A High School Teacher's Commitment to Change: the Influence of Bias caused by Anchoring

Fenna Boerkamp (S1697943) - University of Twente

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Supervised by

dr. M. D. Hubers

dr. J. ter Vrugte

Abstract

Developing a high school teacher's commitment to change is of importance in order to reach educational change. It is still commonly believed that this process is accompanied by a rational decision-making process, but research suggests otherwise. This experiment, therefore, aimed at proving the effect of bias caused by anchoring on high school teachers' (affective, normative and continuance) commitment to change. Differences in gender and work experience were investigated as well. A total of 195 high school teachers in the Netherlands participated in the experiment. The teachers were assigned to three different conditions (no anchor, an encouraging anchor or a discouraging anchor) to possibly manipulate the outcomes. The results indicated that high school teachers that were presented with an encouraging anchor scored higher on normative commitment to change than teachers that were presented with a discouraging anchor. Furthermore, high school teachers with more than three years of work experience in the control condition scored higher on continuance commitment to change than teachers with less than or three years of work experience in the control condition. Even though fewer effects of anchoring were found than expected, the anchors in combination with the scenario might have elicited an unconscious normative influence. Thus, the results do provide evidence to suggest that high school teachers might not be as rational in their decision-making processes towards change as is still commonly assumed. Suggested is to take the role of familiarity, knowledge or expertise with the proposed changes into account when conducting future research.

Keywords: change management, affective, normative, continuance, commitment to change, bias, anchoring, high school teacher, gender, work experience

Het ontwikkelen van de veranderbereidheid van een middelbare school docent is belangrijk om onderwijsveranderingen teweeg te brengen. Tegenwoordig wordt nog steeds aangenomen dat het maken van hieraan gerelateerde keuzes een rationeel proces is, maar wetenschappelijk onderzoek doet anders vermoeden. In dit experiment werd daarom geprobeerd het effect van bias in de vorm van het verankeringseffect op de (affectieve, continuerende en normatieve) veranderbereidheid van een middelbare school docent van aan te tonen. Mogelijke verschillen in geslacht en werkervaring werden ook onderzocht. Een totaal van 195 docenten in Nederland nam deel aan het onderzoek. De docenten waren verdeeld over drie mogelijke condities (geen anker, een motiverend anker en een ontmoedigend anker) om zo mogelijk de uitkomsten te manipuleren. De resultaten toonden aan dat docenten die werden gepresenteerd met een motiverend anker, hoger scoorden op normatieve veranderbereidheid dan wanneer zij gepresenteerd werden met een ontmoedigend anker. Daarnaast bleken docenten

met meer dan drie jaar werk ervaring in de controle conditie hoger te scoren op continuerende veranderbereidheid dan docenten met minder dan of drie jaar werkervaring in de controle conditie. Ondanks het feit dat het verankeringseffect minder effect bleek te hebben dan verwacht, is het mogelijk dat de ankers in combinatie met het scenario een onbewuste normatieve invloed hebben uitgelokt. Kortom, dit onderzoek geeft reden om aan te nemen dat een docent wellicht inderdaad minder rationeel is bij het maken keuzes gerelateerd aan verandering dan over het algemeen wordt aangenomen. Gesuggereerd wordt dat de bekendheid met, kennis van of expertise over de voorgestelde veranderingen in vervolg onderzoek moet worden meegenomen.

Trefwoorden: verandermanagement, affectieve, normatieve, continuerende, veranderbereidheid, bias, verankeringseffect, middelbare school docent, geslacht, werkervaring

A High School Teacher's Commitment to Change: the Influence of Bias caused by Anchoring

In the rapidly developing and improving society of today, more and more complex changes are demanded from organizations. Not only does the corporate section of organizations have to deal with enormous changes, but also school environments are affected by, for example, demographic-, and socio-cultural changes, and large-scale innovations (Sleegers & Leithwood, 2010). As a result, research focuses on causes, consequences, and strategies to deal with these demanded changes in school environments (Doyle & Ponder, 1977; Herscovitch & Meyer, 2002).

The strategies are prescriptions of how teachers can adopt and implement changes in concrete school settings in order to improve the quality of education (Doyle & Ponder, 1977; Sleegers & Leithwood, 2010). The goal of adopting change initiatives, with help of these strategies, is to achieve more self-regulated, reflective, independent, authentic and social-interactive classroom settings (Sleegers & Leithwood, 2010) in order to live up to the demands of the developing society of today. However, despite the high amount of newly developed strategies to improve the quality of education, the effectivity of these strategies seems to be on the lower end. This means that not much actual change is reached (Doyle & Ponder, 1977; Herscovitch & Meyer, 2002; By, 2005; Sleegers & Leithwood, 2010; Hutner & Markman, 2015; Van der Voet, 2015).

A reason for the limited success of the change strategies might be the fundamental lack of understanding of and research on the process of implementation and adoption of change initiatives (By, 2005; Van der Voet, 2015). An example is that many developers were mainly system-oriented in the development of new change strategies, which were often prone to failure (Judge, Thoreson, Pucik, & Welbourne, 1999). System-oriented strategies are the opposite of more psychological individual-oriented strategies and are aimed at promoting change from an organizational level (Judge et al., 1999) coming mainly from decision-makers and management (Cao, Clarke, & Lehaney, 2004). Suggested is that the success of changes might rather lie with the abilities and commitment of individuals within the organization and more integrated approaches are needed (Judge et al., 1999). Similarly, Herscovitch and Meyer (2002) stated that an individual's commitment to change is one of the most important factors when successfully complying to change initiatives.

Commitment to change

Commitment to change can be explained as a mental state in which an individual is bound to actions considered essential in order to implement change initiatives (Herscovitch & Meyer, 2002). The commitment to change is a prior influence to the teacher decision-making process towards change initiatives. The components which commitment to change consists of, are the affective, continuance and normative component (Herscovitch & Meyer, 2002). These components can be seen as different, and possibly combinable mind-sets characterizing one's commitment to change (Herscovitch & Meyer, 2002). Therefore, different motivations for an individual's commitment to change can co-exist and an individual's commitment to change can differ from another individual's commitment to change.

Affective commitment to change (ACC) refers to the wish to follow a change because of a belief in its benefits (Herscovitch & Meyer, 2002). To illustrate, this could mean that a high school teacher believes that the change initiative will lead to higher levels of student learning and therefore the teacher will have a positive attitude towards supporting the change. Continuance commitment to change (CCC) contains the perceived loss when not following the proposed change (Herscovitch & Meyer, 2002). For example, this could refer to the fear of losing one's job when not investing in the change initiative. Lastly, normative commitment to change (NCC) refers to a feeling of responsibility to follow a change initiative (Herscovitch & Meyer, 2002). This is affiliated with the belief or idea that it 'is the right thing to do'. In this research, this three-component model from Herscovitch and Meyer (2002) is applied.

Developing commitment to change

In order to positively influence a teacher's decision making-process towards change initiatives, developing a teacher's commitment to change is important (Herscovitch & Meyer, 2002). Doyle and Ponder (1977) were one of the first to introduce an ethic that could function as a strategy to influence the decision-making process. The so-called 'practicality ethic' conveys the idea that teachers tend to adopt changes that are seen as 'practical' over changes that are perceived as 'unpractical'. The three major components that play a role in this ethic according to Doyle and Ponder (1977) are instrumentality, congruence, and costs. Instrumentality refers to a clear description of procedures. Doyle and Ponder (1977) suggest teachers prefer change initiatives that are high in instrumentality. Congruence refers to the fact that teachers prefer a change when it is congruent with their own perceptions (Doyle & Ponder, 1997). The costs refer to the amount of investment and return, or to say: the ease of the adoption of the change initiative. The easier the adoption, the higher the chance a teacher will support the change initiative (Doyle & Ponder, 1997).

