'Boyle, Vanepps, Pollack, & Finkel, 2013; Dweck & Leggett, 1988; Mueller

& Dweck, 1998). People who hold the latter goal orientation compare their performance with others' performance and are afraid to be seen as less intelligent.

Beliefs about malleability of personal characteristics and goal orientations are thought to create a framework for how an individual interprets and responds to learning situations. For example, Dweck and Leggett (1988) found that when an individual views intelligence as a fixed trait, poor performance on an intellectual task is primarily attributed to a lack of intelligence and no future success is expected. This person views effort as a sign of low intelligence. In contrast, an individual that believes intelligence is malleable interprets poor performance as an opportunity to learn. This person believes that putting in more effort and using an improved strategy could result in better performance, which results in more persistence (Blackwell, Trzesniewski, & Dweck, 2007; Vandewalle, 2012).

In addition, individuals with a growth mindset are more likely to take on new challenges. Hong, Chiu, Dweck, Lin, and Wan (1999) found that children with a growth mindset were much more willing to take a remedial English course than children with a fixed mindset. Also, control participants in Yeager et al. (2016) study were less likely to choose a harder exercise than participants in the growth mindset condition. This illustrates that a growth mindset can lead people to engage in rather than avoid useful developmental opportunities.

At last, it was found that individuals with a growth mindset have a different view of and approach to feedback than individuals with a fixed mindset. People with a growth mindset expect constructive feedback whereas people with a fixed mindset expected feedback to be a judgment about their talent (Heslin & Vandewalle, 2005). They also found that people with a growth mindset seek feedback whereas people with a fixed mindset avoid feedback.

Overall, people with a growth mindset are more likely to seize opportunities to learn than people with a fixed mindset. They are more open to change and alert to new learning opportunities, they put in more effort and change strategy in order to improve their abilities, and as a result they perform better (e.g. grades in school; Blackwell et al., 2007; Good, Aronson, & Inzlicht, 2003). Moreover, companies that pursue growth mindset have happier employees and a more innovative, risk-taking culture than companies that pursue fixed mindset (Senn Delaney, n.d.)

Therefore, encouraging a growth mindset in employees seems to be a promising strategy to increase their learning motivation and persistence. Several growth mindset interventions were tested in multiple studies using different platforms. In three one-hour laboratory sessions,

Aronson, Fried and Good (2002) asked undergraduates to reply to a pen pal that had written a letter. In the malleable pen pal condition, participants received a letter containing a growth mindset message (e.g. “you can change your intelligence”) and a brief video clip that discussed how the brain, and hence intelligence, is capable of growing and making new connections throughout life. In the control pen pal condition, the letter and video clip contained a message about intelligence being not one single entity, but consisting of many different abilities. Participants in the malleable pen pal condition held a stronger growth mindset, had more academic enjoyment, and scored higher grades than participants in the control pen pal condition.

Accordingly, Blackwell et al. (2007) enhanced students’ growth mindsets in an eight-session growth mindset workshop by teaching them about brain plasticity. As a result, low-achieving students improved their math grades.

Paunesku et al. (2015) provided information using an article on the brain’s ability to grow as a consequence of effort and effective strategies on challenging tasks. Two writing exercises followed in order to process gathered information more deeply. In the control condition, students read an article on functional localization of the brain, followed up by the same exercises. All in all, completion of this intervention took 45 minutes and it was delivered online. Students in the experimental condition held a stronger growth mindset and performed better in school than students in the control condition. The discusses studies show the potency of providing information about brain plasticity as a way to affect mindsets.

Other studies found that feedback concerning effort and strategy helped to promote a growth mindset, whereas feedback focusing on intelligence and ability promoted a fixed mindset (Mueller & Dweck, 1998; O’Rourke, Haimovitz, Ballweber, Dweck, & Popović, 2014). Mueller and Dweck (1998) first praised fifth grade students either for their ability (“you must be smart to solve these problems”) or their effort (“you must have worked hard to solve these problems”) on achievable tasks. Then they gave students very challenging tasks, on which they performed poorly. Finally, they gave another set of the achievable tasks again. Students who were praised for their ability attributed their failure to lack of ability, and their performance dropped on the subsequent tasks. In contrast, students who were praised for their effort interpreted their failure as a cue to try harder, and performed better on the subsequent tasks. Gunderson et al. (2013) substantiated the importance of praise for mindsets, showing that the type of praise the parents give can predict the child’s mindset and desire for challenge.

In sum, praising effort (rather than ability) and providing information about brain plasticity, followed up by a task that helps to process the gathered information (e.g. saying-is-believing task), are found to be effective ways to bring about a growth mindset. However, most growth mindset studies were conducted with primary school, secondary school, or college students as participants. The present study is set to test if an intervention containing these aspects can be effective in promoting growth mindsets in employees. Additionally, as Bostwick and Becker-Blease (2018) mentioned, there is not always time or money for an extensive intervention, especially within companies. They found that a brief growth mindset intervention, even without a saying-is-believing task, could be effective in stimulating a growth mindset and better performance. Therefore, a brief intervention, aimed at enhancing growth mindset, learning motivation and approach to challenge, will be tested which is applicable to both classroom and online courses. This intervention consists of a strategy to increase employees' knowledge about brain plasticity and to provide feedback focusing on effort. It will be compared with a control intervention that teaches employees about areas of the brain and provides neutral feedback.

Based on results from growth mindset studies (Aronson et al., 2002; Blackwell et al., 2007; Mueller & Dweck, 1998; Paunesku et al., 2015), employees in the experimental condition are expected to have a greater increase in growth mindset than employees in the control condition. Secondly, as Hong et al. (1999) and Yeager et al. (2016) found a relationship between growth mindset and approach to challenge, participants in the experimental condition will probably be more likely to show interest for more in-depth information after exposure to the intervention than participants in the control condition.

## **Study 1: Online onboarding course**

### **Method**

#### **Participants**

Participants were new employees working worldwide for Vanderlande who were employed between the 1<sup>st</sup> of May and the 17<sup>th</sup> of June, 2019. All 163 newly hired employees were approached between the 3<sup>rd</sup> of May and the 19<sup>th</sup> of June, 2019. In the end, 58 of those employees participated (36%). Participants were randomly assigned to experimental condition ( $n = 27$ ) or control condition ( $n = 31$ ). They were on average 35.45 years old ( $SD = 8.84$ ,  $minimum = 20$ ,  $maximum = 58$ ) and their highest level of education varied: 34.5% had earned a bachelor's degree, 25.9% a master's degree, 15.5% a bachelor's degree of applied sciences,

10.3% vocational education, 8.6% an associate's degree, 3.4% a master's degree of applied sciences, and 1.7% secondary education.

New employees were informed about research purposes of the survey, although they were not told exactly what was being investigated, neither about the two conditions or to which condition they or their colleagues were assigned. Permission was asked to use the data collected on age and highest level of education for research purposes. Except for two employees, all provided permission. Names, sex, e-mail addresses, IP-addresses, and locations were not collected to protect anonymity.

## **Procedure**

**Participant recruitment.** New employees were recruited by enrolling them into the onboarding course (Welcome to Vanderlande!) via the Workday Learning environment, and by sending them an e-mail (see Appendix A) containing an invitation to participate and a link to the survey which was made using Microsoft Forms (see Appendix B). The survey contained both the intervention materials and measurement items. The e-mail was sent using the Vanderlande Academy e-mail account in order to radiate authority. Half of the approached employees received an e-mail containing a link to the experimental survey, the other half received an e-mail containing a link to the control survey. After two or three days, a reminder (see Appendix C) was sent from the researcher's personal Vanderlande e-mail account to make the message more personal.

