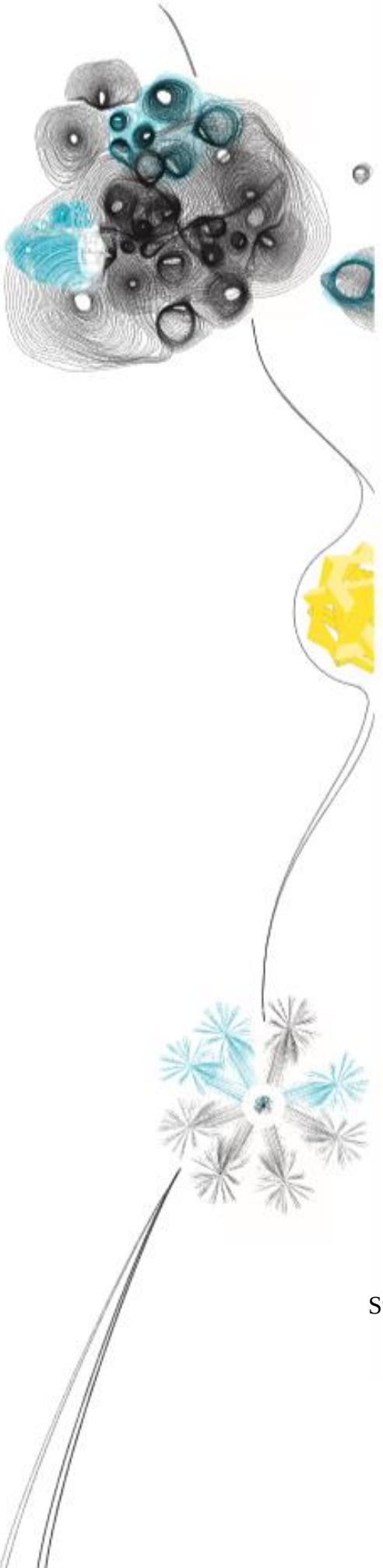

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Educational change from a teacher's perspective: The influence of anchored personal impact on commitment to change

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Abstract

Teachers' commitment to change is considered an essential element for change initiatives to be implemented successfully. This study aimed at examining possible unconscious influencing factors on teachers' commitment to change. Specifically, this study focused on anchoring of the personal impact a change initiative might have on teachers, and investigated the influence of this anchored personal impact on commitment to change (affective, normative, continuance). Differences based on gender and work experience were investigated as well. An experimental design was performed, including a sample of 161 Dutch secondary school teachers, each randomly assigned to one of the following six conditions:

Positive personal impact manipulation	1 High Anchor
	2 Low Anchor
	3 Control Group
Negative personal impact manipulation	4 High Anchor
	5 Low Anchor
	6 Control Group

The results showed that anchored personal impact did not have an influence on teachers' commitment to change. Additionally, no differences were found based on gender and work experience. The only effect found was teachers who were presented a negative low anchor on personal impact, scored significantly higher on affective commitment to change than teachers presented a negative high anchor on personal impact. Although the hypotheses were not confirmed to a large extent, future research could build on these results as a valuable starting point. This study contributes to educational science by providing a new perspective on the teacher-centred approach in educational change literature. Suggestions are made for further research to replicate this study, and to examine other possibilities to improve implementation processes in educational change.

Keywords: educational change, anchoring, commitment to change, personal impact, teacher-centred approach

Educational change from a teacher's perspective: The influence of anchored personal impact on commitment to change

Over the last few decades, the importance of change within organizations has accelerated as organizations are confronted with the need to continuously improve their strategy, products, processes, and services (Armenakis, Harris, & Mossholder, 1993; Shipton, Sparrow, Budhwar, & Brown, 2017). This challenge is not only important for organizations, but for the educational context as well. For instance, the adoption of innovative learning techniques has increased over time (Eagan, Stolzenberg, Lozano, Aragon, Suchard, & Hurtado, 2014). These techniques provide schools to stimulate more customized learning paths for better individual learning outcomes (Lai, Wang, & Wang, 2010; Shute & Towle, 2003). As a consequence, schools are expected to deal with those kinds of innovative learning systems, and therefore are confronted with continuous change. There is a growing research literature on school level change, both policy led (e.g. Priestley, 2011; Hargreaves, 2002) and within-school initiatives (e.g. Ouston, Maughan, & Rutter, 1991; Thomson, McGregor, Sanders, & Alexiadou, 2009).

Despite attempts to incorporate change policies and initiatives within schools, many change initiatives fail to reach their intended aims, and often do not foster sustained change (Choi, 2011). In many cases, this is due to implementation failure rather than flaws regarding the change initiative itself (Klein & Sorra, 1996; Kotter, 1996; Schein, 1999). Implementation failure occurs when employees use the change initiative less frequently, less consistently, or less assiduously than required for the potential benefits of the change to be achieved (Klein & Sorra, 1996). Increasing research emphasizes the importance of the individual in the change process, instead of a policy or system-oriented approach, in order to understand implementation failure better (Huy, 2002; Mossholder, Settoon, Armenakis, & Harris, 2000; Seo, Barrett, & Bartunek, 2004). Accordingly, teachers are seen as the key factors in any reform in education (Armstrong, 2008; Goh, 1999; Harris, 2005; Morrison, 2010; Riley & Louis, 2000; Sarason, 1996), as they need to manage the implementation of the change (Goh, 1999).

However, just informing teachers about a proposed change seems to be insufficient; it is important to actively involve teachers in the implementation process (Soumyaja, Kamlanabhan, & Bhattacharyya, 2011). Teachers' understanding and interpretations about the change serve as critical factors that impact their decision about implementing a change (Borko & Putnam, 1996; Fullan & Hargreaves, 1996). Teachers who understand and can make sense of the change, are more likely to provide support for the change (Bartunek, Rousseau, Rudolph, & DePalma, 2006; Schmidt & Datnow, 2005). A critical aspect in providing support is commitment to change. Teachers' commitment to adopt the change initiative is arguably one of the most dominating factors whether a change project will be implemented successfully or not (Coetsee, 1999; Herscovitch & Meyer, 2002; Klein & Sorra, 1996; Neubert & Cady, 2001; Robinson & Griffiths, 2005).

Consequently, it is important to enhance the commitment to change of teachers (Ning & Jing, 2012). To achieve this, it is essential to understand the forces that impact teachers' commitment to change. In educational literature, it is still commonly assumed that teachers commit to change initiatives

in a conscious manner (Doyle & Ponder, 1977). However, research from the cognitive psychology domain suggest that individuals' decision-making is prone to bias (Newell & Shanks, 2014; Tversky & Kahneman, 1974). Additionally, previous research suggest that it is possible to influence teachers' commitment to change in a unconscious way (Hutner & Markman, 2015). Therefore, this study attempts to discover whether unconscious influences occur in teachers' decisions to commit to an educational change, in order to understand the limited success of educational change implementation better.

A plausible technique of unconscious influencing individuals is *anchoring*. Anchoring has the potential the unconscious influence individuals by presenting a certain value or anchor (Tversky & Kahneman, 1974). Anchoring is an extremely robust phenomenon, and could be one of the most remarkable influences on judgement and decision-making (Furnham & Boo, 2011). In the current study, anchoring will be used to try to influence how teachers understand and make sense of the educational change, by anchoring of the *personal impact* the change initiative might have on teachers' personal lives. Personal impact is an essential aspect within sense-making (Bartunek et al., 2006).

The current study contributes to educational science by providing a new perspective to the teacher-centred approach in educational change literature (e.g. Armstrong, 2008; Goh, 1999), and to research on commitment to change (Herscovitch & Meyer, 2002). This study is the first to investigate the influence of anchored personal impact on the commitment to change of teachers. Ultimately, the rationale of Doyle and Ponder (1977) on teachers' commitment to change will be challenged, by discovering whether teachers also commit to educational change in an unconscious manner. The results from this study might enhance our understanding on the limited success of change implementation from a teachers' point of view. Subsequently, this input could contribute to more effective and successful change implementation processes in the future.

Theoretical framework

Change in Education

Educational change can be defined as a three-stage developmental process, which encompasses initiation, implementation, and institutionalization (Fullan, 1982). First, changes which are intended and desired to be carried out, are initiated. Then, individuals (often teachers) have to put the initiative into practice, that is the implementation. Finally, after successful implementation, the initiative becomes institutionalized. However, this process is often inhibited, and therefore sustained change cannot be fully achieved. Predominantly, this is due to implementation failure (Klein & Sorra, 1996; Kotter, 1996; Schein, 1999). For decades, educational change initiatives were intended by policy-makers, for example through top-down approaches. However, these approaches have been criticized, as they do not take the needs and conditions of the teachers into account (Sakui, 2004); the people essential for implementation.