However, the practicality ethic relies on several assumptions about high school teachers' decision-making processes. The 'rational adopter' is one of those assumptions, which covers the thought that teachers decide on a rational basis (Doyle & Ponder, 1977) Correspondingly, Hutner and Markman (2015) stated that it is still commonly believed that are always fully aware of their decision-making processes and the reasoning behind those. In addition, according to Hutner and Markman (2015), it is assumed that the social environment of a teacher does not influence teachers in their cognitive processes prior to the making of decisions. All of the aforementioned assumptions are however proven to be wrong (Doyle & Ponder, 1977; Hutner & Markman, 2015).

Doyle and Ponder (1977) explained that teachers, as opposed to the 'rational adopting', are rather basing their decisions on pragmatic and normative motives. Hutner and Markman (2015) explained that a teacher can be influenced by a social desirability bias, which means that the answers of the teacher might be displaying what the teacher thinks is expected rather than what the teacher actually thinks. Alternatively, Hutner and Markman (2015) suggested that teachers might be influenced by their own thoughts and beliefs about the decision and, on the same time, by the thoughts

and beliefs held by their social environment. Hence, one can conclude that a teacher is not as rational as is still commonly assumed when it comes to decision-making. These assumptions might contribute to the earlier mentioned fundamental lack of understanding of the implementation and adoption of change initiatives. In its turn, this might lead to the inefficiency of many change strategies.

The role of bias in decision-making

If a teacher's decision-making process is indeed not as rational as one still tends to believe, the question arises what a teacher's decision-making process is possibly based on instead. Kahneman and Klein (2009), for example, describe the role of intuition in decision-making processes. It is explained that the decisions and judgments that are based on intuition evolve without cognitive awareness of the cues that caused those decisions and judgments. Thus, individuals are not always fully aware of their decision-making processes when following one's intuition. Furthermore, individuals also tend to neglect validation or falsification of these cues (Kahneman & Klein, 2009). This could result in systematic deviation from the norm or rationality in the decision-making process, which is called 'cognitive bias' (Haselton, Nettle, & Andrews, 2005). In other words, bias can cause systematic flaws in the process of decision-making. Concluding, one should be aware of biases which potentially could influence the commitment to change of a high school teacher.

The effects of cognitive bias have been demonstrated in a wide array of workplace environments over the last forty years (Furnham & Boo, 2011). A specific form of bias was investigated, which is called 'anchoring' (Furnham & Boo, 2011). When an irrelevant or uninformative message, value or stimulus nevertheless raises the commonness of a possible outcome, one can speak of 'anchoring' (Kahneman, 1992). Tversky and Kahneman (1974) were the first to conduct an experiment to investigate anchoring effects. The participants were asked to rate whether the percentage of African nations in the United Nations was higher or lower than a certain anchor (an irrelevant and randomly chosen number). The experiment showed that participants that were confronted with a high anchor answered with, on average, a higher percentage (45%) than the participants that received the lower anchor (25%) (Tversky & Kahneman, 1974). This experiment showed that individuals tend to make inadequate adjustments downwards when being presented with a higher anchor. Estimations are judged based on the direction of the anchors presented (Tversky & Kahneman, 1974). This experiment illustrates the anchoring effects.

The effects of anchoring on commitment to change

Thereupon, this leads to the idea that a bias caused by anchoring on high school teachers' commitment to change can possibly be demonstrated as well. When being able to elicit a bias caused by anchoring in this experiment, one could assume that, in real life, bias could be affecting a teacher's commitment to change as well. An insight into the factors that underlay a teacher's decision-making process can help with future development of strategies to further improve the adoption and implementation of change in educational settings. Concluding, the aim of this research is to examine whether a high school teacher's commitment to change is prone to anchoring effects. The following

research question is formulated: *"What is the influence of anchoring on the commitment to change (affective, continuance, and normative component) of high school teachers?".*

Nowadays it is still assumed that teachers base their decisions on rational arguments as provided by the practicality ethic from Doyle and Ponder (1977). However, as explained, a teacher tends to be prone to bias and therefore can show signs of irrationality in their decisions to implement a change in the classroom. An irrelevant or uninformative message, value or stimulus (anchor) can possibly influence their commitment to a certain change. One tends to adjust judgements based on the direction of the presented anchor (Tversky & Kahneman, 1974). This could mean that when teachers are confronted with a discouraging anchor (a low anchor) towards the change initiative, teachers will be less committed to the change. Whenever being presented with an encouraging anchor (a high anchor), teachers will possibly be more committed to the change initiative. Following this line of reasoning, expected is that *(H1) high school teachers will be less committed to change when being presented with a discouraging anchor than when being presented with an encouraging anchor.* Furthermore, the influence of gender and work experience on a high school teacher's commitment to change was investigated as well.

Anchoring effects and gender

In research from Kudryavtsev and Cohen (2011) is explained that women tend to pay more attention to details and valuable knowledge, whereas men are taking more risks and think rather globally. In addition, according to Rajdev and Raninga (2016) men often think more independently than women, whereas women are more cooperative and will follow others sooner. These differences account for the fact that women tend to come more into contact with or pay more attention to environmental cues than men do. As a result, Kudryavtsev and Cohen (2011) show that women are more prone to anchoring effects since women are more likely to pay attention and attach value to a presented anchor. One can, therefore, assume that bias caused by anchoring could have more influence on female high school teachers' commitment to change than on male high school teachers' commitment to change. The expectation arises that *(H2) female high school teachers' commitment to change will be more influenced by anchoring effects than male high school teachers commitment to change.*

Anchoring effects and work experience

The work experience of a high-school teacher is another factor that could possibly be of influence on the commitment to change when using the anchoring effects. Kahneman and Klein (2009) state that an expert is able to use practice and experience in order to make decisions, for example when adopting a possible change, on the basis of skilled intuition. According to Kahneman and Klein (2009), experts have the possibility of reacting upon valid cues from the environment since they had more practice to learn these cues. A novice, on the other hand, is not yet able to act upon these environmental cues and will not know where a decision came from. Novices will rather make use of heuristics in order to make decisions and not check upon their intuition. Heuristics are proven to

be prone to bias (Kahneman & Klein, 2009). Therefore, a novice teacher might have more chance to be influenced by bias caused by anchoring than an expert teacher.

Another line of reasoning follows from research from Ho and Liu (2015), in which is stated that expert teachers tend to express a certain consistency between one's own internal beliefs about teaching and the actual teaching behaviour. Contradictory, novice teachers were prone to show inconsistencies between internal beliefs and actual teaching behaviour when those internal beliefs conflicted with environmental factors. This lead to compromises in their decision-making process. Expert teachers were less affected by environmental factors (Ho & Liu, 2015). This means that novice teachers could be more influenced by an anchor, functioning as an environmental factor to affect the novice teacher's decision-making.

An alternative train of thought is that expert teachers use a broader scope of information to make decisions than novice teachers (Ho & Liu, 2015). Smith, Windschitl and Bruchmann (2013) similarly stated that high-knowledge participants have more access to information that is incompatible with the presented anchor than low-knowledge participants. Therefore, high-knowledge teachers might have more opportunity to disagree with the anchor (Smith et al., 2013). This could mean that the anchor is less affecting highly knowledgeable teachers than lower knowledge teachers. As all information points to the following direction, it is expected that *(H3) the commitment to change of experienced high school teachers will be less influenced by anchoring effects than the commitment to change of inexperienced high school teachers.*

Method

Design

A between-groups experimental design was employed. The participants were randomly assigned to three possible conditions. The first condition was the control condition in which no anchor was presented. The second condition was an experimental condition in which an encouraging anchor (high anchor: 7.1) was presented (further referred to as experimental condition high). The third condition was an experimental condition in which a discouraging anchor (low anchor: 4.9) was presented (further referred to as experimental condition low). The condition to which the participant was assigned to, functioned as the independent variable. Commitment to change, consisting of three subscales (affective commitment to change (ACC), continuance commitment to change (CCC) and normative commitment to change (NCC)), was the dependent variable. Furthermore, the variables 'gender' and 'work experience' in relation to the dependent variable were investigated as well.