**Experimental design.** Effectiveness of a growth mindset intervention was investigated using a pretest-posttest design in which the experimental condition was compared with a control condition. The intervention in the experimental condition consisted of brain information and feedback that was meant to enhance growth mindset, whereas the control intervention consisted of more neutral brain information and feedback. The survey measuring the effects consisted of two parts: the first part (pretest) contained demographic questions followed up by questions investigating the degree of motivation to learn and growth mindset. The first part concluded with a video clip providing information about the brain and an item indicating its interestingness. After the pretest, participants were asked to click the link to the onboarding course and complete it. They completed the course in approximately one hour. Part 2 of the survey (posttest) was to be completed after completion of the course. The second part contained the same questions investigating degree of motivation to learn and growth mindset, plus additional questions.

## **Intervention**

**Information about the brain.** Growth mindset interventions often teach scientific facts about the malleability of the brain to show how intelligence can be developed (Aronson et al., 2002; Blackwell et al., 2007; Good et al., 2003; Paunesku et al., 2015; Yeager et al., 2016). In the experimental condition, a two-minute educative ‘Neuroplasticity’ (Sentis, 2012) YouTube clip was shown in order to teach participants about or remind them of the malleability of the brain, to show how intelligence can be developed.

The three-minute ‘Areas of the brain’ (Sentis, 2012) YouTube clip was shown to participants in the control condition, which was neutral with regards to malleability of the brain and intelligence. The control video was similar to the experimental video in presentation and format.

**Feedback.** Previous studies found that feedback could influence participants’ mindsets (Mueller & Dweck, 1998; Yeager et al., 2016). It was found that praising effort and strategy stimulated a growth mindset. Praising use of strategy was not appropriate due to course content that could not be learned by using different strategies like with mathematics in Yeager et al. (2016). That is why feedback in the experimental condition was focused on effort ( “You have completed part 1, good effort!” at the end of part 1; “You have worked hard and showed perseverance and your ability to learn. Keep it up!” at the beginning of part 2).

Participants in the control condition were given neutral feedback (“You have completed part 1 of this survey.” at the end of part 1; “Thank you for investing your time!” at the beginning of part 2), inspired by the letter used for Bostwick and Becker-Blease's (2018) study (“Thank you for coming to class”). Control feedback was similar to experimental feedback in length, presentation, and format.

## **Measures**

**Demographic data.** Information about age and the highest level of education (see Table 1) was collected to be able to interpret the results more accurately. These questions were followed up by items asking for permission to use the data for research purposes (“Do you give permission to use the given information about your age/highest level of education for research purposes?”) and an explanation of what the data would be used for (“Age/Highest level of education would be linked to the rest of your data, but would not be traced back to you.”) in order to adhere to the company’s privacy statements.

**Motivation to learn.** Two items measured motivation to learn, including one item indicating the participant's baseline motivation and one item indicating motivation at the moment of answering the survey (current motivation; see Table 1). Higher scores on a 7-point scale (1 = Very unmotivated, 7 = Very motivated) represent greater motivation to learn. Motivation to learn was measured at pretest and posttest.

**Growth mindset.** At both pretest and posttest, four items composed by Dweck (2017) were used to measure the degree of growth mindset on a 7-point scale (1 = Strongly disagree, 7 = Strongly agree; see Table 1). Scoring low on the first two items and scoring high on the last two indicated a growth mindset. A reliability analysis, using mirrored scores for the first two items, showed the scale was highly reliable (*Chronbach's*  $\alpha = .935$ ).

Degree of growth mindset was also indicated by two items in part 2 of the survey provided to participants that reported they answered a question in the course incorrectly. They were asked to recall the moment they answered an assignment wrong and to indicate to what extent they would agree or disagree with the statements on a 7-point scale (1 = Strongly disagree, 7 = Strongly agree; see Table 1). These statements were inspired by Yeager et al. (2016), which used a similar statement to trace a person-focused response to failure indicating a fixed mindset, and a different statement to trace a process-focused response to failure indicating a growth mindset. However, on closer inspection, the first item was not appropriate for an indication of a fixed mindset. Therefore, only scores on the second item were examined.

**Interestingness.** Both interestingness of the video (in part 1) and the course (in part 2) were measured on a 7-point scale (1 = Very uninteresting, 7 = Very interesting; see Table 1) to validate the measure of growth mindset.

**Approach to challenge.** Approach to challenge was measured in part 2 of the survey by asking if the participant was interested in receiving in-depth information on a course related topic (see Table 1; 1 = Yes, 0 = No). This item was inspired by Mueller and Dweck (1998) and Yeager et al. (2016) which both used a hypothetical scenario to measure the approach to challenge. Answering 'Yes' corresponded to the approach to challenge, so this measure should be positively correlated to growth mindset and be induced by the growth mindset intervention. To better grasp what kind of information the participants were interested in, a multiple choice question was added (see Table 1).

Table 1

*Items used for measuring variables in Study 1*

<b>Measure</b>		<b>Item</b>
<b>Demographic data</b>	Age	“What is your age?”
	Level of education	“What is the highest level of education you have completed?”
<b>Motivation to learn</b>	Baseline motivation	“How motivated are you to learn new things in general?”
	Current motivation	“How motivated are you to learn new things at this moment?”
<b>Growth mindset</b>	Current growth mindset	<ol style="list-style-type: none"> <li>1. “Your intelligence is something very basic about you that you can’t change very much.”</li> <li>2. “You can learn new things, but you can’t really change how intelligent you are.”</li> <li>3. “No matter how much intelligence you have, you can always change it quite a bit.”</li> <li>4. “You can always substantially change how intelligent you are.”</li> </ol>
	Growth mindset after setback	<ol style="list-style-type: none"> <li>1. “This means I probably misunderstood information in module 1 of the Welcome to Vanderlande course.”</li> <li>2. “I could answer the question(s) correctly if I would use a different approach.”</li> </ol>
<b>Interestingness</b>	Interestingness of the video	“In your opinion, how interesting was the video?”
	Interestingness of the course	“In your opinion, how interesting was the module of the 'Welcome to Vanderlande' course you just completed?”
<b>Approach to challenge</b>	Interest for more in-depth information	“On the "Reference Sheet" of module 1, you were provided the opportunity to get more in-depth information. Did you click one (or more) of the blocks to get more information?”
	Subjects of interest	“What block(s) did you click?”

## Data-analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 25 (2017). A repeated-measures ANOVA will be conducted to test if participants in the experimental condition had a greater increase in growth mindset than participants in the control condition. In order to do so, two new variables were computed: one indicating the mean of growth mindset item scores at pretest and one indicating the mean of growth mindset item scores at posttest. These data were not normally distributed. If the increase in growth mindset between pretest and posttest in the experimental condition significantly differs from the increase in growth mindset in the control condition, hypothesis 1 would be supported.

To test if there was a significant relationship between condition (experimental/control) and shown interest for more in-depth information (yes/no) a Chi-Square Test was conducted. A significant relationship would support hypothesis 2. In case of a significant result, the odds ratio would give an indication of how many times higher the odds of showing interest for more in depth information were for participants in the experimental condition than for participants in the control condition.

For exploratory purposes, analyses were conducted to examine the relationship between condition, learning motivation, interestingness of the video and course, and approach after confrontation with setbacks.

## Results

### Hypothesis 1

A repeated-measures ANOVA was conducted to compare mean increase in growth mindset between the experimental condition and the control condition. With time of measurement as the within-subjects factor, condition as the between-subjects factor, and mean growth mindset score as the outcome variable, a repeated-measures ANOVA ( $N = 56$ ) showed a non-significant interaction effect ( $F(1, 54) = .01, p = .940, \eta^2 = .00$ ; see Figure 1). In contrast with hypothesis 1, increase in growth mindset score did not differ between participants in the experimental condition and participants in the control condition. Participants in both conditions significantly scored higher on growth mindset at posttest (control:  $M = 5.46, SD = 1.34$ ; experimental:  $M = 5.11, SD = 1.33$ ) than at pretest (control:  $M = 5.17, SD = 1.34$ ; experimental:  $M = 4.83, SD = 1.35$ ) which indicated a significant effect of time of measurement ( $F(1, 54) = 11.43, p = .001, \eta^2 = .17$ ). No significant effect was found for condition ( $F(1, 54) = .98, p = .326, \eta^2 = .02$ ) which means participants in the experimental condition scored similar to participants in the control condition with regards to growth mindset at pretest or posttest.