More recently, researchers emphasize the role of teachers as an important factor in the change process (Huy, 2002; Mossholder et al., 2000; Seo et al., 2004), in order to increase the fit between the

change initiative and the teachers' context. As a consequence, implementation failure can be better understood. Teachers' perceptions, interpretations, and sense making of the change initiative are essential aspects that impact their decision about implementing a change (Borko & Putnam, 1996). When teachers understand why a change is being implemented, and the goals of the change are consistent with the values and beliefs of the teacher, it is likely that they will provide support for the change (Bartunek et al., 2006; Schmidt & Datnow, 2005). An important aspect of this process towards supporting a change initiative is a teacher's commitment to change. Commitment to change is one of the most essential factors that determine individuals' support for change initiatives (Armenakis, Harris, & Feild, 1999; Coetsee, 1999; Conner, 1992; Conner & Patterson, 1982; Klein & Sorra, 1996), which contributes to more effective change implementation (Demers et al., 1996; Herold et al., 2007). On contrary, a lack of commitment to change is the most prevalent factor why change implementations fail (Conner & Patterson, 1982).

Commitment to Change

Commitment, in general, is described by Meyer and Herscovitch (2001) as "a force [mind set] that binds an individual to a course of action of relevance to one or more targets" (p. 301). Accordingly, commitment to change can be defined as one's psychological agreement striving to accomplish successful adoption of a change initiative (Herscovitch, 1999). This definition emphasizes the necessity of the individual's commitment for a successful implementation of a change initiative. Subsequently, this substantiates results found stating that commitment to change can be seen as an important feature of behavioural intention to support change (Herscovitch and Meyer, 2002; Fedor, Caldwell, & Herold, 2006).

According to Meyer and Herscovitch (2001), commitment to change is a multi-dimensional construct, which indicates that individuals can commit to a change in different ways. In line with this reasoning, the three-component model of Herscovitch and Meyer (2002) identifies three dimensions of commitment to change: affective, continuance, and normative commitment to change. An important distinction between those dimensions can be made based on their different implications for on-the-job behaviour. *Affective commitment to change* implicates a desire to provide support to the change initiative, based on one's belief of its obvious benefits (Herscovitch & Meyer, 2002). For instance, a teacher believes that a particular change is beneficial for student learning outcomes and therefore his/her commitment to adopt to the change increases. Those people seem to be motivated to do their best to perform optimally and do little extra activities to help out (Meyer & Allen, 1991). Consequently, employees with affective commitment to change will likely engage in discretionary behaviour, and thus go beyond compliance (Herscovitch & Meyer, 2002). Second, *normative commitment to change* refers to a feeling of obligation in a way that employees feel individually accountable (Herscovitch & Meyer, 2002). To substantiate, adopting the change is seen as a norm within the school context, and as legitimate behaviour. Likewise, employees who stay at the organization out of this feeling of obligation, feel like they owe this to the organization, as they feel obligated to reciprocate for the perceived benefits

employees received (Meyer & Allen, 1991). As a result, employees are likely to reciprocate with discretionary behaviour, for instance exerting extra effort to provide support for the change. Third, *continuance commitment to change* refers to the awareness that failure could be accompanied with (non)material loss, and to avoid this an individual provides support to the change (Herscovitch & Meyer, 2002). An important loss could be losing the job, or downgrading to a lower function, such as teacher-assistant. In contrast to the two aforementioned dimensions, continuance commitment to change is likely to result in compliance, as employees do little more than is required to remain (Meyer & Allen, 2001). Due to this compliance, only focal behaviours will be performed, such as remaining with the organization without any extra effort to support the change. Employees can experience various combinations of abovementioned commitments simultaneously (Herscovitch & Meyer, 2001). The three types of commitment are all positive predictors of behavioral support for a change (Bouckenooghe, Schwarz, & Minbashian, 2015; Herscovitch & Meyer, 2002). This distinction between the three dimensions of commitment to change provides more precise predictions about the impact of commitment to change on behavior than, for example, commitment to change as a unidimensional construct (Meyer & Allen, 1997). Accordingly, with this model we are able to distinct different types of commitment with different behavioural consequences. Therefore, this model of Herscovitch and Meyer (2002) is applied in the current study. In the following section, it will be addressed why developing commitment to change is important, and how it will be attempted to develop commitment to change in this study.

Creating and Improving Teacher's Commitment to Change

As mentioned before, teachers are seen as the key factors with regards to the successfulness of change implementations in education, and their commitment to change is an essential element in reaching successful implementation. It is therefore important for managers and leaders to understand how to create and improve commitment to change of teachers (Ning & Jing, 2012), in order to assist teachers in being motivated and committed. Accordingly, developing employees' commitment to change will most likely result in a better understanding of the change and a better change adoption among teachers (Herscovitch & Meyer, 2002).

In order to achieve a better adoption of the change, it is essential to understand the factors that impact teachers' decision-making to commit to a change initiative. One perspective brought up from educational research to improve the commitment to change of teachers was introduced by Doyle and Ponder (1977). They argue that teachers make decisions regarding commitment to change in a conscious manner by evaluating a change's *practicality*. According to Doyle and Ponder (1977), the practicality of a new change initiative is assessed by teachers based on (I) clear clues for application of the initiative (*instrumentality*), (II) whether the content and origin of the change is congruent with teachers' self-image and vision (*congruence*), and (III) whether the time and effort invested outweigh the benefit (*costs*). Additionally, it is essential to communicate the practicality aspects of the change initiative clearly (Doyle & Ponder, 1977). This perspective assumes that teachers consider the practical aspects

of the change initiative, and evaluate the probabilities of possible outcomes (Gilovich & Griffin, 2002). This implicates that teachers make decisions regarding committing to a change initiative in a rational and conscious way. To date, it is still commonly believed that teachers' decision-making process occurs in a conscious manner (i.e. teachers are fully aware of their choices and decisions, and why they are making them (Hutner & Markman, 2015; Manning & Payne, 1993)).

However, from psychology literature, it is known that individuals' decision-making processes are prone to bias (Newell & Shanks, 2014; Strack & Mussweiler, 1997; Tversky & Kahneman, 1974, Wegener, Petty, Detweiler-Bedell, & Jarvis, 2001). Regarding educational change processes, this implies that teachers intentions and decisions to commit to an educational change are not solely based on rationality, but that unconscious influencing factors may play a role as well. According to Hutner and Markman (2015), teachers do not seem to be fully rational adopters, and that there is a possibility that the commitment of teachers can be influenced unconsciously. Teachers might be influenced by the thoughts and beliefs held by the social environment, besides the influences of teachers' own thoughts and beliefs on deciding to commit to a change (Hutner & Markman, 2015). This assumption might contribute to an enhanced understanding on why implementation processes often do not result in their intended aims. Hence, it can be concluded that teachers might not be as rational in their decision-making as commonly assumed in educational change literature.

Therefore, this study is an attempt to increase knowledge and insights into how teachers commit to change initiatives. In doing so, the theory of Doyle and Ponder (1977) will be challenged, by investigating whether unconscious influences occur in teachers' decision-making to commit to a proposed change, and thus perhaps commit to change initiatives in a unconscious manner. A plausible way of unconsciously influencing decision making is through *anchoring*. The anchoring technique is chosen as an operationalization of unconscious influencing decision making, as anchoring is considered one of the most remarkable unconscious influences on judgement and decision-making (Mussweiler & Strack, 2001; Tversky & Kahneman, 1974; Wegener, Petty, Blankenship, & Detweiler-Bedell, 2010), considering the extensive evidence of anchoring effects in several areas (see also Furnham & Boo, 2011). Anchoring might also have the potential to unconsciously influence teachers to commit to proposed educational changes. In the following section, the anchoring technique will be discussed more thoroughly.

Anchoring. *Anchoring* (also: *anchoring bias*) can be defined as one's tendency to make estimates based on a presented value, by taking this value as a starting point, and adjust one's judgement to this value for their final estimate (Tversky & Kahneman, 1974). In typical studies on the anchoring effect, participants are first asked to consider whether a target attribute is higher or lower than a high or low anchor value (Wegener et al., 2010). To illustrate, a group of teachers is asked to indicate the extent to which a proposed educational change would be beneficial for learning outcomes, considering whether this value is higher or lower than a 7.1 (on a scale with 1= no benefits for learning outcomes, and 10= great benefits for learning outcomes). This 7.1 is the anchor value. Another group receives the same

question, but these teachers have to consider whether the value of the change for learning outcomes would be higher or lower than a 4.9. It is expected that the values of the former group (with a high anchor 7.1) will be higher than the values of the latter group (with a low anchor 4.9), as the teachers' judgements are drawn into the direction of the anchor (Tversky & Kahneman, 1974). In so doing, people tend to evaluate whether the presented value (7.1 or 4.9) is a good predictor for the final estimate, by unconsciously activating pre-existing knowledge on the particular topic (Strack & Mussweiler, 1997). Accordingly, anchoring has the possibility to influence people's mental process by adding a stimulus – or *anchor* – to that process. Anchoring can influence judgements and behaviour, often in seemingly irrational, subjective processes (Newell & Shanks, 2014).

However, when an anchor is based on unreliable, irrelevant or no longer pertinent information, this could cause risks to the quality of human judgement (Caputo, 2014), and systematic errors in decision-making (Luppe & De Angelo, 2010). For instance, a teacher read that implementing differentiation in the classroom will result in a higher workload of 2 hours a week. When the school decides to introduce differentiation as being implemented in the classroom, the teacher might be unconsciously influenced by the anchor of 2 hours more workload, and therefore feels less willing to commit to the proposed change, despite the anchor of 2 hours per week being unreliable or no longer pertinent. Another example is that teachers could use information drawn from past experiences to base their future decisions on, while the past information may no longer be pertinent.