Participants

Eleven high schools in the Netherlands agreed to participate. The schools were selected by using convenience sampling. A total of 275 responses were collected. Participants that did not proceed with the questionnaire after the demographic questions were excluded from the data set. This resulted in a total of 195 high school teachers in the age range of 21 to 65 years old (M = 43.34, SD = 11.66)

that voluntarily participated in the experiment. The distribution of gender was 43.1 percent male (N = 84), 56.4 percent female (N = 110), and 0.5 percent 'other' (N = 1). The years of work experience of the participants differed between 0 and 43 years (M = 15.42, SD = 10.35). The average grade for job satisfaction was 7.51 out of ten. A summary of the other demographic variables can be found in Table 1. In total, 56 high school teachers were assigned to the control condition, 70 to experimental condition high and 69 to experimental condition low. This research was approved by the BMS Ethics Committee of the University of Twente. The participants gave active informed consent before the start of the experiment.

Table 1

Overview of Percentages of Demographic Variables

		N	Percentages
Substructure[1]	Onderbouw	87	44.6%
	Bovenbouw	108	55.4%
(Highest) degree	Secondary vocational education (MBO)	2	1.0%
	University of applied science (HBO)	120	61.5%
	University of applied science – master (HBO-master)	30	15.4%
	University (WO)	42	21.5%
	Doctorate (gepromoveerd)	1	.5%
Main subject	Geography (Aardrijkskunde)	9	4.6%
	Visual arts (Beeldende vorming)	5	2.6%
	Biology (Biologie)	10	5.1%
	(CKV)	2	1.0%
	German (Duits)	7	3.6%
	Economics (Economie)	5	2.6%
	English (Engels)	22	11.3%
	French (Frans)	6	3.1%
	History (Geschiedenis)	11	5.6%
	Religion (Godsdienst)	4	2.1%
	Greek (Grieks)	1	0.5%
	Informatics (Informatica)	1	0.5%
	Art (Kunst)	1	0.5%
	Latin (Latijn)	2	1.0%
	Social sciences (Maatschappijleer)	5	2.6%
	Music (Muziek)	2	1.0%
	Management and Organisation (M&O)	3	1.5%
	Physics (Natuurkunde)	11	5.6%
	Dutch (Nederlands)	21	10.8%
	Sports (Lichamelijke opvoeding)	11	5.6%
	Chemistry (Scheikunde)	3	1.5%
	Technics (Techniek)	7	3.6%
	Care / Nursing (Verzorging)	1	0.5%
	Math (Wiskunde)	22	11.3%
	Other (Anders)	23	11.8%

[1] In the Netherlands, high schools are divided in two substructures, which are called 'onderbouw' and 'bovenbouw'. The 'onderbouw' represents the first two to three years of high school and the 'bovenbouw' represents the latter years of high school. The exact number of years that count for both the 'onderbouw' and 'bovenbouw' depends on the level of education (Nuffic, 2018).

Materials

An online questionnaire (in Qualtrics) was used in this experiment. The questionnaire consisted of different parts and was presented to the participants in the following order: demographic questions, a questionnaire directed to habits, a scenario, a manipulation question and a commitment to change questionnaire. All parts, except the demographic questions, were presented to the participant twice, for two different scenarios (21st-century skills and differentiation). The different parts of the questionnaire will be accounted for in the same order as described here.

Factor analysis. A factor analysis, principal axis factoring with direct oblimin rotation, was performed twice to determine the validity of the questionnaires for each scenario. For the first factor analysis ($N = 145$), related to the items concerning the 21st-century skills, seven factors with Eigenvalues exceeding 1 were found. In total, these factors accounted for 62% of the variance in the questionnaire. For the second factor analysis ($N = 157$), related to differentiation, five factors with Eigenvalues exceeding 1 were found. In total, these factors accounted for around 61% of the variance in the questionnaire. Expected was to find four factors since the items were related to the habit questionnaire and to the three subscales of commitment to change (ACC, CCC and NCC). Therefore, a fixed factor analysis with four factors was executed. The factor loadings can be found in Appendix A (Table 2 and 3). As can been seen in Table 2 and 3, the items of the habit questionnaire almost all load on one factor. Concerning the items of commitment to change, this is more questionable. On grounds of content was chosen to proceed with the pre-existing classification of four factors, based on the habit questionnaire and the three subscales of commitment to change.

Demographic questions. Questions regarding the participants' function, gender, age, (highest) obtained degree, work experience in years, substructure, main subject, and job satisfaction were asked. For function, one could choose from 'school leader', 'teacher' or 'other'. Only when 'teacher' was selected, the participant could proceed with the questionnaire. This means that this experiment focused only on high school teachers. Furthermore, an answer including less than three years or three years of work experience would describe an inexperienced teacher. An answer including more than three years of work experience referred to an experienced teacher in this experiment. This was decided based on research from Mok (1994) and Melnick and Meister (2008).

Habit questionnaire. This questionnaire was based on the Self-reported Habit Index (SRHI) from Verplanken and Orbell (2003). It measures the extent to which teachers exhibit certain behaviour as a habit. This could be translated as how much experience the teachers had with both 21st-century skills and differentiation in the classroom. This questionnaire consists of twelve items and was translated into Dutch for this experiment. The SRHI had to be filled out twice. Once regarding the 21st-century skills and once for differentiation. Example items are "*the stimulating of 21st-century skills is something I do frequently"* and "*differentiating between my students is something that would require effort not to do it"*. These items were judged on Likert scales ranging from *disagree* (1) to *agree* (5). Cronbach's alpha for the 12-item Habit questionnaire regarding the 21st-century skills ($N = 167$) was

.94. Cronbach's alpha for the 12 items related to differentiation (N = 178) was .96. Both can be perceived as excellent internal consistency (Gliem & Gliem, 2003). The results of the habit questionnaire were not taken into account in this experiment.

Scenarios. For this experiment, two different scenarios were presented to each participant. The first scenario was about the change initiative 21st-century skills, which includes skills like collaboration, communication, problem-solving, critical thinking, creativity, and digital literacy (Van Laar, van Deursen, van Dijk, & de Haan, 2017). The second scenario was about differentiation as a change initiative. Differentiation means that teachers monitor the progress of individual students and adapt the instruction to the needs of individual students (Deunk, Smale-Jacobse, de Boer, Doolaard, & Bosker, 2018). Both scenarios were developed by the researchers themselves and underwent a pilot-test in which two experts in the field were consulted. The reasoning behind these developed scenarios is the earlier mentioned 'practicality ethic' from Doyle and Ponder (1977) since it is assumed that teachers base their decisions on rational arguments as provided by this ethic. For the context of the scenarios, those assumptions were maintained to possibly prove otherwise by means of the anchoring effect. Therefore, the emphasis lies on the presumed benefits, the ease of use, and low investment of the proposed changes.

Manipulation. A manipulation question was developed to possibly elicit the anchoring effects. The teachers were asked to rate the value of the proposed change (21st-century skills or differentiation) between 0 and 10 with a higher or lower grade than the encouraging anchor (7.1) in experimental condition high or, in experimental condition low, higher or lower than the discouraging anchor (4.9). In this experiment, the 7.1 was hoped to be considered an encouraging anchor, as it would suggest that the proposed change is valuable. The discouraging anchor of 4.9 was hoped to have the opposite effect. The values were randomly chosen. There was no anchor presented to the participants that were assigned the control condition.