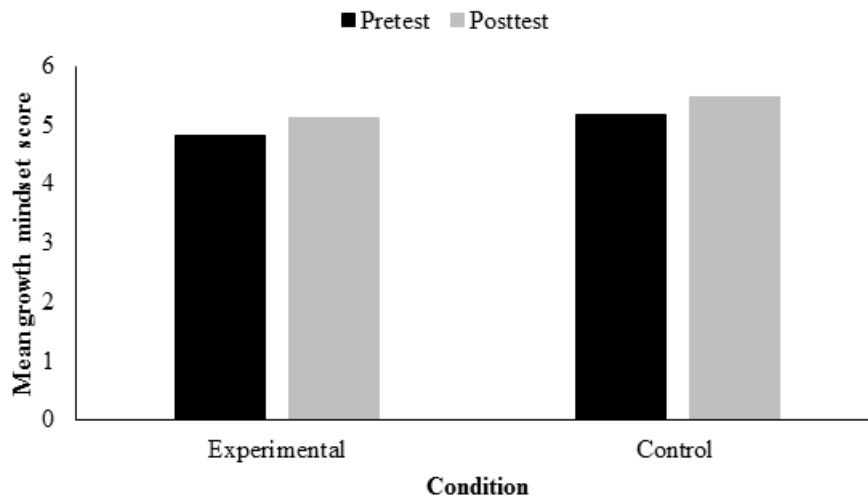


Figure 1. Bar chart presenting mean growth mindset of participants in the experimental and control condition at pretest and posttest

## Hypothesis 2

To test if the number of employees who showed interest for more in-depth information was greater in the experimental condition than in the control condition, a Chi Square Test was performed (see Table 2). The sample size assumption was not met, therefore a Fisher's Exact Test was more appropriate. Condition and likeliness to show interest for in-depth information were not significantly related ( $\chi^2(2,56) = .98$ , Fisher's Exact  $p = .766$ ). Hypothesis 2 was not supported.

Table 2

*Number of participants that showed interest for more in depth information per condition*

	Showed interest for more information ('Yes')	Showed no interest for more information ('No')	No report ('I don't remember')
Experimental condition	13	9	5
Control condition	16	12	3

## Exploratory analyses

Motivation to learn was measured at pretest and posttest. This measure consisted of a baseline item (baseline motivation) and an item concerning motivation at the moment of filling

out the questionnaire (current motivation). Item scores were not normally distributed. A repeated-measures ANOVA ( $N = 58$ ) with time of measurement as the within-subjects factor, condition as the between-subjects factor, and baseline motivation as the outcome variable showed no significant interaction effect ( $F(1,56) = .09, p = .771, \eta^2 = .00$ ) nor a significant effect of time ( $F(1,56) = .62, p = .434, \eta^2 = .01$ ) or condition ( $F(1,56) = 1.22, p = .274, \eta^2 = .02$ ). Baseline measure appeared to be constant over time and between conditions. The item measuring current motivation was therefore assumed to be reliable. A repeated-measures ANOVA ( $N = 58$ ) with time of measurement as the within-subjects factor, condition as the between-subjects factor, and current motivation score as the outcome variable showed no significant interaction effect ( $F(1, 56) = .20, p = .659, \eta^2 = .00$ ), nor any main effect of time ( $F(1, 56) = 1.24, p = .270, \eta^2 = .02$ ) or condition ( $F(1, 56) = 2.69, p = .11, \eta^2 = .05$ ). This suggests that current motivation was independent from the intervention participants were exposed to.

Information about approach to setbacks was collected using participants who reported they had answered a question incorrectly. Scores on the item that was meant as an indication of growth mindset were analyzed by conducting a one-way ANOVA ( $N = 31$ ) with condition as the between-subjects variable. Contrary to expectations, participants in the experimental condition scored on average lower ( $M = 4.24, SD = 1.82$ ) than participants in the control condition ( $M = 5.36, SD = 1.34$ ). This effect of condition was marginally significant ( $F(1,29) = 3.67, p = .065, \eta^2 = .11$ ) which implies that participants in the control condition handled setbacks with a stronger growth approach than participants in the experimental condition.

Correlations between all variables, including motivation to learn, interestingness, and approach after setback, were assessed in order to further explore the data (see Appendix E).

## **Study 2: Technical classroom courses**

### **Method**

#### **Participants**

A total of eight classroom courses from Vanderlande Academy were recruited, and 47 trainees provided data. The classroom courses were about technical topics and took place between the 13<sup>th</sup> of May and the 13<sup>th</sup> of June, 2019. Duration of the courses varied between two and eight hours per session. Participants were on average 35.50 years old ( $SD = 10.04$ ; *minimum* = 22; *maximum* = 60). Their highest educational level varied: 38.3% had earned a

master's degree, 31.9% a bachelor's degree of applied sciences, 14.9% a bachelor's degree, 6.4% a master's degree of applied sciences, 4.3% vocational education, 2.1% an associate's degree, and 2.1% secondary education. All trainees within one classroom course were assigned to the same condition. Courses were alternately assigned to a condition to get an equal amount of participants in the experimental ( $n = 21$ ) and the control condition ( $n = 26$ ).

Trainees were informed about the research purposes of the survey, although they were not told exactly what was being investigated, neither about the two conditions or to which condition they or their colleagues were assigned. Permission was asked to use their data at the beginning of the survey. Names and sex were not collected to protect anonymity.

## **Procedure**

**Participant recruitment.** After getting permission from trainers, the researcher went to eight classroom courses to give instructions, provide intervention materials, and hand out two surveys. Trainees that completed the online survey or that participated during a previous classroom course were excluded from participation. On average, 5.88 employees per course participated.

**Experimental design.** Effectiveness of the growth mindset intervention used in Study 1 was investigated using a similar pretest-posttest design with a control condition. After introduction and instructions, the attendees were asked to fill out the first survey (pretest; see Appendix D), which contained the same components as part 1 of the online survey in Study 1, until the survey gave the instruction to watch a video. When all participants had reached this point, the researcher played the video. After watching the video, the item indicating interestingness of the video was to be answered. When the first survey was completed, the researcher left the room and the trainer started the course. The completed survey was kept on the participants' tables. The researcher returned to hand out the second survey (posttest; see Appendix D), which was comparable to part 2 of the online survey in Study 1, after two hours. This mean some employees filled out the second survey when the course was finished, whereas other employees did so during the course they took due to varying course durations. After completion of the second part, both parts of the survey were collected at the same time in order to connect the pretest and posttest data provided by one participant.

## **Intervention**

**Information about the brain.** Identical to Study 1.

**Feedback.** Identical to Study 1.

## **Measures**

The content of the paper survey was similar to the content of the online survey, although it was adjusted to classroom courses. Since the paper survey was used for several technical classroom courses, no specific course was mentioned. Besides that, the introduction text, the permission section, and instructions were adjusted (see Appendix D).

**Demographic data.** Identical to Study 1. However, permission for using all the obtained data was asked on the first page of the survey.

**Motivation to learn.** Identical to Study 1.

**Growth mindset.** Identical to Study 1. However, the two items meant to indicate the participant's response to failure were adjusted to classroom courses ("This means I probably misunderstood information in the course"; "I could answer the question(s) correctly or do the assignment(s) correctly if I would use a different approach").

**Interestingness.** Identical to Study 1.

**Approach to challenge.** The item regarding approach to challenge was adjusted to classroom courses ("If you got the opportunity, would you want to get more in-depth information about the subject of the (part of the) course you just completed?") with answer categories "Yes, I would want to get more in-depth information about ..." and "No".

## **Data-analysis**

Identical to Study 1.