As already mentioned, anchoring could be one of the most remarkable influences on judgement and decision-making, and the anchoring effect has been proven to be robust considering the extensive evidence of anchoring effects in several areas (see also Furnham & Boo, 2011). In some studies, anchor values are randomly generated (Mussweiler & Strack, 1999), and in other studies the anchor values are irrelevant to the correct target estimates (Ariely, Loewenstein, & Prelec, 2003; Tversky & Kahneman, 1974). Hence, regardless of how the anchor values are generated, their effects remain strong (Wegener et al., 2010). Furthermore, the anchoring technique is frequently used in educational research (Bowman & Bastedo, 2011; Dünnebier, Gräsel, & Krolak-Schwerdt, 2009; Yuan et al., 2014), as well as in judgement contexts, such as evaluations of others' job performance and judgmental decision-making (e.g. Epley, 2004; Mussweiler, Englich, & Strack, 2004). For instance, evidence was found for anchoring effects on judgements of peer performance among teachers (Zhao & Linderholm, 2011).

All in all, it can be concluded that the anchoring effect is a robust phenomenon when it comes to unconscious influences on decision-making, also in the educational field. Therefore, it can be assumed that anchoring has the potential to unconsciously influence decision-making of teachers, and possibly affects the commitment to change of teachers. In this study, the technique of anchoring will be used to investigate its influence on teachers' judgements and decisions on commitment to change. In the following section, the way anchoring was manifested in this study will be explained.

Anchored Personal Impact

In order to investigate whether anchoring influences teachers' decisions on commitment to change, the anchoring technique will be used to try to influence the *personal impact* of the change perceived by teachers. The personal impact teachers might experience in response to change, is an essential aspect within sense making (Bartunek et al., 2006). As mentioned earlier, for teachers it is important to deeply understand why the change is being initiated and why it is beneficial. Through a process of sense making, teachers seek and create meanings of a change initiative, and form one's own understanding (Anderson, 2012; Dervin, 1983). Accordingly, sense making appears to be an important determinant of teachers' behaviors in change processes (Schmidt & Datnow, 2005). Teachers who understand, and make sense of, the change initiative are more likely to provide support for the change (Bartunek et al., 2006; Borko & Putnam, 1996), which contributes to more successful change implementation (Demers et al., 1996; Herold et al., 2007). As a part of sense making, personal impact is the impact a change initiative could have on one's (work) life. This is a subjective process (Craig-Lees, 2001), in which individuals evaluate the personal value of the change for themselves (Rafaeli, 2006), and the (perceived) consequences that change might have on their personal life, either negative or positive. Accordingly, personal impact encompasses the psychological and emotional impact a change might have on the individual.

Within sense making, personal impact is an important factor that can help teachers to evaluate the gains and losses for them personally, and subsequently give meaning to the change in order to enhance their commitment to change (Bartunek et al., 2006; Schmidt & Datnow, 2005). The perceived gains are linked with interpretations of the change initiative and with pleasant feelings towards the change. When teachers interpret the impact of a change initiative as positive for them personally, it is expected that they are more inclined to commit to the change, as they can see/understand how the change can be beneficial for them (in terms of perceived gains when supporting the change) (Bartunek et al., 2006). On contrary, when teachers experience negative personal impact of the change, it is expected that they will be less inclined to commit to change, and are therefore less likely to support the change. For example, when teachers get information that a proposed change initiative could reduce the workload as teachers are able to work more efficiently, then teachers interpret the change in a way that it has advantages for them personally (e.g. they have more time left to give attention to the students or they could finish tasks they were not able to finish before). Knowing the change could positively impact their personal (work) lives, teachers are more likely to commit to the change.

In conclusion, interpreting and understanding the personal impact of a change helps teachers construct meaning accordingly, which can affect their commitment. With the help of the anchoring technique, it is attempted to discover whether the perceived personal impact could be influenced positively or negatively. In this study, anchoring of personal impact will be referred to as anchored personal impact. In addition, anchoring will be applied within a *positive* personal impact manipulation question, and a *negative* personal impact manipulation question.

Derived from the abovementioned line of reasoning, the aim of this study is to examine whether the commitment to change of teachers could be influenced, by bias their judgement of personal impact through anchoring. Accordingly, the following research question was formulated: *"To what extent does anchored personal impact influence the three types of commitment to change (affective, normative, and continuance) of secondary school teachers?"*. In answering the research question, it will be investigated whether presenting an anchor on personal impact affects the teachers' commitment to change. Regarding the manipulation question on *positive* personal impact, it is expected that presenting a high anchor results in higher commitment to change of teachers than presenting a low anchor. For *negative* personal impact, it is expected that presenting a high anchor results in lower commitment to change of teachers than presenting a low anchor. The judgement estimate is expected to be drawn towards the anchor (Newell & Shanks, 2014). Additionally, those who anchor on a high number tend to make higher judgments on a particular scale than those who anchor on a low number (Zhao & Linderholm, 2011). Accordingly, it is suggested that the commitment to change of secondary school teachers is prone to anchoring effects. In the current study, this is investigated through anchored positive personal impact, and anchored negative personal impact. Therefore, it is expected that (H1a): *secondary school teachers will be more committed to the educational change when being presented with a high anchor on positive personal impact, than when being presented with a low anchor on positive personal impact.* Regarding the manipulation question on negative personal impact, it is expected that (H1b): *secondary school teachers will be less committed to the educational change when being presented with a high anchor on negative personal impact, than when being presented with a low anchor on negative personal impact.* In addition, it will be investigated whether different anchoring effects arise, based on the variables *gender* and *work experience*

Gender

In the study of Gerrans and Clark-Murphy (2002), it is stated that women seem to be more comprehensive information processors, who are more focused on details and tend to produce more detailed information. In contrast, men tend to think more broadly, and seem to view information more as a whole. This implicates that women notice a detail, such as a stimulus (or: anchor) more often (unconsciously or not) (Downing, Chan, Downing, Kwong, & Lam, 2008), and that women might be influenced by a stimulus more rapidly than men. Kudryavtsev and Cohen (2011) even conclude that women are more susceptible to anchoring effects than men. In line with this, women tend to pay more attention to anchor indicators, and subsequently provide answers more closely to the anchors subconsciously. Additionally, these findings are subscribed by explaining that women tend to follow suggestions by others more by cooperating with others, instead of men who tend to have more independent thoughts and actions (Feingold, 1994; Rajdev & Raninga, 2016).

Looking at gender differences and personal impact on the work floor, it appears that employment and its psychological consequences have a greater influence on women than on men (Pugliesi, 1995). Pugliesi (1995) found that features such as self-esteem and social integration raises

higher effects on women's well-being than compared to men. As a consequence, females seem to be more psychologically and emotionally tied to their work. This might be the case within the context of organizational change as well.

To conclude, it is expected that female teachers are more prone to anchored personal impact effects than male teachers, as females tend to be more susceptible to anchoring effects and experience higher personal impact in their work. To illustrate, when confronted with a high anchor on positive personal impact of the change, it is expected that female teachers experience more positive personal impact of a change initiative than male teachers, which subsequently has a greater effect on their commitment to change than that of male teachers. Concerning negative personal impact, the reversed effect is expected. Based on abovementioned line of reasoning, the following is expected (H2): *Female teachers will be more influenced by the anchor in personal impact than male teachers*.

Work experience

Besides *gender*, the variable *work experience* will be investigated as well. According to Furnham and Boo (2011), highly experienced and knowledgeable people seem to be less prone to presented anchors than less experienced people (Furnham & Boo, 2011). The reasoning behind this, is that people with high expertise in a certain field should have more knowledge, more experience, and less uncertainty in their decision-making process than novices in the field. Besides, in the study of Kaustia, Alho and Puttonen (2008) it was found that novices to a subject (students) showed much larger anchoring effects than professionals. Professionals seem to learn from experience, and can rely upon previous acquired knowledge. In this way, experienced professionals tend to avoid behavioural biases more. Another, more recent study (Welsh, Delfabbro, Burns, & Begg, 2014), found that higher levels of experience with a certain task or subject were associated with less susceptibility to anchors, as more experienced people have an increased understanding and knowledge of actual probabilities. Within the educational context, Dünnebier et al. (2009) found that expert teachers were far less influenced by the anchoring heuristic than novice teachers, in assessing students' performance on a test with the goal of giving an educational recommendation. They state that expert teachers are able to choose adequate information based on previous experiences of repetitive educational change. Novices do not have those past experiences, and so are more susceptible to use the anchoring heuristic.

Additionally, teachers in their early careers seem to have higher levels of emotional enthusiasm and involvement, and have an orientation to change that is characterized as adaptive and flexible (Hargreaves, 2005). On the contrary, experienced teachers have a higher emotional distance towards their work, and their change orientation is characterized more by resistance and resilience (Hargreaves, 2005). Moreover, experienced teachers tend to have more self-confidence than novices, and therefore are harder to convince (Burden, 1981).