Commitment to change questionnaire. The commitment to change questionnaire was based on the one developed by Herscovitch and Meyer (2002). The questionnaire aimed at measuring the participants' ACC, CCC and NCC towards the proposed changes (21st-century skills and differentiation). Each of the components of commitment to change had six items to measure them, thus a total of eighteen items to measure commitment to change. The items were translated into Dutch. The questionnaire was filled out twice, for both scenarios once. Example items are "*the stimulation of 21st-century skills of my students serves an important purpose"* and "*it would be irresponsible of me to resist differentiating between my students"*. These items were judged on Likert scales ranging from *disagree* (1) to *agree* (5). For each of the components of commitment to change (ACC, CCC and NCC), a Cronbach's alpha was calculated. For the items in regard to the 21st-century skills (N = 145), the Cronbach's alpha was, in order of ACC, CCC and NCC, .83, .82 and .71. As for the items in relation to differentiation (N = 157), the Cronbach's alpha was .85, .84 and .70. These results can be perceived as acceptable to good internal consistency (Gliem & Gliem, 2003).

Procedure

The participants could participate in the experiment by clicking on the link provided by the school director (or secretary). This link directed the participants to the online questionnaire developed for this experiment. The participants were first informed about the goal of the research and the confidentiality of personal details. Consequently, the participants were asked to give active informed consent. When a participant gave consent to voluntarily participate in the experiment, the questionnaire followed with demographic questions about the participant.

Thereafter, the participants were randomly assigned to one of six conditions in the online questionnaire. There were six conditions since the three earlier mentioned conditions (control condition, experimental condition high an experimental condition low) were subdivided by the order in which the scenarios were presented. Fifty per cent of the participants started with questions about the 21st-century skills scenario and fifty per cent started with questions about the differentiation scenario.

First of all, the participants were asked to answer questions related to their experience with one of the aforementioned proposed changes. Secondly, the scenario was presented to the participants, followed by the manipulation question. Consequently, questions were asked about the participants' commitment to the proposed change in the scenario. The same order was applied for the second scenario. Lastly, a debriefing was provided to the participants. In the debriefing, the anchoring effects were briefly explained and contact details of the researcher were given. The questionnaire took approximately fifteen minutes to fill-out.

Data analysis

For executing the statistical analyses, the statistical software SPSS (25.0) was used. Before testing the hypotheses, it was analysed whether the manipulation had worked. For this, the values given by the participants to the proposed changes (one variable for 21st-century skills and one variable for differentiation) were the dependent variables. The independent variable was the condition to which the participants were randomly assigned to, as this accounted for the presented anchors. A one-way between groups ANOVA was executed. Beforehand, the assumptions of normal distribution and homogeneity of variance were tested. A significance level of $\alpha < .05$ was used.

For each of the three hypotheses, the three subscales of commitment to change were considered the dependent variables; ACC, CCC, NCC. The independent variables differed per hypothesis: condition (H1), condition and gender (H2) and condition and work experience (H3). For the first hypothesis, a one-way MANOVA was executed. A two-way MANOVA was executed for the second and third hypotheses. The analysis was performed twice for each hypothesis: once for each scenario. Prior to the analyses, it was investigated whether the following necessary criteria were met: the normality distribution of each of the variables, absence of multicollinearity, a (rough) linear relationship between each of the dependent variables and homogeneity of variance-covariance. A significance level of $\alpha < .05$ was considered the threshold. Post-hoc analyses were executed, in case of

a significant effect, to establish between which conditions the difference occurred. Gabriel's post-hoc test was used when the group sizes were unequal (Allen & Bennett, 2010). Hochberg's GT2 post-hoc test was used when the group sizes were extremely unequal (Allen & Bennett, 2010).

Regarding the second hypothesis, the one participant that indicated 'other' as gender, was filtered out of the dataset for this analysis, as this hypothesis focused only on the difference between female and male teachers. In advance to analysing the third hypothesis, work experience was split into two groups: a group with high school teachers who had less than or three years of work experience and a group with high school teachers who had more than three years of work experience.

Results

Descriptive statistics

Pearson R was used to establish the correlations between commitment to change, gender, and work experience (see Table 4). Commitment to change was split into three components: affective commitment to change (ACC), continuance commitment to change (CCC) and normative commitment to change (NCC). A difference was made between commitment to change for each scenario: 21st-century skills and differentiation. The correlations printed in **bold** are found to be significant. A negative correlation means that, on average, a low score on one of the variables is accompanied by a high score on another variable or vice versa. This is the case for ACC for 21st-century skills and CCC for 21st-century skills, for ACC for differentiation and CCC for differentiation and for the resulting two combinations. Another negative correlation was found between NCC for differentiation and work experience. This means that, on average, less work experience is accompanied by a high score on NCC for differentiation and vice versa.

A positive correlation was found for ACC for 21st-century skills and NCC for 21st-century skills, for ACC for differentiation and NCC for differentiation and the resulting two combinations, meaning that a high score on one variable is accompanied by a high score on the other variable and vice versa. Furthermore, a positive correlation was found between ACC for differentiation and for 21st-century skills. This means that, on average, when one scores high on ACC for one of the scenarios, the person will score high on ACC for the other scenario as well and vice versa. Similarly, a positive correlation is found between both scores on CCC and between both scores on NCC as well. Lastly, a positive correlation was found between NCC for differentiation and CCC for differentiation. Thus, a high score on NCC will result in a high score on CCC and vice versa.

Table 4

Pearson's Correlations of Commitment to Change, Gender and Work Experience (WorkE)

	1	2	3	4	5	6	7	8
1. ACC_21	1							

	1	2	3	4	5	6	7	8
2. CCC_21	**-.42***	1						
3. NCC_21	**.44***	.05	1					
4. ACC_dif	**.39***	**-.29***	**.21***	1				
5. CCC_dif	**-.35***	**.65***	.13	**-.33***	1			
6. NCC_dif	**.24***	.11	**.51***	**.31***	**.33***	1		
7. Gender	.06	-.05	.11	.15	.01	.07	1	
8. WorkE	-.05	.00	.04	-.10	-.03	**-.18***	-.03	1
M	3.87	2.62	3.32	4.05	2.56	3.36	1.57	15.42
SD	0.61	0.74	0.61	0.61	0.81	0.69	0.51	10.35
N	145	145	145	157	157	157	195	195

*. $p < 0.05$ (2-tailed)

Manipulation check

A one-way between groups ANOVA was executed twice to investigate whether the manipulation questions had worked. The first analysis was aimed at the value given to the proposed change '21st-century skills' ($N = 159$), and the second analysis at the value given to the proposed change 'differentiation' ($N = 175$).

21st-century skills. The Shapiro-Wilk tests indicated an absence of normal distribution, but the normality plots showed that the departure from normality was moderate. A continuance of analysis was possible as the ANOVA is quite robust against violations of the normality assumption. Levene's statistic was non-significant, F (2, 156) = 1.96, p = .145, which means that the assumption of homogeneity of variance has not been violated. The ANOVA was non-significant, F (2, 156) = 0.09, p = .910, which indicates that the presented anchors (or lack of an anchor in the control condition) in each condition did not have an effect on the value given to the proposed change. Therefore, the manipulation did not work as expected.

Differentiation. According to the Shapiro-Wilk test, some of the variables lacked a normal distribution. However, the plots showed that the departure from normality was mild. The analysis was continued because of the robust nature of the ANOVA. Levene's statistic was non-significant, F (2, 172) = 0.50, p = .605, which means that the assumption of homogeneity of variance has not been violated. No significant effect was found when executing the ANOVA, F (2, 172) = 0.66, p = .521. Similar to the first scenario, one can conclude that no effect was found of the presented anchors in each condition on the value given the proposed change. This means that the manipulation did not succeed as intended.