## **Results**

### **Hypothesis 1**

A repeated-measures ANOVA was conducted to compare mean increase in growth mindset between the experimental condition and the control condition. With time of measurement as the within-subjects factor, condition as the between-subjects factor, and mean growth mindset score as the outcome variable, a repeated-measures ANOVA ( $N = 47$ ) showed

a non-significant interaction effect ( $F(1, 45) = .25, p = .619, \eta^2 = .01$ ; see Figure 2). Increase in growth mindset score did not differ between the experimental condition and control condition. No significant main effects were found for time of measurement ( $F(1, 45) = 1.88, p = .178, \eta^2 = .040$ ) or condition ( $F(1, 45) = 1.18, p = .284, \eta^2 = .03$ ). However, participants in both conditions generally scored lower on growth mindset at posttest (control:  $M = 4.36, SD = 1.281$ ; experimental:  $M = 4.01, SD = 1.29$ ) than at pretest (control:  $M = 4.51, SD = 1.19$ ; experimental:  $M = 4.08, SD = 1.21$ ). No support for hypothesis 1 was found.

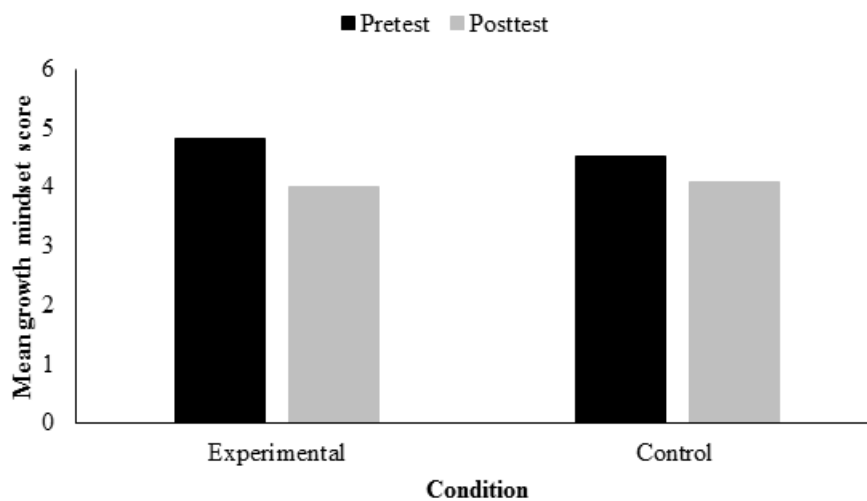


Figure 2. Bar chart presenting mean growth mindset of participants in the experimental or control condition at pretest and posttest

### Hypothesis 2

To test if the number of employees that showed interest for more in-depth information was greater in the experimental condition than in the control condition, a Chi Square Test was performed (see Table 3). Condition and likeliness to show interest for in depth information were not significantly related ( $\chi^2(1,46) = .27, p = .604$ ). Hypothesis 2 was not supported.

Table 3

*Number of participants that showed interest for more in depth information per condition*

	Showed interest for more information ('Yes')	Showed no interest for more information ('No')
Experimental condition	10	10
Control condition	15	11

## Exploratory analyses

Motivation to learn was measured and processed the same way as in Study 1. Motivation scores were not normally distributed. First, a repeated-measures ANOVA ( $N = 47$ ) was conducted to investigate if the baseline measure was stable over time and between conditions. No significant interaction effect ( $F(1,45) = .51, p = .477, \eta^2 = .01$ ) or effect of condition was found ( $F(1,45) = .04, p = .847, \eta^2 = .00$ ). However, participants in both conditions scored significantly higher at pretest (control:  $M = 6.27, SD = .67$ ; experimental:  $M = 6.33, SD = .48$ ) than at posttest (control:  $M = 6.19, SD = .63$ ; experimental:  $M = 6.19, SD = .40$ ) ( $F(1,45) = 5.72, p = .021, \eta^2 = .11$ ). Therefore, current motivation scores are assumed to be less reliable than in Study 1. A repeated-measures ANOVA ( $N = 47$ ) was conducted to investigate if participants in the experimental condition had a greater increase in motivation between pretest and posttest than participants in the control condition. As in Study 1, no significant interaction effect was found ( $F(1,45) = 1.27, p = .266, \eta^2 = .03$ ), nor an effect of time ( $F(1,45) = .42, p = .520, \eta^2 = .01$ ) or condition ( $F(1,45) = .02, p = .899, \eta^2 = .00$ ). This suggests that motivation was independent of the intervention participants were exposed to.

Approach to setbacks was also measured and processed the same way as in Study 1. A one-way ANOVA ( $N = 8$ ) with condition as the between-subjects variable was conducted. Only participants who reported to have done an assignment incorrectly were included. In line with the results in Study 1, participants in the experimental condition scored on average lower ( $M = 3.40, SD = 1.34$ ) than participants in the control condition ( $M = 5.33, SD = 1.16$ ). This effect of condition was marginally significant ( $F(1,6) = 4.26, p = .085, \eta^2 = .42$ ) which implies that participants in the control condition handled setbacks with a stronger growth approach than participants in the experimental condition.

The data were further explored using correlations (see Appendix F).

## Discussion

The goal of this study was to test a brief mindset intervention that included key components of previously successful interventions and could be disseminated in a work environment. The intervention was designed to enhance employees' growth mindset, approach to challenge, and learning motivation in the context of existing job-related courses. It was hypothesized that employees who were exposed to the growth mindset intervention would have a greater increase in growth mindset than employees who were exposed to the control intervention. However, the results did not support this hypothesis. Secondly, participants who

were exposed to the growth mindset intervention were expected to be more likely to show interest for more in-depth information than participants who were exposed to the control intervention. The second hypothesis was not supported either. The growth mindset intervention was not significantly effective in establishing a growth mindset, motivation to learn, and approach to challenge. These results were not in line with previous findings that showed a mindset intervention could enhance these variables (Aronson et al., 2002; Bostwick & Becker-Blease, 2018; Burnette, Russell, Hoyt, Orvidas, & Widman, 2018; Paunesku et al., 2015; Yeager et al., 2016).

Based on discussed literature, there are three main explanations for not finding the expected effects. Firstly, the growth mindset intervention did not contain a task meant for participants to deeply process information about brain plasticity. Most studies tested an intervention containing such a processing task (e.g. saying-is-believing task; Aronson et al., 2012; Blackwell et al., 2007; Walton, 2014). Even though Bostwick and Becker-Blease (2018) found effectiveness of a mindset intervention that did not contain such a task, perhaps a processing task was needed in the current context for employees to integrate the intervention's message.

Secondly, the current context was possibly not suitable for finding an effect of the growth mindset intervention. According to Bostwick and Becker-Blease (2018) growth mindset interventions tend to target times when individuals are educationally challenged, such as the transition between high school and higher education (Aronson et al., 2002). In the current study, participants in Study 1 were in an assumingly challenging transition into a new job. However, it is possible that participants did not experience the transition as challenging and therefore did not apply the intervention's message.

Thirdly, Bostwick and Becker-Blease (2018) stated that growth mindset interventions are more likely to be effective when individuals have the opportunity to improve their future performance. Within the current study, pretest and posttest were separated by only a few hours. Possibly, this period was too short to observe an effect of the intervention on growth mindset, learning motivation, and approach to challenge. According to Garcia and Cohen (2012) and Yeager and Walton (2011) mindset interventions owe their effectivity to recursive processes. That is, a growth mindset intervention enhancing growth mindset, motivation, approach to challenge, or performance in one situation can affect these variables in future situations by reinforcing individuals' belief in their potential for growth. For example, when confronted with academic setbacks in serial exams, individuals have the opportunity to apply the intervention's

message in future challenging situations (Hong et al., 1999). A follow-up measure would be needed to observe an effect of recursive processes triggered by the intervention.

Besides deviations from previous studies, unforeseen variables might have had an effect on employees' mindsets and related cognitions. As Chao, Visaria, Mukhopadhyay, and Dehejia (2017) found, multiple factors play a role in the effectiveness of a mindset intervention. For example, the growth mindset intervention they tested facilitated performance through persistence, but only in an incentive system that imparted individuals with a sense of autonomy. This effect was only found among students with high prior achievement, but not amongst those with low prior achievement. In the current study, only a few variables were manipulated or measured. Therefore, it is assumable that an unobserved variable was at play. This explanation is supported by Study 1 in which growth mindset increased over time independent of the condition to which employees were assigned. This suggests that employees' mindsets had changed, but this change was not explained by one of the measured variables.