Thus, anchored personal impact seems to be less influential for experienced teachers than for less experienced teachers. To illustrate, when confronted with a high anchor on positive personal impact of the change, it is expected that less experienced teachers perceive more positive personal impact of a

change initiative than experienced teachers, which subsequently has a greater effect on their commitment to change than that of experienced teachers. Concerning negative personal impact, the reversed effect is expected. In line with abovementioned reasoning, it is expected that (H3): *More experienced teachers will be less influenced by the anchor in personal impact than less experienced teachers.*

Method

Research Design

A quantitative research design was used for the current study, wherein an experiment was performed. This experiment consisted of six conditions in total: two experimental groups, and one control group per type of manipulation question (positive personal impact and negative personal impact). The participants were randomly assigned to one of the six conditions (see Figure 1). The first experimental group per type of manipulation question was presented a high anchor (7.1), the second experimental group was presented a low anchor (4.9), and the control group was not presented any anchor. The anchor values were based on the study of Boerkamp (2019), in which anchoring bias on commitment to change was already investigated. The groups were tested on their commitment to change, conceptualized here in three domains: affective commitment to change, continuance commitment to change, and normative commitment to change. Additionally, the variables gender and work experience were tested as well as potential moderating variables.

Participants

This research included eighteen secondary schools that have agreed to participate in the experiment. The number of participants per school differed between 1 and 57. Schools were asked to participate by using convenience sampling. In total, 290 responses were collected. Other educational staff than teachers were excluded from the data set. Additionally, respondents who did not finish the questions of the first proposed educational change (either 21st century skills, or differentiation) were excluded as well. As a result, the sample consisted of 161 secondary school teachers in the age between 21 and 68 years old (M = 42.06, SD = 11.60). Within this sample, 44.7% percent was male (N = 72), 54.7% percent was female (N = 88), and 0.6% responded ‘other’ (N = 1). The years of work experience was distributed between 1 and 46 years (M = 14.59, SD = 9.69). On average, the job satisfaction of the sample was 7.74 with a standard deviation of .83. The participants were assigned to the six conditions as follows. For the conditions regarding positive personal impact: 27 participants to the control condition, 21 to the high anchor condition, and 18 to the low anchor condition. For the conditions regarding negative personal impact: 34 participants to the control condition, 30 to the high anchor condition, and 31 to the low anchor condition. Table 1 presents other demographic features of the sample, containing educational degree, substructure, and subject teachers mainly teach.

Table 1

Overview Demographics (N, percentages)

Demographics	*N*	Percentages
Highest degree		
Secondary vocational education	1	.6%
University of applied sciences	92	57.1%
University of applied sciences – master	25	15.5%
University	41	25.5%
Doctorate	2	1.2%
Total	161	100.0%
Substructure*		
1st substructure	63	39.1%
2nd substructure	98	60.9%
Total	161	100.0%
Subject		
Biology	10	6.2%
Chemistry	5	3.1%
Dutch	24	14.9%
Economics	9	5.6%
English	14	8.7%
French	4	2.5%
Geography	5	3.1%
German	4	2.5%
History	10	6.2%
Mathematics	21	13.0%
Music	4	2.5%
Sports	8	5.0%
Visual arts	6	3.7%
Other	37	23.0%
Total	161	100.0%

*In Dutch secondary schools, education can be divided into two substructures. The first substructure within VMBO represents the first two years, and within HAVO and VWO the first three years. The second substructure represents the remaining years (for VMBO and HAVO: two years, for VWO: three years).

Instrumentation

For the experiment, an online questionnaire was used to collect data. The questionnaire consisted of six components (chronological order): a short introduction of the study's questionnaire, questions on demographic features, questions regarding reflection on past experience and familiarity, a scenario description, a manipulation question on personal impact (either positive or negative), and questions on commitment to change aspects. The components following after the demographic features were tested on two potential change scenarios: 21st century skills and differentiation. The format of the questionnaire was based on the counterbalance design. The change scenarios were sequentially displayed, in a way that the questions on the second change scenario started as soon as the questions of the first had finished. Within all six experiment conditions, the participants were divided into two subgroups, so a total of twelve groups. The first group within each experiment condition started with the concept of '21st century skills' and the second group started with the concept of 'differentiation'. In this way, the sequence of concepts offered to the participants does not bias the outcomes of the experiment. A visual representation of the groups and the method design is presented in Figure 1.

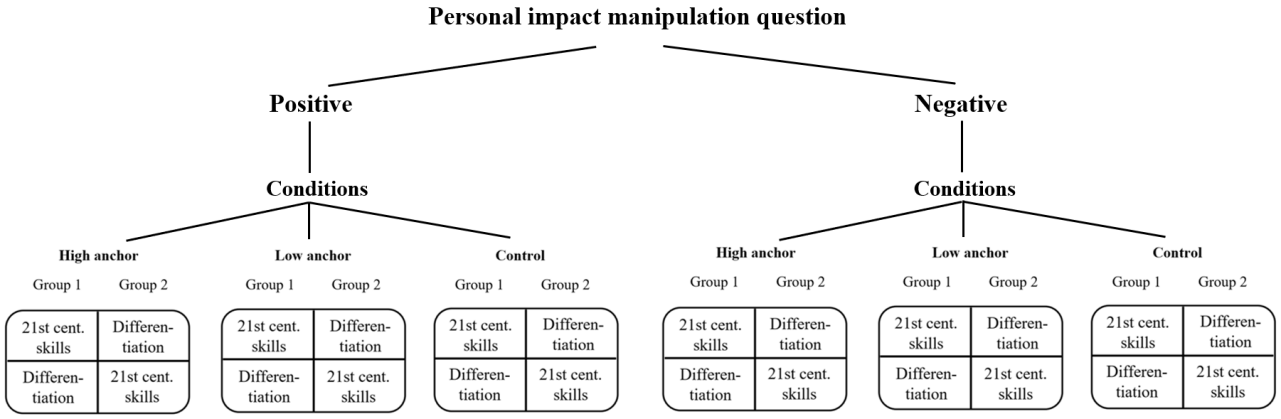

Figure 1. *Method Model*

Demographic features. The online questionnaire started with demographic questions regarding age, function, gender, work experience, which classes he/she teaches (mainly), and subject. The current study wanted to include secondary school teachers. Therefore, an important question was the role of the participant within the school. Only when the participant selected 'teachers', a participant could proceed. Otherwise, data from non-teachers could not be used.

Familiarity questions. Both change scenario parts (21st century skills and differentiation) started with questions about the extent to which teachers have experience with the two change scenarios. The questions of this part were based on Verplanken and Orbell (2003). In their study, Verplanken and Orbell (2003) tested the Self-Report Habit Index (SRHI), which examines habit strength that was based on the repetition of past behaviour, the difficulty of controlling behaviour, the lack of awareness and efficiency, and the expression of one's identity. The instrument consisted of 12 items, which all were used in the current study. Example questions are: *Stimulating 21st century skills is something… (1) I do frequently (2) I do automatically (3) I do without having to consciously remember*. Participants had to provide an answer on a five points Likert-scale, ranging from 1 (totally disagree) to 5 (totally agree). Cronbach's Alpha for the familiarity items regarding 21st century skills (N = 147) was .95. Cronbach's Alpha for the same items, but regarding differentiation (N = 155) was also .95. Consequently, both values represent excellent internal consistency between the items.

Change scenario description. After the familiarity questions, a scenarios description was provided for both educational changes. The first scenario description was about 21st century skills in education, which explains that skills and abilities like creative thinking, solving problems, collaboration, and digital literacy are important in today's educational environment. The second scenario description was about differentiation, which includes that learners differ in terms of interests, learning methods, learning pace, and performance level. Therefore, differentiating could help teachers to overcome differences between learners, and stimulate to maximize the learning potential of every individual learner. The scenarios were written based on the earlier mentioned practicality of the change (Doyle and

Ponder, 1977). For instance, the instrumentality of the change was encompassed in the scenario description by explaining that stimulating 21st century skills (or differentiation) is easier than often thought, and that teachers could apply it in class immediately. The congruence between the content and origin of the change and a teacher's vision was made clear by explaining why 21st century skills is getting more attention, and why it is important in education. Finally, the costs were pointed out by explaining that students perform better on their final exam, and that the work pressure remains the same when applying the educational change. The scenario descriptions have been pilot-tested. Two experts in the field of education evaluated and approved the descriptions on their accuracy.

Anchor question. Then, the manipulation question was presented to the participants. For this question, the participants had to indicate the impact of the change (21st century skills or differentiation) on their personal work lives. The first half of the participants received a manipulation question concerning the positive impact a change could have on one's personal life: 'On the scale below, indicate the extent to which stimulating 21st century skills has a positive impact on your personal life (e.g. an expected reduced workload, the feeling that you are better able to carry out your work, a feeling of happiness that this change is being implemented, etc.). Here 0 means no positive influence at all, and 10 means a very positive influence.'. The other half of the participants received a manipulation question concerning negative personal impact, exactly the opposite of the question above. For the first experimental group per type manipulation, a high anchor is added to the question. This anchor is indicated in the question as 'Consider whether this value is higher or lower than 7.1'. For the second experimental group, a low anchor is added to the question indicated in the same way for the value 4.9. For the control group, no anchor was added to the question. The anchor values were based on the study of Boerkamp (2019), and were randomly chosen in her research.