Anchoring and commitment to change

A one-way MANOVA was used to examine the influence of anchoring on the commitment to change (ACC, CCC and NCC) of high school teachers. The analysis was performed twice, first for the scenario of 21st-century skills ($N = 145$) and afterwards for the scenario of differentiation ($N = 157$).

21st-century skills. Shapiro-Wilk tests showed that the majority of variables was not normally distributed, although the plots showed only mild deviation. Furthermore, multivariate outliers were found, which implies that the assumption of multivariate normality was violated too. However, a continuance of the analysis was possible since the group sizes exceeded thirty participants. There were no excessive correlations between the dependent variables, which means that there was no indication of multicollinearity. In addition, the relationships between the dependent variables appeared to be roughly linear. Box's M was non-significant at $\alpha = .001$ which indicates that the assumption of homogeneity of variance-covariance has not been violated. According to the MANOVA, no significant effect was found for the program variable (condition) on the combined dependent variables, $F(6, 282) = 0.96$, $p = .451$, partial $\eta^2 = .020$. An analysis of the individual dependent variables did not show any significant effects either (see Table 5). This means that for the scenario of 21st-century skills no difference was found in the influence of anchoring on the ACC, CCC or NCC of high school teachers.

Table 5

Summary of Univariate Analyses of Subscales of Commitment to Change for 21st-Century Skills

Predictor	Dependent variables	F	p	Partial η^2
Condition	Affective commitment to change	0.15	.860	.002
	Continuance commitment to change	0.89	.413	.012
	Normative commitment to change	1.15	.318	.016

Differentiation. Most of the variables were normally distributed according to the Shapiro-Wilk tests and plots. Multivariate outliers were found, which implies that the assumption of multivariate normality was violated. However, a continuance of the analysis was possible since the group sizes exceeded thirty participants. There were no excessive correlations between the dependent variables, which means that there was no indication of multicollinearity. In addition, rough linear relationships were found between the dependent variables. Box's M was non-significant at $\alpha = .001$ which indicates that the assumption of homogeneity of variance-covariance has not been violated. The MANOVA was non-significant for the program variable (condition) on the combined dependent variables, $F(6, 306) = 1.57$, $p = .155$, partial $\eta^2 = .030$. However, when analysing the dependent variables individually (see Table 6), a significant effect for condition on NCC was found, $F(2, 154) = 3.90$, $p = .022$, partial $\eta^2 = .048$.

Consequently, a post-hoc test (*Gabriel*) showed that high school teachers who were presented with a low anchor ($M = 3.15$, $SD = 0.09$) scored significantly lower on NCC than when high school teachers were presented with a high anchor ($M = 3.50$, $SD = 0.09$). This analysis shows that, in the case of differentiation, the anchor presented to the participants did have an effect on the NCC of high school teachers.

Table 6

Summary of Univariate Analyses of Subscales of Commitment to Change for Differentiation

Predictor	Dependent variables	*F*	*p*	Partial η^2
Condition	Affective commitment to change	1.93	.149	.024
	Continuance commitment to change	0.04	.965	.000
	Normative commitment to change	3.90	.022	.048

Gender and commitment to change

A two-way MANOVA was used to investigate the difference between the influence of anchoring on male and female high school teachers' commitment to change (ACC, CCC and NCC). First, the commitment to change of high school teachers in relation to the scenario of 21st-century skills was investigated ($N = 144$), followed by an analysis of the effect in case of the scenario of differentiation ($N = 156$).

21st-century skills. The Shapiro-Wilk tests showed that the majority of the variables were normally distributed. However, the Mahalanobis Distance indicated signs of multivariate outliers, which violated the assumption of multivariate normality. Nevertheless, a continuance of analysis was possible as the group sizes for both gender and condition exceeded thirty participants. The resting assumptions of homogeneity of variance-covariance, linearity and no multicollinearity were satisfied. The two-way MANOVA showed no effect for the interaction variable (*Gender x Condition*) on the combined dependent variables, $F(6, 274) = 0.71$, $p = .640$, partial $\eta^2 = .015$. An analysis of the effect of the interaction variable on the individual dependent variables did not show any significant effects either (see Table 7). This means that for the scenario of 21st-century skills no difference was found between the influence of anchoring on female and male teachers' ACC, CCC or NCC.

Table 7

Summary of Univariate Analyses of Subscales of Commitment to Change for 21st-Century Skills

Predictors	Dependent variables	*F*	*p*	Partial η^2
Gender *	Affective commitment to change	1.95	.146	.027
Condition	Continuance commitment to change	0.39	.742	.004
	Normative commitment to change	0.61	.544	.009

Predictors	Dependent variables	*F*	*p*	Partial η^2
Gender	Affective commitment to change	5.36	.022	.037
	Continuance commitment to change	0.84	.361	.006
	Normative commitment to change	3.89	.050	.027
Condition	Affective commitment to change	0.99	.375	.014
	Continuance commitment to change	0.85	.432	.012
	Normative commitment to change	0.67	.513	.010

Differentiation. Most of the variables seemed to be normally distributed, according to the Shapiro-Wilk tests and normality plots. However, the assumption of multivariate normality has been violated, as multivariate outliers were found. Continuance of analysis was possible since the group sizes exceeded thirty participants. The resting assumptions of homogeneity of variance-covariance, linearity and no multicollinearity were satisfied. No effect was found when executing the two-way MANOVA, F (6, 298) = 0.85, p = .536, partial η^2 = .017. An analysis of the effect of the interaction variable on the individual dependent variables did not show any significant effects either (see Table 8). This means that, for the scenario of differentiation, no difference was found between the influence of anchoring on female and male high school teachers' ACC, CCC or NCC.

Table 8

Summary of Univariate Analyses of Subscales of Commitment to Change for Differentiation

Predictors	Dependent variables	*F*	*p*	Partial η^2
Gender *	Affective commitment to change	0.84	.433	.011
Condition	Continuance commitment to change	0.21	.812	.003
	Normative commitment to change	0.91	.405	.012
Gender	Affective commitment to change	2.65	.105	.017
	Continuance commitment to change	0.00	.981	.000
	Normative commitment to change	1.24	.267	.008
Condition	Affective commitment to change	1.80	.169	.023
	Continuance commitment to change	0.02	.978	.000
	Normative commitment to change	2.83	.062	.036

Work experience and commitment to change

To investigate the difference between the influence of anchoring on experienced and inexperienced high school teachers' commitment to change (ACC, CCC and NCC), another two-way MANOVA was executed. The first MANOVA was directed to the scenario of 21st-century skills (N = 145) and the second analysis was aimed at the scenario of differentiation (N = 157).

21st-century skills. The Shapiro-Wilk test and plots showed that most of the variables were normally distributed. However, the Mahalanobis Distance implied multivariate outliers, which violates the assumption of multivariate normality. The analysis was still continued, as the MANOVA is quite robust against violations of normality. The resting assumptions of homogeneity of variance-covariance, linearity and no multicollinearity were satisfied. The two-way MANOVA was statistically non-significant for the interaction variable (*Work Experience x Condition*) on the combined dependent variables, $F(6, 276) = 0.15$, $p = .990$, partial $\eta^2 = .003$. An analysis of the effect of the interaction variable on the individual dependent variables did not result in any significant effects either (see Table 9). Therefore, it could be stated that there is no difference found between the effect of anchoring on inexperienced and experienced high school teachers' ACC, CCC and NCC.