In addition, different variables important for changing mindsets might differ between students and employees. As mentioned before, most studies that found support for effectiveness of mindset interventions were conducted using students as participants. However, employees are, overall, more experienced and learn for different purposes and in different environments than students (e.g. educational vs. job-related). In an organizational setting, variables such as the incentive system within the organization, the level of autonomy experienced by an employee, and the way a manager coaches employees might partly determine whether a growth mindset intervention affects an employee's mindset or not (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Heslin & Vandewalle, 2008; Saks, 2008).

In an attempt to discover such variables of influence, the data on motivation to learn and approach after setback were further explored. In both Study 1 and 2, increase in motivation to learn did not differ between conditions, which suggests that the growth mindset intervention did not affect motivation. However, a significant correlation between condition and motivation at posttest implied that participants who were exposed to the growth mindset intervention were more motivated to learn at posttest than participants who were exposed to the control intervention. The latter finding points in the direction of Dweck (2000) and Mueller and Dweck (1998) who related growth mindset to motivation to learn.

Condition affected the way participants handled setbacks, but in the unexpected direction. This suggests that participants who were exposed to the control intervention had a

more growth-like approach after failure than participants who were exposed to the growth mindset intervention. However, approach after setback was only measured at posttest. Therefore, it is not certain if the difference between groups was caused by the difference in interventions.

### **Limitations and future directions**

Although this study advances research on growth mindset interventions and provides insight for practice, it has a few limitations. First of all, most of the data violated assumptions of the conducted analyses (e.g. assumption of normality) which means results should be interpreted carefully. Additionally, although group sizes were nearly equal, sample sizes were relatively small due to limitations associated with field research. This may have reduced the statistical power to detect true differences between intervention effects. Using a repeated-measures ANOVA, 592 participants should have been recruited in order to reach a power of .80 with a small effect size (Faul, Erdfelder, Lang, & Buchner, 2007). Concerning generalizability of the results, employees who participated were between 20 and 60 years old, which is relatively representative for the labor force. Also, participants had varying nationalities and were employed at different locations worldwide. However, employees in the sample were highly educated (85.4% earned a bachelor's or master's degree of (applied) sciences) and were employed by an organization providing technical solutions. Therefore, results should be interpreted more carefully when expanded to employees with lower educational levels or working in different fields.

With that mentioned, a few suggestions for improvement will be given. Firstly, the growth mindset intervention's design could be improved. The mindset intervention that was implemented did not contain all aspects that other effective interventions contained. For example, effort-focused feedback was given by using a standardized message due to the way courses were set up and time limitation of the project. Since it was standardized, the message did not necessarily match the employees' performances and the risk of irrelevance and overpraising existed. An employee should consider praise as relevant and matching with performance to have a positive effect on his or her mindset (Yeager Walton, & Cohen, 2013). Furthermore, no strategy-focused feedback was applicable in the context of the job-related courses considering the course content that did not lend itself to applying different strategies. Praising not only effort but also use of strategy can have positive effects on growth mindset and related constructs, such as motivation to learn and approach to challenge (Mueller & Dweck, 1998; O'Rourke et al., 2014). According to Yeager et al. (2013) the praise of effort solely can

even undermine motivation in cases when individuals are confronted with failure and effort is encouraged when they actually need to change strategy.

Besides the way the mindset intervention was operationalized, the study's design leaves some room for improvement. Despite the attempt, not all variables could be controlled in the current field study. For example, participants in Study 1 were asked to watch a video clip and to complete the onboarding course after. Participants were asked if they finished the course before they could continue the questionnaire. It is not certain, however, if participants watched the video clip and completed the course when they were asked to do so. Future studies should make sure that participants will be exposed to the intervention materials and complete the course before completing the posttest. Study 2, in which the researcher controlled when the video clip was played and when the posttest survey was to be completed, can be taken as an example.

However, Study 2 has its limitations as well. That is, participants were trainees of different courses. Those courses had different contents and were of different durations. Course content might be important for the effectiveness of a mindset intervention. Participants in the experimental condition rated the courses they attended as significantly less interesting than participants in the control condition (see Appendix F). Interestingness of the course could either be a confounding variable or interestingness was affected by condition. Also, difference in duration of the courses might have had an effect. Pretest and posttest were separated by a period of two hours in order to establish consistency of measurements. Though, course duration differed between two and eight hours a day, and some courses consisted of sessions on multiple days. This way, some participants filled out the posttest questionnaire when a course was finished, whereas others did so during a course. This might have had an effect due to the possibility to improve that might be needed to observe an effect. Future studies should aim to keep course content and duration stable between conditions.

Additionally, the period in between pretest and posttest might have been too short to obtain valid data. At posttest, employees could possibly remember what they had answered at pretest. This way, results might have been biased. Next time, the effect of mindset intervention should be investigated when controlling for this memory bias.

At last, two final recommendations for future studies will be given. Firstly, the intervention's effect on performance should be assessed. Previous studies mostly included a performance score as an outcome variable (Bahník & Vranka, 2017; Blackwell et al., 2007;

Bostwick & Becker-Blease, 2018; Burnette et al., 2018). The onboarding and technical courses used in the current study did not allow for measuring employees' performance. Therefore, the growth mindset intervention's effect on performance remains unknown.

Secondly, it would be interesting to include a measure of challenge-seeking behavior using a tool comparable to the "Make-a-Math-Worksheet" task in Yeager et al. (2016). In this task, students indicated if they would want to solve 'not very challenging', 'somewhat challenging', or 'very challenging' mathematical problems. In the current study, such a challenge-seeking behavior measure was not applicable due to unsuitable content of the online onboarding and technical classroom courses. Future research should use courses with content that allows for a challenge-seeking behavior measure to expand knowledge on the intervention's effectiveness.

## **Conclusion**

The current study aimed to investigate the value of implementing a growth mindset intervention within organizations in order to establish a lifelong learning culture. No significant effect of the assessed growth mindset intervention on growth mindset and approach to challenge was found. Though, employees who were exposed to a growth mindset intervention were more motivated to learn afterward than employees who were exposed to a control intervention. This is promising for the role of growth mindset in establishing a lifelong learning culture. Further research is needed to investigate ways to enhance growth mindsets in employees and stimulate lifelong learning.

## References

- AACSB (2018, February). AACSB Industry Brief: Lifelong learning and talent management. Retrieved from <https://www.aacsb.edu/publications/researchreports/lifelong-learning-and-talent-management>
- Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology, 38*, 113-125. doi:10.1006/jesp.2001.1491
- Avolio, B., Gardner, W., Walumbwa, F., Luthans, F., & May, D. (2004). Unlocking the mask: a look at the process by which authentic leaders impact follower attitudes and behaviors. *Leadership Quarterly, 15*, 801-823. doi:10.1016/j.leaqua.2004.09.003
- Bahník, S., & Vranka, M.A. (2017). Growth mindset is not associated with scholastic aptitude in a large sample of university applicants. *Personality and Individual Differences, 117*, 139-143. doi:10.1016/j.paid.2017.05.046
- Blackwell, L.A., Trzesniewski, K.H., & Dweck, C.S (2007). Implicit theories of intelligence predict achievement across an adolescent transition: a longitudinal study and an intervention. *Child Development, 78*, 246–263. doi:10.1111/j.1467-8624.2007.00995.x
- Bostwick, K.C.P., & Becker-Blease, K.A. (2018). Quick, easy mindset intervention can boost academic achievement in large introductory psychology classes. *Psychology Learning & Teaching, 17*, 177-193. doi:10.1177/1475725718766426
- Burnette, J.L., O’Boyle, E.H., Vanepps, E.M., Pollack, J.M., & Finkel, E.J. (2013). Mind-sets matter: a meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin, 139*, 655-701. doi:10.1037/a0029531
- Burnette, J.L., Russell, M.V., Hoyt, C.L., Orvidas, K., & Widman, L. (2018). An online growth mindset intervention in a sample of rural adolescent girls. *The British Journal of Educational Psychology, 88*, 428-445. doi:10.1111/bjep.12192
- Chao, M.M., Visaria, S., Mukhopadhyay, A., & Dehejia, R. (2017). Do rewards reinforce the growth mindset?: Joint effects of the growth mindset and incentive schemes in a field intervention. *Journal of Experimental Psychology General, 146*, 1402-1419. doi:10.1037/xge0000355