Commitment to change questions. The last component of the experiment was a questionnaire to examine the participants' commitment to change. The questions asked in this section, were based on Herscovitch and Meyer (2002). In their study, different items to measure affective, normative, and continuance commitment to change were tested in a factor analysis. Per domain of commitment to change, six items were used to measure the particular construct. For affective commitment to change, an example is 'I believe in the value of this change'. For normative commitment to change, an example is 'I feel a sense of duty to work toward this change'. Lastly, for continuance commitment to change, an example is 'I have no choice but to go along with this change'. Participants had to provide an answer on a five points Likert-scale, ranging from 1 (totally disagree) to 5 (totally agree). Cronbach's Alpha for the commitment-items regarding 21st century skills revealed: .85 (affective), .83 (continuance), and .71 (normative). Cronbach's Alpha for the commitment-items regarding differentiation revealed: .85 (affective), .79 (continuance), and .76 (normative). The values affective and continuance commitment to change of 21st century skills, and affective commitment to change of differentiation can be considered good internally consistent. The values normative commitment to change of 21st century skills, and

continuance and normative commitment to change of differentiation can be considered acceptable. As a result, the items were sufficiently consistent to continue with the analyses.

Factor Analysis. A principal axis factoring was conducted with oblique rotation for both scenarios, in order to establish the validity of the questionnaires. The first factor analysis (N = 135), regarding the 21st century skills scenario, resulted in seven factors with Eigen values >1. Those seven factors accounted for approximately 69% of the variance in the questionnaire. The second factor analysis (N = 148), regarding the differentiation scenario, resulted in five factors with Eigen values >1. Those factors explained approximately 65% of the variance in the questionnaire. However, it was expected that four factors would be extracted from both factor analyses, namely for familiarity and for the three types of commitment to change (affective, normative, continuance). Therefore, a fixed factor analysis with four factors was performed for both 21st century skills items (Appendix A Table 2), and differentiation items (Appendix A, Table 3). Here, the first analysis showed that four factors explain 62% of the variance for the scenario of 21st century skills, and the scenario of differentiation 61% of the variance. For both 21st century skills and differentiation, the items concerning familiarity questions loaded all on one factor. However, the results for the commitment to change constructs were less clear. Despite the findings of these factor analyses, the research continued with the current constructs and corresponding items.

Procedure

A letter for informed consent was sent to the board of various secondary schools in the Netherlands. This letter contained a request for permission to approach the teachers at their schools, and asked them to participate in the experiment. Besides, the letter consisted of a description of the aim of the current study, and the role the teachers have in the experiment. With approval of the board, the teachers were permitted to participate in the experiment. Only when both board and individual teacher accepted the participation request, the teacher was able to participate in the experiment. In case that the schools did not respond, a reminder was sent. This research was approved by the Ethics Committee of the University of Twente, faculty Behavioural, Management and Social sciences (BMS). When the sample was composed, the questionnaire was sent to the participants.

The participants received a link to the online questionnaire. First, the participants read a description of the study purpose. Besides, it was emphasized that the data derived from the experiment would be treated confidentially, and that the participants could end his/her participation at any moment during the experiment. Moreover, the participants needed to confirm (by clicking ‘I agree’) that their participation in this study is on a voluntary base. During the experiment, the participants filled out the questionnaire individually. Filling out the complete questionnaire took approximately fifteen minutes. After the experiment, the participants received additional information on the study. For instance, the study aimed at investigating whether the way of posing question could influence their willingness to adapt to change implementation. Additionally, the e-mail address of the researcher will be enclosed as well, in case participants came up with questions or remarks.

Data Analysis

For analysing the quantitative data, statistical analyses were performed through using the statistical software SPSS. Before testing the hypotheses, a manipulation check was done in order to test whether the manipulation through anchoring had worked. In doing so, it was checked whether participants from different conditions (independent variable) gave different answers to the manipulation question (dependent variable). A one-way between groups ANOVA was performed for the manipulation check. The results were considered significant when $\alpha < .05$. Post-hoc analyses were performed in order to investigate possible significant effects between conditions. Gabriel's post-hoc test was performed when the assumption for equality of variances was met, and Games-Howell's post-hoc test was performed when the assumption of equality of variances was not met (Field, 2009).

Thereafter, the hypotheses were tested. For the first hypotheses, a one-way MANCOVA was performed. The independent variable for H1 was the condition, and the dependent variables were the dimensions of commitment to change: affective, normative, and continuance commitment to change. Bonferroni's post-hoc test was performed to investigate possible significant effects between conditions (Field, 2009). For hypothesis 2, a two-way MANOVA was performed, with the condition and gender as independent variables, and affective, normative, and continuance commitment to change as dependent variables. After performing the two-way MANOVAs, the p-values were manually corrected with Bonferroni-adjustment, as the output from SPSS only provides p-values of all three dependent variables together (Grice & Iwasaki, 2009; Huizingh, 2014). Outcomes were perceived significant when the p-value is lower than $.05/3 = .017$.

Preceding the analyses, the assumptions for the statistical tests were examined. The Shapiro Wilk test was used to examine normality. According to this test, the data were in approximately half of the cases not normally distributed for each of the six groups. However, normality plots showed that deviation from normality was moderate to low, with some exceptions. Despite the analyses not supporting normality entirely, it was decided to proceed with the analyses, as the plots give indications for normality. Second, the Mahalanobis Distance indicated signs of multivariate outliers, which violated the assumption of multivariate normality. Nevertheless, the analysis was continued as the MANOVA is quite robust against violations of normality. No data was removed from the data set, as the data set is already small, and removing outliers would decrease the power of the statistical tests (Bakker & Wicherts, 2014). Third, there are no indications of multicollinearity according to the variance inflation factor (VIF) for both gender x condition and work experience x condition (Field, 2009). In conclusion, the assumptions provided for the analyses to proceed, based on interpretations and decisions mentioned before.

Results

In this section, the results of the analyses are summarized and interpreted, in order to answer the study's question to what extent anchored personal impact affects a teacher's affective, continuance, and normative commitment to change.

Descriptive Statistics

First, means and standard deviations were performed for all study's variables (see Table 4). Regarding the covariate variables, teachers scored moderately high on 21st century skills, namely 3.49 (*SD* = 0.73), and moderately high on familiarity with differentiation in the classroom, with a score of 3.46 (*SD* = 0.77). Accordingly, teachers were on average relatively familiar with the proposed changes and evaluated teaching 21st century skills and differentiating in the classroom to be a habit. Regarding the scores on the dependent variables for commitment to change, teachers scored relatively high on affective commitment to change for 21st century skills, namely 3.93 (*SD* = 0.67), as well as for differentiation, namely 4.13 (*SD* = 0.58). This means that teachers were on average supportive towards the proposed changes based on their own motivations and believes. Teachers scored moderately high on normative commitment to change, with an average of 3.40 (*SD* = 0.62) for 21st century skills, and an average of 3.53 (*SD* = 0.68) for differentiation. This means that teachers tend to provide support for the proposed changes based on a feeling of obligation. Scores on continuance commitment to change were below moderate for both 21st century skills, namely 2.66 (*SD* = 0.77), and differentiation, namely 2.55 (*SD* = 0.77). Hence, teachers, on average, did not have the tendency to support the change in order to prevent failure and (non-)material loss. Thus, teachers were, on average, more committed to the proposed changes as they believed that the changes were beneficial, or they felt obligated to support the proposed changes, than provide support for the changes in order the prevent potential loss. Furthermore, teachers scored on average a 7.74 (*SD* = 0.83) on job satisfaction. This indicates that teachers were, on average, moderate to highly satisfied with their job. Regarding work experience, the average score was 14.59 (*SD* = 9.69), which indicated that teachers were relatively experienced in the educational field, but there were moderate differences between teachers.

Pearson's R correlations were established between familiarity, affective commitment to change, continuance commitment to change, normative commitment to change, gender (1 = male; 2 = female; 3 = other), and work experience (see Table 4), for both educational changes: 21st century skills, and differentiation in the classroom. As shown in Table 4, several significant correlations were found. Positive correlations were found between familiarity for 21st century skills and affective commitment to change for 21st century skills, $r = .56$, $p < .001$, and job valuation for 21st century skills, $r = .23$, $p < .05$. This means that a high value on familiarity is accompanied by a high score on affective commitment to change, and by a high score on job valuation in the case of 21st century skills. A negative correlation was found between affective commitment to change for 21st century skills and continuance commitment to change for 21st century skills, $r = -.34$, $p < .001$, meaning that a low value on affective commitment to change is accompanied by a high value on continuance commitment to change in the case of 21st

century skills. Additionally, positive correlations were found between normative commitment to change for 21st century skills and affective commitment to change for 21st century skills, $r = .58$, $p < .001$, and familiarity for 21st century skills, $r = .44$, $p = .005$. This means that high values on normative commitment to change are accompanied by high values on affective commitment to change, and by high values on familiarity in the case of 21st century skills.