Table 9

Summary of Univariate Analyses of Subscales of Commitment to Change for 21st-Century Skills

Predictors	Dependent variables	*F*	*p*	Partial η^2
WorkE *	Affective commitment to change	0.03	.970	.000
Condition	Continuance commitment to change	0.24	.790	.003
	Normative commitment to change	0.04	.960	.001
WorkE	Affective commitment to change	0.33	.567	.002
	Continuance commitment to change	0.96	.328	.007
	Normative commitment to change	0.53	.466	.004
Condition	Affective commitment to change	0.15	.860	.002
	Continuance commitment to change	0.74	.481	.010
	Normative commitment to change	0.34	.710	.005

Differentiation. The majority of the variables seemed to be normally distributed following the Shapiro-Wilk tests and normality plots. Multivariate outliers were found, which indicates that the assumption of multivariate normality has been violated. Nevertheless, the analysis was continued. The resting assumptions of homogeneity of variance-covariance, linearity and no multicollinearity were satisfied. The two-way MANOVA was statistically non-significant for the interaction variable (*Work Experience x Condition*) on the combined dependent variables, $F(6, 300) = 1.57$, $p = .155$, partial $\eta^2 = .030$. An analysis of the effect of the interaction variable on the individual dependent variables (see Table 10) showed a significant effect for the interaction variable on CCC, $F(2, 151) = 3.97$, $p = .021$, partial $\eta^2 = .050$.

Table 10

Summary of Univariate Analyses of Subscales of Commitment to Change for Differentiation

Predictors	Dependent variables	*F*	*p*	Partial η^2
WorkE *	Affective commitment to change	1.82	.165	.024
Condition	Continuance commitment to change	3.97	.021	.050
	Normative commitment to change	0.31	.734	.004
WorkE	Affective commitment to change	0.01	.933	.000
	Continuance commitment to change	5.66	.019	.036
	Normative commitment to change	0.44	.508	.003
Condition	Affective commitment to change	2.30	.104	.030
	Continuance commitment to change	1.66	.194	.022
	Normative commitment to change	3.09	.049	.039

Post-hoc analyses (*Hochberg's GT2*) were executed to see where the difference occurred. This showed that experienced high school teachers in the control condition ($M = 2.76$, $SD = 0.13$) scored significantly higher on CCC than inexperienced high school teacher in the control condition ($M = 1.58$, $SD = 0.32$). This means that, without the interference of the anchors, more work experience results in a higher CCC for the scenario of differentiation.

Summary

For an overview of the status per hypotheses, one is referred to Table 11.

Table 11

Summary of Status of Hypotheses per Scenario

Hypotheses	Scenario	Condition	Status
(H1): Expected is that high school teachers would be less committed to change when being presented with a discouraging anchor than when being presented with an encouraging anchor.	21st-century skills	Control vs. high anchor	Rejected
		Control vs. low anchor	Rejected
		High anchor vs. low anchor	Rejected
	Differentiation	Control vs. high anchor	Rejected
		Control vs. low anchor	Rejected
		High anchor vs. low anchor	**Accepted***
(H2): Expected is that female high school teachers' commitment to change will be more influenced by anchoring effects than male high school teachers commitment to change.	21st-century skills	Control	Rejected
		High anchor	Rejected
		Low anchor	Rejected
	Differentiation	Control	Rejected
		High anchor	Rejected
		Low anchor	Rejected

Hypotheses	Scenario	Condition	Status
(H3): Expected is that the commitment to change of experienced high school teachers will be less influenced by anchoring effects than the commitment to change of inexperienced high school teachers.	21st-century skills	Control	Rejected
		High anchor	Rejected
		Low anchor	Rejected
	Differentiation	Control	**Accepted****
		High anchor	Rejected
		Low anchor	Rejected

*. Only for normative commitment to change.

**. Only for continuance commitment to change.

Discussion

The purpose of this experiment was to investigate the effect of bias caused by anchoring on the commitment to change (affective commitment to change (ACC), continuance commitment to change (CCC) and normative commitment to change (CCC)) of high school teachers. The following main research question and subsequent hypothesis were investigated: *"what is the influence of anchoring on the commitment to change (ACC, CCC and NCC) of high school teachers?"*. It was expected that high school teachers would be less committed to change when being presented with a discouraging anchor than when being presented with an encouraging anchor. Two additional hypotheses were examined in this experiment, namely that female high school teachers' commitment to change would be more influenced by anchoring effects than male high school teachers commitment to change and that the commitment to change of experienced high school teachers would be less influenced by anchoring effects than the commitment to change of inexperienced high school teachers.

Manipulation

The values given to the proposed changes did not differ among the different conditions with either no anchor, a high anchor or a low anchor. This is an unexpected result since previous research did prove the effect of anchoring in many different workplace environments (Furnham & Boo, 2011). Tversky and Kahneman (1974) explained that an anchor affects one's estimations or judgements based on the direction of the anchor. However, the same effect did not occur in this experiment, even though different directions of anchors were used (a discouraging anchor (4.9) and an encouraging anchor (7.9)) to direct the participants in their appreciation of the proposed change. Possible explanations are given in a research paper from Wegener, Petty, Detweiler-Bedell and Jarvis (2001), in which is explained that, first of all, it could be that the chosen anchors in this experiment were too extreme. As opposed what is often assumed in literature on the anchoring effects, more moderate anchors lead to more excessive anchoring effects (Wegener et al., 2001).

Alternatively, it could be that some of the participants were favourable towards the change initiative and, therefore, when being presented with a discouraging anchor, found a reason to disagree

instead of agreeing with the anchor and valued the proposed change otherwise. This is called 'discomfirmatory search' as opposed to 'confirmatory search' (Wegener et al., 2001). Some participants engaging in discomfirmatory search could have evened out the manipulation effect, which means that the anchoring effect possibly might have worked in a certain way for some of the participants.

Normative influence

For the scenario regarding differentiation, high school teachers who were presented with a low anchor scored lower on NCC than high school teachers who were presented with a high anchor. This suggests that high school teachers confronted with a high anchor expressed more responsibility to implement the change initiative and felt more like it 'was the right thing to do'. This is in line with the first hypothesis: "*expected is that high school teachers will be less committed to change when being presented with a discouraging anchor than when being presented with an encouraging anchor".* However, the same result has not been found for any of the other subscales of commitment to change and neither for the scenario of 21st-century skills.

A possible explanation could be that the anchors in combination with the scenario functioned as a norm instead. The anchors could have elicited a normative influence. Normative influence is the process in which the normal is defined and, consequently, will be seen as the standard to aim for (Banyard, Dillon, Norman, & Winder, 2015). This can lead to conformity, because of fear of negative social consequences when not following the norm (Kassin, Fein, & Markus, 2014). A feeling of responsibility to follow the norm or feeling like 'it is the right thing to do' can be a consequence. Those feelings define NCC (Herscovitch & Meyer, 2002). If the scenario, in combination with the presented anchors, elicited a strong normative influence, this could explain why only a difference was found for normative commitment to change.

Gender

The results indicated that, for both scenarios, no difference was found between the influence of anchoring on female and male high school teachers' commitment to change. This is contradicting the second hypothesis: "*expected is that female high school teachers' commitment to change will be more influenced by anchoring effects than male high school teachers commitment to change".* This hypothesis was based on the idea that woman are more likely to attend to details in the environment and, therefore, would attach more value to anchors (Kudryavtsev & Cohen, 2011; Rajdev & Raninga, 2016). Even though this statement could still be true, Beblo, Beninger and Markowsky (2017) explain that this effect might be lost due to a similar level of experience with the specific task or due to similar levels of previous education.