- Dweck, C. S. (2000). *Self-Theories: Their Role in Motivation, Personality, and Development* (1<sup>st</sup> ed.). London, UK: Psychology Press.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York, NY: Random House.
- Dweck, C.S., (2017). *Mindset - Updated Edition : Changing The Way You think To Fulfil Your Potential* (1<sup>st</sup> ed.). London, UK: Little Brown.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*, 256–273. doi:10.1037/0033-295X.95.2.256
- Senn Delaney. (n.d.). New study findings: why fostering a growth mindset in organizations matters. Retrieved from [http://knowledge.senndelaney.com/docs/thought\\_papers/pdf/stanford\\_agilitystudy\\_hart.pdf](http://knowledge.senndelaney.com/docs/thought_papers/pdf/stanford_agilitystudy_hart.pdf)
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191. Retrieved from <http://www.gpower.hhu.de/>
- Garcia, J. & Cohen, G.L. (2012). A social-psychological approach to educational intervention. In E. Shafir (Ed.), *Behavioral foundations of policy* (pp. 329-350). Princeton, NJ: Princeton University Press. [https://ed.stanford.edu/sites/default/files/social\\_psych\\_perspective\\_education.pdf](https://ed.stanford.edu/sites/default/files/social_psych_perspective_education.pdf)
- Good C., Aronson J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology*, *24*, 645–662. doi:10.1016/j.appdev.2003.09.002
- Gunderson, E.A., Gripshover, S.J., Romero, C., Dweck, C.S., Goldin-Meadow, S., & Levine, S.C. (2013). Parent praise to 1- to 3-year-olds predicts children's motivational frameworks 5 years later. *Child Development*, *84*, 1526-1541. doi:10.1111/cdev.12064
- Heslin, P. A., & Vandewalle, D. (2005). Feedback interventions and feedback seeking: Implications for self-regulation. Paper presented at the 20th Annual Conference of the Society for Industrial and Organizational Psychology, Los Angeles, CA.

- Heslin, P. A., & VandeWalle, D. (2008). Managers' implicit assumptions about personnel. *Current Directions in Psychological Science*, *17*, 219–223. doi:10.1111/j.1467-8721.2008.00578.x
- Hong, Y.Y., Chiu, C.Y., Dweck, C.S., Lin, D.M.S., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology*, *77*, 588-599. doi:10.1037/0022-3514.77.3.588
- IBM SPSS Statistics for Windows, Version 25.0 [Computer software]. (2017). Armonk, NY: IBM Corp.
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, *75*, 33-52. doi:10.1037/0022-3514.75.1.33
- O'Rourke, E., Haimovitz, K., Ballweber, C., Dweck, C. S., & Popović, Z. (2014). Brain points: A growth mindset incentive structure boosts persistence in an educational game. *Proceedings of the SIGCHI Conference on Human Factors in Computer Systems (CHI '14), USA*, 3339-3348. doi:10.1145/2556288.2557157
- Paunesku, D., Walton, G.M., Romero, C.L., Smith, E.N., Yeager, D.S., & Dweck, C.S (2015). Mindset interventions are a scalable intervention for academic underachievement. *Psychological Science*, *26*, 784–793. doi:10.1177/0956797615571017
- Saks, A. (2008). The meaning and bleeding of employee engagement: how muddy is the water? *Industrial and Organizational Psychology: Perspectives on Science and Practice*, *1*, 40-43. doi:10.1111/j.1754-9434.2007.00005.x
- Sentis (2012, November 6). *Neuroplasticity* [YouTube]. Retrieved from <https://www.youtube.com/watch?v=ELpfYCa87g&t=5s>
- Sentis (2012, September 25). *Areas of the brain* [YouTube]. Retrieved from [https://www.youtube.com/watch?v=5\\_vT\\_mnKomY&t=8s](https://www.youtube.com/watch?v=5_vT_mnKomY&t=8s)
- Van Dellen, T. (2011). Lifelong learning in Nederland: wat is het en waarom? In P.W.J. Schramade (Ed.), *Handboek Effectief Opleiden* (55) (pp. 159-178). Den Haag, NL: Elsevier Bedrijfsinformatie B.V.

- Van der Krogt, F. J. (1995). *Leren in netwerken: Veelzijdig organiseren van leernetwerken met het oog op humaniteit en arbeidsrelevantie* [Learning in networks: The many-faceted job of organizing learning networks with a view to humanity and work relevance]. Utrecht, NL: Lemma.
- Vandewalle, D. (2012). A growth and fixed mindset exposition of the value of conceptual clarity. *Industrial and Organizational Psychology*, 5, 301-305. doi:10.1111/j.1754-9434.2012.01450.x
- Walton, G.M. (2014). The new science of wise psychological interventions. *Current Directions in Psychological Science*, 23, 73-82. doi:10.1177/0963721413512856
- Yeager, D.S., Romero, C., Paunesku, D., Hulleman, C.S., Schneider, B., Hinojosa, C., ... Dweck, C.S. (2016). Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school. *Journal of Educational Psychology*, 108, 374-391. doi:10.1037/edu0000098
- Yeager, D.S., & Walton, G. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research*, 81, 267-301. doi:10.3102/0034654311405999
- Yeager, D.S., Walton, G., & Cohen, G.L. (2013). Addressing achievement gaps with psychological interventions. *Phi Delta Kappan*, 94, 62-65. doi:10.1177/003172171309400514

## Appendix A

### Study 1: E-mail that was sent to new employees

**VANDERLANDE**

Dear new colleague,

First of all: Welcome to Vanderlande!

You might be planning on doing the 'Welcome to Vanderlande' course in the Workday Learning environment to get to know more about the organization. That's great!

You can now help to improve upcoming courses while completing the 'Welcome to Vanderlande' course by filling out a brief survey (max. 10 minutes). Your answers will help Vanderlande Academy to make courses more educative and enjoyable for you and your colleagues! During the survey you will watch a short video and there will be time to complete the first module of the 'Welcome to Vanderlande' course.

#### Will you help to improve courses?

By clicking on the following link or button you will be directed to the survey: ['Welcome to Vanderlande' survey](#). Unfortunately you cannot participate if you have already started module 1 of the 'Welcome to Vanderlande' course.

Start Survey

#### Survey information

The survey is meant to obtain information on the effectivity of a different approach to learning. The results will be reported in my master's thesis.

#### Privacy statements

Your data will be processed anonymously and will only be used for research purposes within Vanderlande. The collected data will be deleted within 3 months.

If you have any questions about the survey or difficulties with the link, please do not hesitate to contact me by e-mail.

Thank you for your help!



With best regards,

**Iris Hodenius**

Research intern at Vanderlande Academy

Master's student at Radboud University

E-mail: [Iris.Mirte.Hodenius@vanderlande.com](mailto:Iris.Mirte.Hodenius@vanderlande.com)

## Appendix B

### Study 1: Survey experimental condition

# 'Welcome to Vanderlande' survey A

Welcome to this survey!

This survey consists of two parts.

Part 1 consists of a video regarding brain functioning and questions with regards to your view on that topic (5 minutes).

Part 2 of this survey is to be completed after completion of Welcome to Vanderlande module 1 (5 minutes). Don't forget to return and complete part 2 of this survey!

Don't think too long about your answers, there are no wrong answers and your answers will not be evaluated. It's important for you to finish the entire survey. You can take a break at any time.