Furthermore, high values on familiarity for differentiation are accompanied by high values for affective commitment to change for differentiation, $r = .42$, $p < .001$, and normative commitment to change for differentiation, $r = .41$, $p < .001$. In addition, positive correlations were found between normative commitment to change for differentiation and affective commitment to change for 21st century skills, $r = .21$, $p < .05$, and affective commitment to change for differentiation, $r = .51$, $p < .001$. This means that high values on normative commitment to change for differentiation are accompanied by high values on affective commitment to change in both scenarios. Also, a positive correlation was found for affective commitment to change for differentiation and affective commitment to change for 21st century skills, $r = 42$, $p < .001$. Accordingly, this means that, on average, a high score for affective commitment to change for one scenario is accompanied by a high score for affective commitment to change for the other scenario and vice versa. This is also the case for continuance commitment to change, $r = .64$, $p < .001$, and for normative commitment to change, $r = .50$, $p < .001$.

A negative correlation was found for affective commitment to change for differentiation and continuance commitment to change for 21st century skills, $r = -.26$, $p < .05$, which means that high values on affective commitment to change for differentiation are accompanied by low values for continuance commitment to change for 21st century skills. Moreover, high values on affective commitment to change for differentiation are accompanied by high values on normative commitment to change for 21st century skills, $r = .28$, $p < .05$. Besides, high levels of continuance commitment to change for differentiation are accompanied by low levels of familiarity with 21st century skills, $r = -.17$, $p < .05$, low levels of affective commitment to change for 21st century skills, $r = -.34$, $p < .001$, and low levels of affective commitment to change for differentiation, $r = -.34$, $p < .001$.

Table 4

Pearson Correlations and Descriptive Statistics of Study Variables

-		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Scenario 21st century skills	1. Familiarity	-										
	2. Affective Commitment to change	**.56***	-									
	3. Continuance Commitment to change	-.06	**-.34***	-								
	4. Normative Commitment to change	**.44***	**.58***	-.02	-							
Scenario Differentiation	5. Familiarity	.13	.10	.03	.15	-						
	6. Affective Commitment to change	.05	**.42***	**-.26***	**.28***	**.42***	-					
	7. Continuance Commitment to change	**-.17***	**-.34***	**.64***	-.06	-.11	**-.34***	-				
	8. Normative Commitment to change	-.03	**.21***	.14	**.50***	**.41***	**.51***	.13	-			
Demographic variables	9. Gender	-.11	.08	.15	.09	-.11	-.01	.07	.02	-		
	10. Work experience	.16	.06	.16	.14	.09	-.02	.00	-.03	-.12	-	
	11. Job valuation	**.23***	.11	-.10	.03	.12	.07	-.09	.02	-.12	.07	
Anchoring condition	12. Manipulation question	-.05	.11	-.05	.08	.05	.13	.03	.11	-.10	.11	.06
	Mean	3.49	3.93	2.66	3.40	3.46	4.13	2.55	3.53	1.56	14.59	7.74
	SD	.73	.67	.77	.62	.77	.58	.77	.68	.51	9.69	.83

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

Note: Significant correlations shown in bold.

Manipulation Check

To determine whether the manipulation question led to different answers between conditions, a one-way between groups ANOVA was performed for both change scenarios 21st century skills, and differentiation. Per scenario, the results for the positive impact manipulation question and the negative impact manipulation question will be described separately. Levene's test for equality of variances will be described in order to test whether the conditions have approximately the same amount of variability between scores on the dependent variables, and to determine which post hoc test will be used for pair-wise comparisons.

Scenario 21st Century Skills. Levene's test for equality of variances was non-significant for both the positive impact manipulation question, $F(2, 57) = .05$, $p = .952$, and the negative impact manipulation question, $F(2, 86) = .52$, $p = .599$. In other words, the assumption of equal variances was met for both manipulation conditions. Subsequently, the ANOVA tests found non-significant effects for the positive impact manipulation question, $F(2, 57) = 2.21$, $p = .119$, as well as for the negative impact manipulation question, $F(2, 86) = .18$, $p = .837$. Gabriel post hoc tests showed that no significant effects were found based on pair-wise comparisons (see Table 5). This indicates that there were no differences in scores on the manipulation question between the high anchor, low anchor and control condition. Thus, the manipulation did not have the expected effect for the scenario of 21st century skills in the classroom, neither for the positive impact manipulation question, nor for the negative impact manipulation question.

Scenario Differentiation. Levene's test for equality of variances for the positive impact manipulation question was non-significant, $F(2, 60) = 1.33$, $p = .274$. Therefore, the assumption of equal variances was not violated. Levene's test was significant regarding the negative impact manipulation question, $F(2, 88) = 4.93$, $p = .009$, which means that for this manipulation condition the assumption of equal variances was violated. Therefore, Games-Howell post hoc test was performed instead of Gabriel after performing the ANOVA for the negative impact manipulation condition. The ANOVA performed for the positive impact manipulation question revealed a non-significant outcome, $F(2, 60) = .40$, $p = .674$. Consequently, a Gabriel post hoc test showed that no significant effects were found based on pair-wise comparisons (see Table 5). Additionally, the ANOVA for the negative impact manipulation question showed a non-significant outcome as well, $F(2, 88) = 2.01$, $p = .141$. A Games-Howell post hoc test showed that no significant effects were found based on pair-wise comparisons (see Table 5). This indicates that there were no differences in scores on the manipulation question between the high anchor, low anchor and control condition. Accordingly, the manipulation did not have the expected result for the scenario of differentiation, neither for the positive impact manipulation question, nor for the negative impact manipulation question.

All in all, the manipulation did not work as expected, as the scores of secondary school teachers on the manipulation question did not significantly differ between groups. Teachers in the high anchor conditions did not score higher on the manipulation question than teachers in the low anchor conditions.

Table 5

Post hoc Comparison Tests for Anchoring Conditions of Commitment to Change for the Change Scenarios 21st Century Skills and Differentiation per Manipulation Question Type

Change scenario	Manipulation question type	Pairwise comparisons	*M* difference	*SE*	*p*	95% CI
21st century skills	Positive impact manipulation question*	Control vs. High	0.95	.62	.333	[-0.55, 2.46]
		Control vs. Low	-0.37	.62	.912	[-1.90, 1.16]
		High vs. Low	-.131	.65	.137	[-2.92, 0.29]
	Negative impact manipulation question*	Control vs. High	0.37	.65	.921	[-1.21, 1.95]
		Control vs. Low	0.28	.64	.960	[-1.28, 1.85]
		High vs. Low	-0.08	.66	.999	[-1.69, 1.52]
Differentiation	Positive impact manipulation question*	Control vs. High	0.50	.70	.851	[-1.21, 2.21]
		Control vs. Low	-0.12	.72	.998	[-1.88, 1.64]
		High vs. Low	-0.62	.76	.797	[-2.47, 1.23]
	Negative impact manipulation question**	Control vs. High	0.65	.72	.636	[-1.07, 2.38]
		Control vs. Low	1.32	.65	.115	[-0.25, 2.90]
		High vs. Low	0.67	.62	.526	[-0.81, 2.15]

*Gabriel post hoc test

**Games-Howell post hoc test

Note. CI = confidence interval.

Anchoring and Commitment to Change

In order to determine whether there were differences in commitment to change between the high anchor, low anchor, and control condition, a one-way MANCOVA was performed twice, for the scenario 21st century skills and the scenario differentiation, while controlling for familiarity with the change scenarios. Per scenario, the results for the positive impact manipulation question and the negative impact manipulation question will be described separately. Levene's test for equality of variances was performed in order to test whether the conditions have approximately the same amount of variability between scores on the dependent variables. Additionally, Box's M test was performed to test whether the variances and covariances of the dependent variables were equal in all groups, and to determine which test should be used within the MANCOVA.

21st Century Skills: Positive Impact Manipulation Question. Levene's test for equality of variances showed a non-significant outcome for affective commitment to change, $F(2, 52) = 3.04$, $p = .056$, continuance commitment to change, $F(2, 52) = 2.92$, $p = .063$, and normative commitment to change, $F(2, 52) = .20$, $p = .820$. In other words, all dependent variables were equal across the group. Box's M test appeared non-significant, $p = .165$. Therefore, the assumption of equality of variances and covariances was not violated. Accordingly, Wilks' Lambda test was used to proceed. The one-way MANCOVA test revealed a non-significant effect between the manipulation and the dependent variables affective, continuance, and normative commitment to change combined, while controlling for the influence of teachers' familiarity with 21st century skills, $F(2, 52) = .53$, $p = .787$, $\eta_p^2 = .03$. Moreover,

the MANCOVA did not reveal a significant effect between the manipulation and the dependent variables when measured independently, also while checking for familiarity (see Table 6). Consequently, a Bonferroni post hoc test showed that no significant effects were found based on pair-wise comparisons (See Table 7). This indicates that for the positive impact manipulation question, the commitment to change of teachers did not significantly differ between the high anchor, low anchor, and control condition, while controlling for familiarity with the educational change 21st century skills. As a result, the tests showed that there was, on average, no effect of anchored positive personal impact on teachers' affective, continuance, or normative commitment to change for the change scenario 21st century skills in education.