In this research is stated that the observed gender differences in literature on anchoring might rather be due to gender differences regarding level of previous education and/or the experience with the specific task (Beblo et al., 2017). Thus, in case, on average, no differences in the level of previous education and/or experience with the proposed changes (21st-century skills or differentiation) existed

between both female and male high school teachers, this could account for the lack of results. A similar statement was made before by Eagly and Carli (1981) about conformity bias, which contained the idea that any difference in a tendency to conform would rather stem from one's familiarity with the situation (for example with the proposed changes) and not from one's gender.

Work experience

The results revealed that the anchoring effects did not cause any differences between experienced and inexperienced high school teachers' commitment to change. This is contradicting the third hypothesis: "*expected is that the commitment to change of experienced high school teachers will be less influenced by anchoring effects than the commitment to change of inexperienced high school teachers".* An explanation could be that expertise of high school teachers is not so much defined by the years of work experience, as was used in this experiment based on research from Mok (1994) and Melnick and Meister (2008), but more by the knowledge, expertise and/or familiarity with the proposed changes (Eagly & Carli, 1981; Smith et al., 2013; Beblo et al., 2017).

This means that it could be that experienced and inexperienced teachers, differentiated by years of work experience, were evenly knowledgeable, experienced and/or familiar with both 21st-century skills and differentiation. The concept of 21st-century skills gained attention last years due to the shift to a more knowledge-based economy (Van Laar et al., 2017). Even though the concept of differentiation exists already longer, it recently regained attention due to the fact that research pointed out the lack of differentiation in secondary education in the Netherlands (ResearchNed, 2017). Due to these facts, both inexperienced and experienced teachers might have been just as up-to-date on the proposed changes. This could have contributed to the lack of differences.

Apart from the experimental conditions, the results did indicate that experienced high school teachers in the control condition scored higher on CCC than inexperienced high school teachers in the control condition. This indicates that more work experience in years contributes to, as CCC is defined by Herscovitch and Meyer (2002): more perceived loss when one is not supporting the change initiative. An explanation of why experienced high school teachers scored higher on CCC, therefore, could be that those teachers have higher amounts of investment in the job because of more years of experience. As a result, experienced high school teachers might experience more perceived loss when not complying with the proposed change.

The fact that the same difference did not occur in the experimental conditions, might imply that the anchors actually did have some kind of effect. In the experimental conditions, it could be that the anchors functioned as indications for more perceived loss for the inexperienced teachers since these teachers scored higher on CCC in the experimental conditions than in the control condition. This could have caused the differences between inexperienced and experienced teachers in the experimental conditions to disappear. However, this would mean that inexperienced teachers were more affected by the anchors than the experienced teachers and this seems to be contradicting the other results found.

Hence, this shows that the search for a comprehensive understanding of the anchoring effect is not over yet and future research is necessary.

Limitations

A potential shortcoming of the experiment can lie in the fact that results were found for the scenario of differentiation, but not for the scenario of 21st-century skills. This could be explained by the outcome of the factor analyses previously described. The factor analyses revealed that, instead of the expected four factors, seven underlying factors were present for the items of the scenario of 21st-century skills. For the items concerning differentiation, only five underlying factors were found. The analyses show that the items in relation to 21st-century skills could have caused more unclarity or confusion with the participants than the items related to differentiation. This could be due to the fact that 21st-century skills contain multiple aspects, like for example critical thinking, collaboration, and problem-solving (Van Laar et al., 2017). The ambiguity could have been a result of this since one can have different opinions about different aspects of the 21st-century skills and have troubles filling out the questionnaire as if one is talking about one aspect. Therefore, this explanation could account for the fact that the same results have not been found for the scenario related to the 21st-century skills.

Furthermore, the results showed high indications of multivariate outliers for each hypothesis. Outliers can be defined as scores that do not fit the rest of the data (Etikan, Musa, & Alkassim, 2016). These multivariate outliers can be caused by the use of convenience sampling in this experiment (Etikan et al., 2016). Convenience sampling means that the participants in this experiment are participating due to their accessibility rather than a random selection of participants (Etikan et al., 2016). This causes the possibility that the schools that agreed to participate were, for example, more favourable towards organisational change than high school teachers that did not participate. One of the participants also mentioned feeling like the questionnaire assumed that one is opposed to change initiatives and stated not to be. The earlier described ‘discomfirmatory search’ could have been a consequence. This means that, for example, participants who were favourable towards the change initiative disagree, found a reason to disagree with the discouraging anchor and valued the proposed change better instead (Wegener et al., 2001). This is an example of bias that could have played a role due to the convenience sampling (Etikan et al., 2016). Therefore, the results of this experiment are hard to generalize to the general population of high school teachers in the Netherlands.

Lastly, the most prominent limitation of this experiment lies in the fact that the role of familiarity with (or knowledge of) the proposed changes is not taken into account. Familiarity with the proposed change could have acted as a confounding variable. A confounding variable can affect the variables investigated in a study and cause the findings not to reflect the true relationships (Pourhoseinholi, Baghestani & Vahedi, 2012). If one’s tendency to conform is indeed influenced by one’s familiarity with the situation (Eagly & Carli, 1981; Smith et al., 2013; Beblo et al., 2017), the possibility exists that familiarity with the proposed change influences one’s tendency to commit to a

change. The fact that the effect of familiarity with the proposed changes was not taken into account in this experiment could have been a possible source of error.

Scientific and practical implications

Even though we expected, based on previous research (Furnham & Boo, 2011; Kahneman & Klein 2009; Tversky and Kahneman, 1974), to find anchoring effects and this research did not as expected; the possible effects of anchoring are not yet ruled out. This experiment possibly rather showed the effects of conformity bias in the form of normative influence. However, the results did reveal that an unconscious process can affect one's commitment to change. This is proven by research from Nolan, Schultz, Cialdini, Goldstein and Griskevicius (2008) in which participants stated to believe to be least influenced in their behaviour by a descriptive norm, but ended up being most influenced by the norm. This shows how normative influence can affect commitment to change in an unconscious manner. Even though it is still commonly assumed that teachers are rational actors in decision-making processes (Doyle & Ponder, 1977; Hutner & Markman, 2015), this experiment sheds light on the influence of unconscious processes.

In addition, this experiment indicates that the role of familiarity, knowledge or experience with the situation or topic plays a huge role in the effects of anchoring. Other studies already mentioned the role of these factors affecting the influence of the anchoring effects before (Eagly & Carli, 1981; Smith et al., 2013; Beblo et al., 2017), and the same is suggested by the results, or to say; the lack of results, in this experiment. Interesting might be to investigate whether it is exactly familiarity, knowledge or experience what is affecting the influence of the anchoring effects the most. Tang and Lin (2017), for example, suggest that knowledge should be complemented by experience to not be affected by the anchoring effects and that solely knowledge will not be enough. Furthermore, Tang and Lin (2017) also already give suggestions of situations in which high-knowledge and experienced participants will still be affected by the anchoring effects, for example by time-pressure. More scientific insight into the role of these factors can contribute to the knowledge of factors affecting high school teachers' commitment to change.

Practically, this experiment could contribute to the way change management is currently dealt with at high schools in the Netherlands. More awareness about the unconscious processes affecting high school teacher's commitment to change could decrease the lack of understanding of change implementation and adoption processes that currently still exists (By, 2005; Van der Voet, 2015). Management boards of high schools in the Netherlands could act based on the perspective that high school teachers might not always make rational decisions and that their commitment to change might be affected by environmental (irrelevant) factors. More concrete strategies should be formed based on further research on the topic.