Your data will be processed anonymously and will only be used for research purposes within Vanderlande. The collected data will be deleted within 3 months.

Thank you for your participation!

Best regards,  
Iris Hodenius

This research is an initiative of Vanderlande Academy in cooperation with Radboud University.

\* Required

1

What is your age? \*

Number should be between 0 ~ 99

2

Do you give permission to use the given information about your age for research purposes? \*

*Age would be linked to the rest of your data, but would not be traced back to you.*

Yes

No

3

What is the highest level of education you have completed? \*

- Secondary education (NL: voortgezet onderwijs)
- Vocational education (NL: MBO)
- Associate's degree - Ad (NL: 2-jarige HBO-opleiding)
- Bachelor's degree of applied sciences - B (NL: HBO bachelorgraad)
- Bachelor's degree - BA, BSc, LLB (NL: WO bachelorgraad)
- Master's degree of applied sciences - M (NL: HBO mastergraad)
- Master's degree - MA, MSc, LLM (NL: WO mastergraad)
- Doctoral/Professional degree - D, PhD (NL: WO doctorsgraad)
- No education

4

Do you give permission to use the given information about your highest level of education for research purposes? \*

*Highest level of education would be linked to the rest of your data, but would not be traced back to you.*

- Yes
- No

5

Please answer the following questions. \*

	Very unmotivated	Unmotivated	Somewhat unmotivated	Neither motivated nor unmotivated	Somewhat motivated	Motivated	Very motivated
How motivated are you to learn new things in general?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How motivated are you to learn new things at this moment?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6

To what extent do you agree or disagree with the following statements? \*

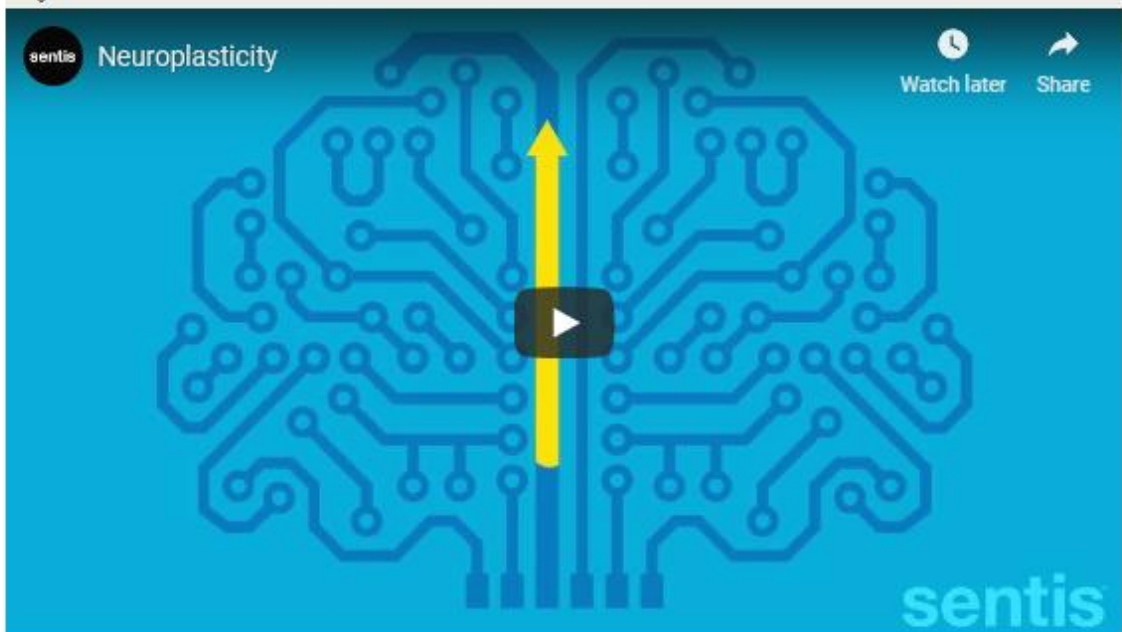
	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Your intelligence is something very basic about you that you can't change very much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can learn new things, but you can't really change how intelligent you are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No matter how much intelligence you have, you can always change it quite a bit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can always substantially change how intelligent you are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7

Please watch the video below.

↓

↓ \*



Very uninteresting   Uninteresting   Somewhat uninteresting   Neither interesting nor uninteresting   Somewhat interesting   Interesting   Very interesting

In your opinion, how interesting was the video?

8

You have completed part 1 of this survey, good effort!  
Part 2 of this survey is to be completed after completion of Welcome to Vanderlande module 1.

Please get started with module 1 of the Welcome to Vanderlande course by clicking here: [https://wd3.myworkday.com/vanderlande/d/inst/16908\\$5421/rel-task/2997\\$10953.html](https://wd3.myworkday.com/vanderlande/d/inst/16908$5421/rel-task/2997$10953.html)  
(In case the link is not working: go to the Workday Learning environment > "Progress: Not started" > "Welcome to Vanderlande!" > "Start Module 1")

Have you completed Welcome to Vanderlande module 1? \*

*In case you could not complete Welcome to Vanderlande module 1, please explain what went wrong in the 'Other' option.*

Yes

Other

9

Congratulations! You have successfully completed the first module of the Welcome to Vanderlande course.

You have worked hard, and showed perseverance and your ability to learn. Keep it up!

Let's get started with part 2 of this survey. \*

Very uninteresting    Uninteresting    Somewhat uninteresting    Neither interesting nor uninteresting    Somewhat interesting    Interesting    Very interesting

In your opinion, how interesting was the module of the 'Welcome to Vanderlande' course you just completed?

10

Please answer the following questions. \*

	Very unmotivated	Unmotivated	Somewhat unmotivated	Neither motivated nor unmotivated	Somewhat motivated	Motivated	Very motivated
How motivated are you to learn new things in general?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How motivated are you to learn new things at this moment?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11

To what extent do you agree or disagree with the following statements? \*

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Your intelligence is something very basic about you that you can't change very much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can learn new things, but you can't really change how intelligent you are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No matter how much intelligence you have, you can always change it quite a bit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can always substantially change how intelligent you are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12

In module 1 of the Welcome to Vanderlande course, you were asked to do assignments. Did you answer an assignment incorrectly within module 1? \*

- Yes
- No
- I don't remember

Submit

## Appendix C

### Study 1: Reminder that was sent to new employees

Dear colleague,

Last week, you received an e-mail from Vanderlande Academy containing an invitation to fill out a brief survey ('Welcome to Vanderlande survey'). I would like to remind you to fill out this survey (max. 10 minutes) if you have not done so yet. Your response would really help me to write my thesis and the Academy to improve courses for you.

You can participate by searching for the e-mail the Academy sent you (subject: Welcome to Vanderlande survey) or by clicking the following button:

[Start Survey](#)

If you have any questions about the survey or difficulties with the link, please do not hesitate to contact me by e-mail.

Thank you in advance! 😊



With best regards,

**Iris Hodenius**

Research intern at Vanderlande Academy

Master's student at Radboud University

E-mail: [Iris.Mirte.Hodenius@vanderlande.com](mailto:Iris.Mirte.Hodenius@vanderlande.com)

## Appendix D

### Study 2: Survey experimental condition

**VANDERLANDE**

Welcome to this survey!

As part of my thesis, I am investigating the effectivity of a new approach to learning. You can make a valuable contribution by filling out this survey. Thank you in advance!

This survey consists of two parts:

Part 1 (max. 5 minutes) is to be completed now.

Part 2 (max. 5 minutes) is to be completed after (partial) completion of the course.

Don't think too long about your answers, there are no right or wrong answers and your answers will not be evaluated.

Please fill out the survey by yourself and do not discuss the questions or answers with your colleagues.

It's important for you to finish the entire survey. You can take a break at any time.

Your data will be processed anonymously and will only be used for research purposes within Vanderlande.

The collected data will be deleted within 3 months. Your participation is completely voluntarily, you can stop at any time without giving a reason.