21st Century Skills: Negative Impact Manipulation Question. Levene's test revealed a non-significant value for affective commitment to change, $F(2, 77) = 1.08$, $p = .346$, continuance commitment to change, $F(2, 77) = .29$, $p = .752$, and normative commitment to change, $F(2, 77) = 1.23$, $p = .298$. Subsequently, the assumption of equal variances was met for all dependent variables. Box's M test appeared non-significant, $p = .606$. Therefore, the assumption of equality of variances and covariances was not violated. Subsequently, Wilks' Lambda test was used to proceed. The one-way MANCOVA test revealed a non-significant effect between the manipulation and the dependent variables affective, continuance, and normative commitment to change combined, while checking for familiarity with 21st century skills, $F(2, 77) = .98$, $p = .439$, $\eta_p^2 = .04$. Moreover, the MANCOVA did not reveal a significant effect between the manipulation and the dependent variables when measured independently, also while checking for familiarity (see Table 6). Consequently, a Bonferroni post hoc test showed that no significant effects were found based on pair-wise comparisons (see Table 7). This indicates that for the negative impact manipulation question, the commitment to change of teachers did not significantly differ between the high anchor, low anchor, and control condition, while controlling for familiarity with the educational change 21st century skills. As a result, the tests showed that there was, on average, no effect of anchored negative personal impact on teachers' affective, continuance, or normative commitment to change for the change scenario 21st century skills in education.

Table 6

Summary of Multivariate Analyses for the Change Scenario 21st century skills

Predictor	Dependent variable	*F*	*p*	η_p^2
Positive impact manipulation question	Affective Commitment to Change	.49	.616	.02
	Continuance Commitment to Change	.45	.637	.02
	Normative Commitment to Change	.02	.984	.00
Negative impact manipulation question	Affective Commitment to Change	1.54	.222	.04
	Continuance Commitment to Change	.26	.775	.01
	Normative Commitment to Change	.67	.513	.02

* p < .05 (2-tailed)

Note: Results are controlled for teachers' familiarity with 21st century skills in education.

Table 7

Post hoc Bonferroni Comparison Tests for Anchoring Conditions of Commitment to Change for the Change Scenario 21st Century Skills

Dependent variable	Pairwise comparisons	*M* difference	*SE*	*p*	95% CI
Positive impact manipulation question					
Affective commitment	Control vs. High	0.21	.19	≈ 1.000	[-0.34, 0.58]
	Control vs. Low	-0.07	.19	≈ 1.000	[-0.53, 0.39]
	High vs. Low	-0.19	.19	≈ 1.000	[-0.68, 0.29]
Continuance commitment	Control vs. High	-0.12	.25	≈ 1.000	[-0.74, 0.51]
	Control vs. Low	-0.24	.25	≈ 1.000	[-0.86, 0.38]
	High vs. Low	-0.12	.25	≈ 1.000	[-0.78, 0.53]
Normative commitment	Control vs. High	-0.03	.18	≈ 1.000	[-0.48, 0.42]
	Control vs. Low	0.00	.18	≈ 1.000	[-0.45, 0.45]
	High vs. Low	0.03	.19	≈ 1.000	[-0.45, 0.51]
Negative impact manipulation question					
Affective commitment	Control vs. High	0.23	.15	.367	[-0.13, 0.59]
	Control vs. Low	0.01	.15	≈ 1.000	[-0.35, 0.37]
	High vs. Low	-0.23	.15	.427	[-0.59, 0.15]
Continuance commitment	Control vs. High	-0.14	.21	≈ 1.000	[-0.65, 0.38]
	Control vs. Low	-0.02	.21	≈ 1.000	[-0.53, 0.50]
	High vs. Low	0.12	.22	≈ 1.000	[-0.40, 0.65]
Normative commitment	Control vs. High	-0.09	.16	≈ 1.000	[-0.47, 0.30]
	Control vs. Low	-0.18	.16	.748	[-0.56, 0.20]
	High vs. Low	-0.09	.16	≈ 1.000	[-0.49, 0.30]

Note. CI = confidence interval. *p* is adjusted for multiple comparison Bonferroni.

Differentiation: Positive Impact Manipulation Question. Levene's test for equality of variances showed a non-significant value for affective commitment to change, $F(2, 56) = .11$, $p = .892$, continuance commitment to change, $F(2, 56) = .27$, $p = .763$, and normative commitment to change, $F(2, 56) = .25$, $p = .780$. Subsequently, the assumption of equal variances was met for all dependent variables. Box's M test appeared non-significant, $p = .867$. which means that the assumption of equality of variances and covariances was not violated. Accordingly, Wilks' Lambda test was used to proceed. The one-way MANCOVA test revealed a non-significant effect between the manipulation and the dependent variables affective, continuance, and normative commitment to change combined, while checking for familiarity with differentiation, $F(2, 56) = .99$, $p = .433$, $\eta_p^2 = .05$. Moreover, the MANCOVA did not reveal a significant effect between the manipulation and the dependent variables when measured independently, also while checking for familiarity with differentiation (see Table 8). A Bonferroni post hoc test showed that no significant effects were found based on pair-wise comparisons (see Table 9). Accordingly, this means that for the positive impact manipulation question, the commitment to change of teachers did not significantly differ between the high anchor, low anchor, and control condition, while controlling for familiarity with the educational change differentiation. As a result, the tests showed that there was, on average, no effect of anchored positive personal impact on

teachers' affective, continuance, or normative commitment to change for the change scenario differentiation in the classroom.

Differentiation: Negative Impact Manipulation Question. Levene's test revealed a non-significant value for affective commitment to change, $F(2, 86) = 1.11$, $p = .334$, continuance commitment to change, $F(2, 86) = .38$, $p = .686$, and normative commitment to change, $F(2, 86) = 1.16$, $p = .318$. This means that the assumption of equal variances was met for all dependent variables. Box's M test appeared non-significant, $p = .437$. Therefore, the assumption of equality of variances and covariances was not violated, and Wilks' Lambda test was used to proceed. The one-way MANCOVA test revealed a non-significant effect between the manipulation and the dependent variables affective, continuance, and normative commitment to change combined, while checking for familiarity with differentiation, $F(2, 86) = 1.73$, $p = .116$, $\eta_p^2 = .06$. However, the MANCOVA revealed a significant effect between the negative impact manipulation and the dependent variable affective commitment to change when measured independently (see Table 8). A Bonferroni post hoc test showed that secondary school teachers who were presented with a negative low anchor ($M = 4.34$, $SD = .10$) scored significantly higher on affective commitment to change than secondary school teachers who were presented with a negative high anchor ($M = 3.99$, $SD = .10$). This is in line with the hypothesis 1b, which states that the commitment to change of the high anchor group regarding the negative impact manipulation question is expected to be lower than the commitment to change of the low anchor group. No other significant effects were found for the influence of anchored negative personal impact on teachers' commitment to change while controlling for familiarity with differentiation, based on the pairwise comparisons (see Table 9).

Table 8
Summary of Multivariate Analyses for the Change Scenario Differentiation

Predictor	Dependent variable	*F*	*p*	η_p^2
Positive impact manipulation question	Affective Commitment to Change	.09	.914	.00
	Continuance Commitment to Change	.62	.540	.02
	Normative Commitment to Change	.59	.558	.02
Negative impact manipulation question	Affective Commitment to change	3.34	**.040***	.07
	Continuance Commitment to Change	2.10	.128	.05
	Normative Commitment to Change	1.86	.164	.04

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

Note: Results are controlled for teachers' familiarity with differentiation in the classroom.

Table 9

Post hoc Bonferroni Comparison Tests for Anchoring Conditions of Commitment to Change for the Change Scenario Differentiation

Dependent variable	Pairwise comparisons	*M* difference	*SE*	*p*	95% CI
Positive impact manipulation question					
Affective commitment	Control vs. High	0.50	.16	≈ 1.000	[-0.33, 0.43]
	Control vs. Low	0.06	.16	≈ 1.000	[-0.33, 0.45]
	High vs. Low	0.01	.17	≈ 1.000	[-0.40, 0.43]
Continuance commitment	Control vs. High	0.15	.24	≈ 1.000	[-0.43, 0.74]
	Control vs. Low	-0.14	.24	≈ 1.000	[-0.73, 0.46]
	High vs. Low	-0.29	.26	.808	[-0.92, 0.35]
Normative commitment	Control vs. High	-0.11	.17	≈ 1.000	[-0.54, 0.32]
	Control vs. Low	0.09	.18	≈ 1.000	[-0.34, 0.53]
	High vs. Low	0.20	.19	.851	[-0.26, 0.67]
Negative impact manipulation question					
Affective commitment	Control vs. High	0.27	.14	.164	[-0.07, 0.61]
	Control vs. Low	-0.08	.14	≈ 1.000	[-0.41, 0.26]
	High vs. Low	-0.35	.14	**.049***	[-0.61, 0.07]
Continuance commitment	Control vs. High	-0.37	.20	.191	[-0.86, 0.11]
	Control vs. Low	-0.04	.20	≈ 1.000	[-0.52, 0.45]
	High vs. Low	0.34	.20	.300	[-0.16, 0.83]
Normative commitment	Control vs. High	0.09	.17	≈ 1.000	[-0.32, 0.50]
	Control vs. Low	-0.23	.17	.532	[-0.64, 0.18]
	High vs. Low	-0.32	.17	.198	[-0.74, 0.10]

Note. CI = confidence interval. *p* is adjusted for multiple comparison Bonferroni.