Future research

A first proposal for improvements for future research concerning the effect of anchoring on commitment to change is to rephrase the scenarios. A suggestion is to choose a different change

initiative instead of 21st-century skills because of the possible unclarity caused by it. It is important that this change initiative covers only one concept or, for example, represents only one of the aspects of 21st-century skills. An example could be using only 'critical thinking', which is part of the 21st-century skills (Van Laar et al., 2017). In addition, as the combination of the scenario and the presented anchor resulted possibly in a normative influence, rewriting the scenario is advised. Currently, the scenario includes sentences like: "other high school teachers point to …", which could have been, in combination with the presented anchors, experienced as a social norm (Nolan et al., 2008). Future studies should rather target at the individual teachers and exclude such statements from the scenarios.

Furthermore, it is recommended to examine the role of confounding variables like familiarity, knowledge and/or experience with the proposed changes in future studies. Controlling for the effect of these factors could lead to more insight into anchors affecting commitment to change (Pourhoseinholi et al., 2012). Lastly, a note of caution is sounded with regard to the sampling method chosen in further research on the effects of anchoring on commitment to change. As the current experiment was limited by the use of convenience sampling, future studies should choose their sampling methods with great care.

Conclusion

Even though this experiment did not find clear links between the anchoring effects and the commitment to change of a high school teacher, there is still evidence to suggest that high school teachers might not be as rational in their decision-making processes as is still commonly assumed. These findings add to a growing body of literature on factors influencing commitment to change. With help of the suggestions to improve future research, hopefully, effective change strategies to foster the implementation of change initiatives in educational settings can be developed. For now, the picture is still incomplete.

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Appendix

Table 2

Direct Oblimin Rotated Fixed Factor Structure of the Items related to 21st-Century Skills

	Factor			
	1	2	3	4
1. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik vaak doe.	.65			
2. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik automatisch doe.	.81			
3. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik doe zonder dat ik mezelf daaraan hoef te herinneren.	.81			
4. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets waarvan ik het raar zou vinden als ik het niet zou doen.	.63			
5. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik zonder nadenken doe.	.81			
6. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat me moeite zou kosten om niet te doen.	.74			
7. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat hoort bij mijn dagelijkse routines.	.77			
8. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik al doe nog voordat ik me realiseer dat ik het doe.	.68			
9. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets waarvan ik het moeilijk zou vinden om het niet te doen.	.75			
10. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets waarover ik niet hoef na te denken of ik het moet doen.	.78			
11. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat typisch bij mij hoort.	.76			

	Factor			
	1	2	3	4
12. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik al lange tijd doe.	.74			
13. Ik geloof in de waarde van het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.				-.92
14. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is een goede strategie voor onze school.				-.82
15. Ik denk dat onze directie een fout begaat door de 21ste eeuwse vaardigheden van mijn leerlingen te willen stimuleren.		-.67		
16. Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen dient een belangrijk doel.				-.70
17. Dingen zouden beter gaan als ik de 21ste eeuwse vaardigheden van mijn leerlingen niet stimuleer.		-.74		
18. Het is niet nodig om de 21ste eeuwse vaardigheden van mijn leerlingen te stimuleren.		-.86		
19. Ik heb geen keus: ik moet meegaan in het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.44	
20. Ik voel druk om mee te gaan in het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.48	
21. Er staat voor mij te veel op het spel om weerstand te bieden tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.64	
22. Het zou mij te veel kosten om weerstand te bieden tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.64	
23. Het zou risicovol zijn om mij uit te spreken tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.53	.43
24. Weerstand bieden tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is geen werkbare optie voor mij.			.65	

	Factor			
	1	2	3	4
25. Ik voel een plichtsbesef om te werken aan het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.54	-.34
26. Ik denk dat het niet goed van mij zou zijn als ik me verzet tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.52	-.40
27. Ik zou me niet slecht voelen als ik me verzet tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.		-.39		
28. Het zou onverantwoordelijk van mij zijn als ik weerstand bied tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.37	-.49
29. Ik zou me schuldig voelen als ik me verzet tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen.			.42	-.41
30. Ik voel geen enkele verplichting om het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen te ondersteunen.		-.48		
Eigenvalues	8.03	4.61	3.52	1.54
% of explained Variance	25.39	13.98	10.05	3.58

Note. factor loadings over .30 were reported.

Table 3

Direct Oblimin Rotated Fixed Factor Structure of the Items related to Differentiation

	Factor			
	1	2	3	4
1. Differentiëren tussen mijn leerlingen is iets wat ik vaak doe.	.76			
2. Differentiëren tussen mijn leerlingen is iets wat ik automatisch doe.	.88			
3. Differentiëren tussen mijn leerlingen is iets wat ik doe zonder dat ik mezelf daaraan hoef te herinneren.	.87			
4. Differentiëren tussen mijn leerlingen is iets waarvan ik het raar zou vinden als ik het niet zou doen.	.68			
5. Differentiëren tussen mijn leerlingen is iets wat ik zonder nadenken doe.	.89			
6. Differentiëren tussen mijn leerlingen is iets wat me moeite zou kosten om niet te doen.	.61			
7. Differentiëren tussen mijn leerlingen is iets wat hoort bij mijn dagelijkse routines.	.87			
8. Differentiëren tussen mijn leerlingen is iets wat ik al doe nog voordat ik me realiseer dat ik het doe.	.83			
9. Differentiëren tussen mijn leerlingen is iets waarvan ik het moeilijk zou vinden om het niet te doen.	.78			
10. Differentiëren tussen mijn leerlingen is iets waarover ik niet hoef na te denken of ik het moet doen.	.83			
11. Differentiëren tussen mijn leerlingen is iets wat typisch bij mij hoort.	.78			
12. Differentiëren tussen mijn leerlingen is iets wat ik al lange tijd doe.	.80			
13. Ik geloof in de waarde van differentiëren tussen mijn leerlingen.	.33		.52	
14. Differentiëren tussen mijn leerlingen is een goede strategie voor onze school.	.34		.43	
15. Ik denk dat onze directie een fout begaat door het differentiëren tussen mijn leerlingen te willen stimuleren.			.66	

	Factor			
	1	2	3	4
16. Het differentiëren tussen mijn leerlingen dient een belangrijk doel.	.40		.43	
17. Dingen zouden beter gaan als ik niet differentieer tussen mijn leerlingen.			.56	
18. Het is niet nodig om tussen mijn leerlingen te differentiëren.			.70	
19. Ik heb geen keus: ik moet meegaan in het differentiëren tussen mijn leerlingen.		.45		-.31
20. Ik voel druk om mee te gaan in het differentiëren tussen mijn leerlingen.		.71		
21. Er staat voor mij te veel op het spel om weerstand te bieden tegen het differentiëren tussen mijn leerlingen.		.80		
22. Het zou mij te veel kosten om weerstand te bieden tegen het differentiëren tussen mijn leerlingen.		.85		
23. Het zou risicovol zijn om mij uit te spreken tegen het differentiëren tussen mijn leerlingen.		.71	-.30	
24. Weerstand bieden tegen het differentiëren tussen mijn leerlingen is geen werkbare optie voor mij.		.56		
25. Ik voel een plichtsbesef om te differentiëren tussen mijn leerlingen.		.43		-.31
26. Ik denk dat het niet goed van mij zou zijn als ik me verzet tegen het differentiëren tussen mijn leerlingen.		.32		-.37
27. Ik zou me niet slecht voelen als ik me verzet tegen het differentiëren tussen mijn leerlingen.				
28. Het zou onverantwoordelijk van mij zijn als ik weerstand bied tegen het differentiëren tussen mijn leerlingen.				-.91
29. Ik zou me schuldig voelen als ik me verzet tegen het differentiëren tussen mijn leerlingen.				-.83
30. Ik voel geen enkele verplichting om te differentiëren tussen mijn leerlingen.			.63	
Eigenvalues	10.24	4.27	2.98	1.50
% of explained Variance	32.99	12.76	8.50	3.77

Note. factor loadings over .30 were reported.