I need your permission to process your data for research purposes. Do you give permission?

Yes, I give permission

If you have any questions about the research, please do not hesitate to contact me by e-mail.

With best regards,

Iris Hodenius

Research intern at Vanderlande Academy

Master's student at Radboud University

E-mail: Iris.Mirte.Hodenius@vanderlande.com

*This research is an initiative of Vanderlande Academy in cooperation with Radboud University.*

## Part 1

*This survey consists of questions and statements.*

*You can tick the box that is (most) applicable to you. If you do not want to or are not able to answer, you do not need to tick a box.*

1. What is your age? .....

2. What is the highest level of education you have completed?

- Secondary education (NL: voortgezet onderwijs)
- Vocational education (NL: MBO)
- Associate's degree – Ad (NL: 2-jarige HBO-opleiding)
- Bachelor's degree of applied sciences – B (NL: HBO bachelorgraad)
- Bachelor's degree – BA, BSc, LLB (NL: WO bachelorgraad)
- Master's degree of applied sciences - M (NL: HBO mastergraad)
- Master's degree – MA, MSc, LLM (NL: WO mastergraad)
- Doctoral/Professional degree – D, PhD (NL: WO doctorsgraad)
- No education

3. Please answer the following questions.

	Very unmotivated	Unmotivated	Somewhat unmotivated	Neither motivated nor unmotivated	Somewhat motivated	Motivated	Very motivated
How motivated are you to learn new things in general?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How motivated are you to learn new things at this moment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*The survey continues on the next page →*

4. To what extent do you agree with the following statements?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Your intelligence is something very basic about you that you can't change very much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You can learn new things, but you can't really change how intelligent you are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No matter how much intelligence you have, you can always change it quite a bit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You can always substantially change how intelligent you are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Please tell me when you have answered the questions above.*

*When every trainee has answered the questions above, a video will be shown to you in class.*

5. Please answer the following question.

	Very uninteresting	Uninteresting	Somewhat uninteresting	Neither interesting nor uninteresting	Somewhat interesting	Interesting	Very interesting
In your opinion, how interesting was the video?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*You have completed part 1 of this survey, good effort!*

*Part 2 of this survey is to be completed after (partial) completion of the course. Further instructions will follow.*

## Part 2

*Congratulations! You have successfully completed the (part of the) course.  
You have worked hard, and showed perseverance and your ability to learn. Keep it up!  
Let's get started with part 2 of this survey.*

*This survey consists of questions and statements.  
You can tick the box that is (most) applicable to you. If you do not want to or are not able to answer, you do not need to tick the box.*

### 1. Please answer the following question.

	Very uninteresting	Uninteresting	Somewhat uninteresting	Neither interesting nor uninteresting	Somewhat interesting	Interesting	Very interesting
In your opinion, how interesting was this (part of the) course?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 2. Please answer the following questions.

	Very unmotivated	Unmotivated	Somewhat unmotivated	Neither motivated nor unmotivated	Somewhat motivated	Motivated	Very motivated
How motivated are you to learn new things in general?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How motivated are you to learn new things at this moment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*The survey continues on the next page →*

3. To what extent do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Your intelligence is something very basic about you that you can't change very much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You can learn new things, but you can't really change how intelligent you are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No matter how much intelligence you have, you can always change it quite a bit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You can always substantially change how intelligent you are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Did you answer a question incorrectly or did you do an assignment incorrectly during the completed (part of the) course?

- Yes
- No
- I don't remember
- The course did not contain questions or assignments

*If you answered 'Yes', please answer question 5 and 6.*

*If you answered 'No', 'I don't remember', or 'The course did not contain questions or assignments', please answer question 6.*

*The survey continues on the next page →*

5. Recall the moment you answered a question incorrectly or did an assignment incorrectly.  
To what extent would you agree or disagree with the following statements?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
This means I probably misunderstood information in the course.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could answer the question(s) correctly or do the assignment(s) correctly if I would use a different approach.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. If you got the opportunity, would you want to get more in depth information about the subject of the (part of the) course you just completed?  
 Yes, I would want to get more in depth information about .....

No

*This is the end of this survey. Thank you for participating!*

*If you have any questions or feedback, please tell me or send it to: [Iris.Mirte.Hodenius@vanderlande.com](mailto:Iris.Mirte.Hodenius@vanderlande.com)*

## Appendix E

### Study 1: Correlation matrix

Table E1

*Pearson Correlations and Sample Sizes*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Condition														
2. Age	.22 58													
3. Education	.11 58	.20 58												
4. Interesting video	-.01 58	.11 58	.00 58											
5. Interesting course	-.21 57	.20 57	.15 57	.16 57										
6. Incorrect	-.16 58	-.07 58	-.14 58	.07 58	.06 57									
7. Extra information	.11 58	-.14 58	.17 58	-.02 58	.10 57	-.04 58								
8. Growth mindset pretest	.13 58	-.04 58	-.20 58	-.05 58	.18 57	.12 58	-.02 58							
9. Growth mindset posttest	-.13 58	-.07 58	-.22 58	-.04 58	.08 57	.24 58	.05 58	.89** 58						
10. Growth mindset increase	-.00 58	-.07 58	-.04 58	.03 58	-.22 57	.24 58	.15 58	-.25 58	.21 58					
11. Motivation pretest	.15 58	.23 58	.10 58	-.03 58	.42 57	-.01 58	-.02 58	.19 58	.14 58	-.12 58				
12. Motivation posttest	.27* 58	.07 58	.11 58	.23 58	.08 57	-.02 58	.08 58	.29* 58	.26 58	-.08 58	.26 58			
13. Motivation increase	-.08 58	-.16 58	-.04 58	.08 58	-.06 57	-.03 58	-.08 58	-.15 58	-.14 58	.03 58	-.35** 58	.47** 58		
14. Incorrect item	-.34 31	-.05 31	.04 31	-.06 31	-.01 31	<b>b</b> 31	-.18 31	-.09 31	-.14 31	-.08 31	-.33 31	-.01 31	.16 31	

\*  $p < .05$  (2-tailed)

.05 (2-tailed)

\*\*  $p < .01$  (2-tailed)

**b** cannot be computed because at least one of the variables is constant

## Appendix F

### Study 2: Correlation matrix

Table F1

*Pearson Correlations and Sample Sizes*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Condition														
2. Age	-.02 46													
3. Education	.10 47	-.22 46												
4. Interesting video	.26 47	-.06 46	.07 47											
5. Interesting course	-.43** 47	.30* 46	-.15 47	-.01 47										
6. Incorrect	-.23 47	.05 46	.06 47	.03 47	.05 47									
7. Extra information	.08 46	.33* 45	.11 46	-.01 46	.28 46	.13 46								
8. Growth mindset pretest	-.18 47	-.06 46	-.03 47	.11 47	-.03 47	.09 47	-.43* 46							
9. Growth mindset posttest	-.34 47	-.05 46	.00 47	.14 47	-.10 47	.08 47	-.31 46	.90** 47						
10. Growth mindset increase	.07 47	.01 46	.08 47	.07 47	-.18 47	.01 47	.21 46	-.09 47	.35 47					
11. Motivation pretest	.09 47	-.04 46	-.13 47	-.03 47	-.02 47	.08 47	.02 46	-.33* 47	-.26 47	.12 47				
12. Motivation posttest	-.05 47	.29 46	-.15 47	-.15 47	.24 47	.08 47	.28 46	-.12 47	-.11 47	-.00 47	.66** 47			
13. Motivation increase	-.11 47	.27 46	.06 47	-.07 47	.22 47	-.10 47	.20 46	.33* 47	.26 47	-.10 47	.41* 47	.29 47		
14. Incorrect item	-.64 8	-.19 8	-.25 8	-.58 8	-.07 8	<b>b</b> 8	.11 8	-.21 8	-.15 8	.56 8	.88* 8	.57 8	-.49 8	

\*  $p < .05$  (2-tailed)

\*\*  $p < .01$  (2-tailed)