All in all, this analysis showed that there was a significant effect of anchored negative personal impact on teachers' affective commitment to change for the scenario of differentiation in the classroom. This effect is in line with the hypothesis 1b, as secondary school teachers who were presented a high negative impact anchor, scored lower on affective commitment to change than secondary school teachers who were presented a low negative impact anchor. Additionally, no other significant differences in teachers' commitment to change were found between the high anchor, low anchor, and control conditions, while controlling for familiarity with the proposed change scenarios.

The Influence of Gender

To determine whether there was a significant difference in the influence of anchored personal impact between male and female secondary school teachers' commitment to change, a two-way MANOVA was performed. This was tested for all dependent variables together, as well as independently (affective, continuance, normative commitment to change). The MANOVA test was performed for both educational scenarios: 21st century skills, and differentiation. Per scenario, the results for the positive impact manipulation question and the negative impact manipulation question will be described separately. Levene's test for equality of variances was performed in order to test whether the conditions have approximately the same amount of variability between scores on the dependent variables.

Additionally, Box's M test was performed to test whether the variances and covariances of the dependent variables were equal in all groups, and to determine which test should be used within the MANCOVA.

21st Century Skills: Positive Impact Manipulation Question. Levene's test for equality of variances showed a non-significant value for affective commitment to change, $F(1, 32) = .52$, $p = .673$, continuance commitment to change, $F(1, 32) = 1.21$, $p = .323$, and normative commitment to change, $F(1, 32) = 1.22$, $p = .320$. Subsequently, the assumption of equal variances was met for all dependent variables. Box's M test was not significant, $p = .203$, which means that the assumption of equality of covariances has not been violated. Wilk's Lambda was used in the two-way MANOVA, and showed no significant effect between the interaction variable gender x condition and the dependent variables, $F(1, 32) = .67$, $p = .581$, $\eta_p^2 = .07$. Additionally, no effects were found between the interaction variable and the dependent variables independently, (see Table 10). In order to investigate possible effects further, the mean value of females and males per dependent variable were compared (see Figure 2). The reason for this is that a post-hoc test is not applicable here due to the low number of groups (fewer than three).

Comparing the mean values of females and males per dependent variable provided some indications for differences in anchoring effects for the dependent variables affective commitment to change and normative commitment to change. Regarding affective commitment to change, Figure 2(A) shows that male teachers scored on average 0.50 lower than female teachers on the high anchor on positive impact, while the difference between males and females in the low anchor condition is much smaller, namely 0.14. The average score of female teachers was almost the same comparing the high anchor condition ($M = 3.98$, $SD = 0.29$), and the low anchor condition ($M = 4.00$, $SD = 0.24$), while the average score of male teachers for the high anchor condition ($M = 3.48$, $SD = 0.24$) was 0.38 lower than for the low anchor condition ($M = 3.86$, $SD = 0.29$). Additionally, for normative commitment to change, Figure 2(C) shows that male teachers scored on average 0.47 lower than female teachers on the low anchor on positive personal impact, while the difference between males and females in the high anchor condition was smaller, namely 0.17. The average score of male teachers on normative commitment to change for the high anchor condition ($M = 3.28$, $SD = 0.19$) was 0.18 higher than for the low anchor condition ($M = 3.10$, $SD = 0.23$). The average score of female teachers was almost the same comparing the high anchor condition ($M = 3.45$, $SD = 0.23$) and the low anchor condition ($M = 3.57$, $SD = 0.19$).

Hence, it seems that there are some indications that male teachers were more prone to the high anchor on positive personal impact for the variable affective commitment to change, and were more prone to the low anchor on positive personal impact for the variable normative commitment to change. It must be noted that these indications were not found significant.

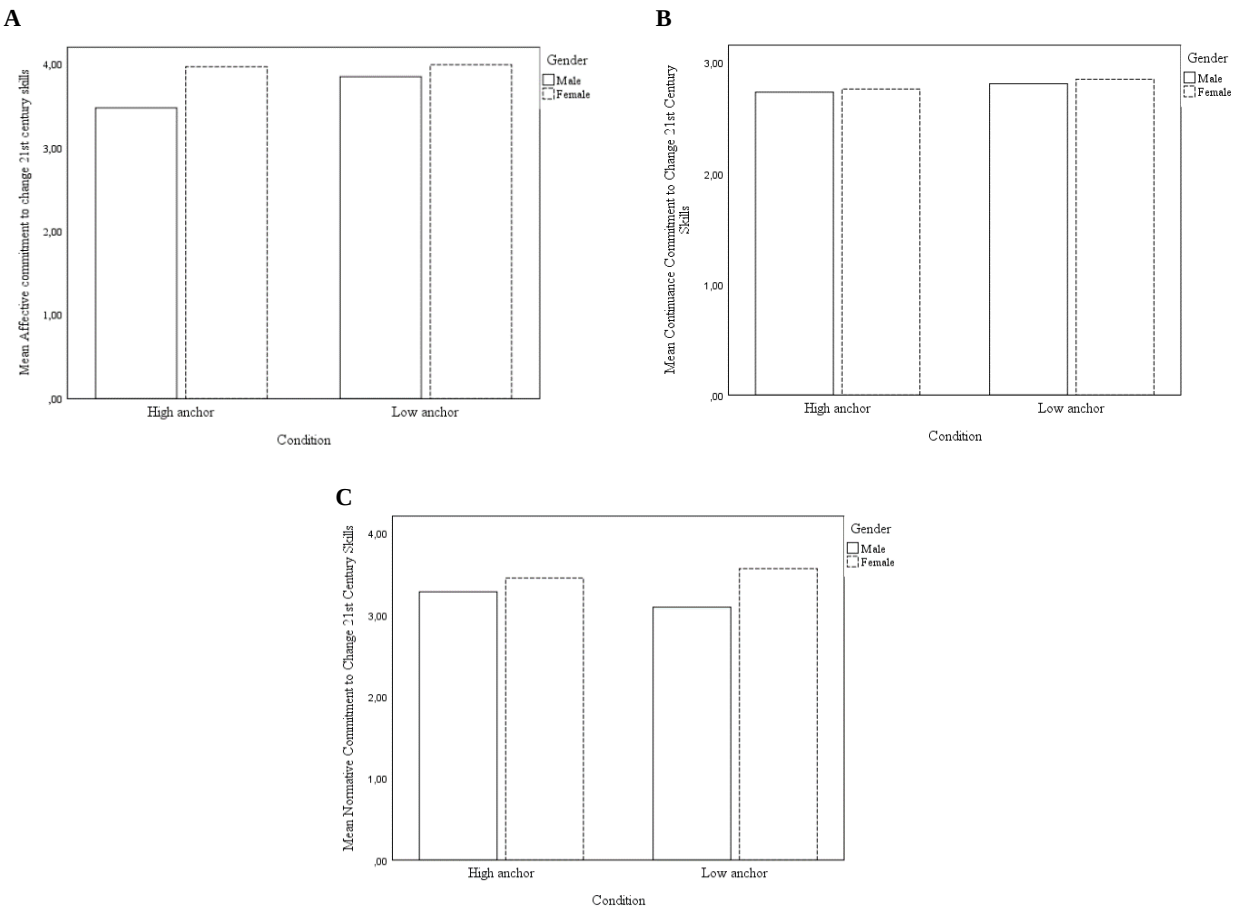

Figure 2. Differences in mean for (A) affective commitment to change (B) continuance commitment to change and (C) normative commitment to change between male and female participants for the positive impact manipulation question (scenario 21st century skills)

21st Century Skills: Negative Impact Manipulation Question. Levene's test revealed a non-significant value for affective commitment to change, $F(1, 50) = .51$, $p = .680$, continuance commitment to change, $F(1, 50) = 1.28$, $p = .292$, and normative commitment to change, $F(1, 50) = .45$, $p = .718$. This means that the assumption of equal variances was met for all dependent variables. Box's M test was found significant, $p = .024$, which means that the assumption of equality of covariances has been violated. Pillai's Trace was used in the two-way MANOVA, and showed no significant effect between the interaction variable gender x condition and the dependent variables, $F(1, 50) = .34$, $p = .800$, $\eta_p^2 = .02$. Additionally, no effects were found between the interaction variable and the dependent variables independently (see Table 10).

Comparisons of the mean values for females and males per dependent variable provided indications for possible differences in anchoring effects between female and male teachers for the variable continuance commitment to change (see Figure 3). Regarding continuance commitment to change, male teachers scored on average 0.61 lower than female teachers in the low anchor condition, and 0.28 lower than female teachers in the high anchor condition. The average score of female teachers was almost the same comparing the high anchor condition ($M = 2.83$, $SD = 0.20$) and the low anchor

condition (*M* = 2.87, *SD* = 0.21), while the difference in scores of male teachers between the high anchor condition (*M* = 2.55, *SD* = 0.23) and the low anchor condition (*M* = 2.26, *SD* = 0.20) was larger, namely 0.29. Hence, it seems that there are some indications that male teachers are more prone to the low anchor on negative personal impact for the variable continuance commitment to 21st century skills in education. It must be emphasized that these indications are not found significant.

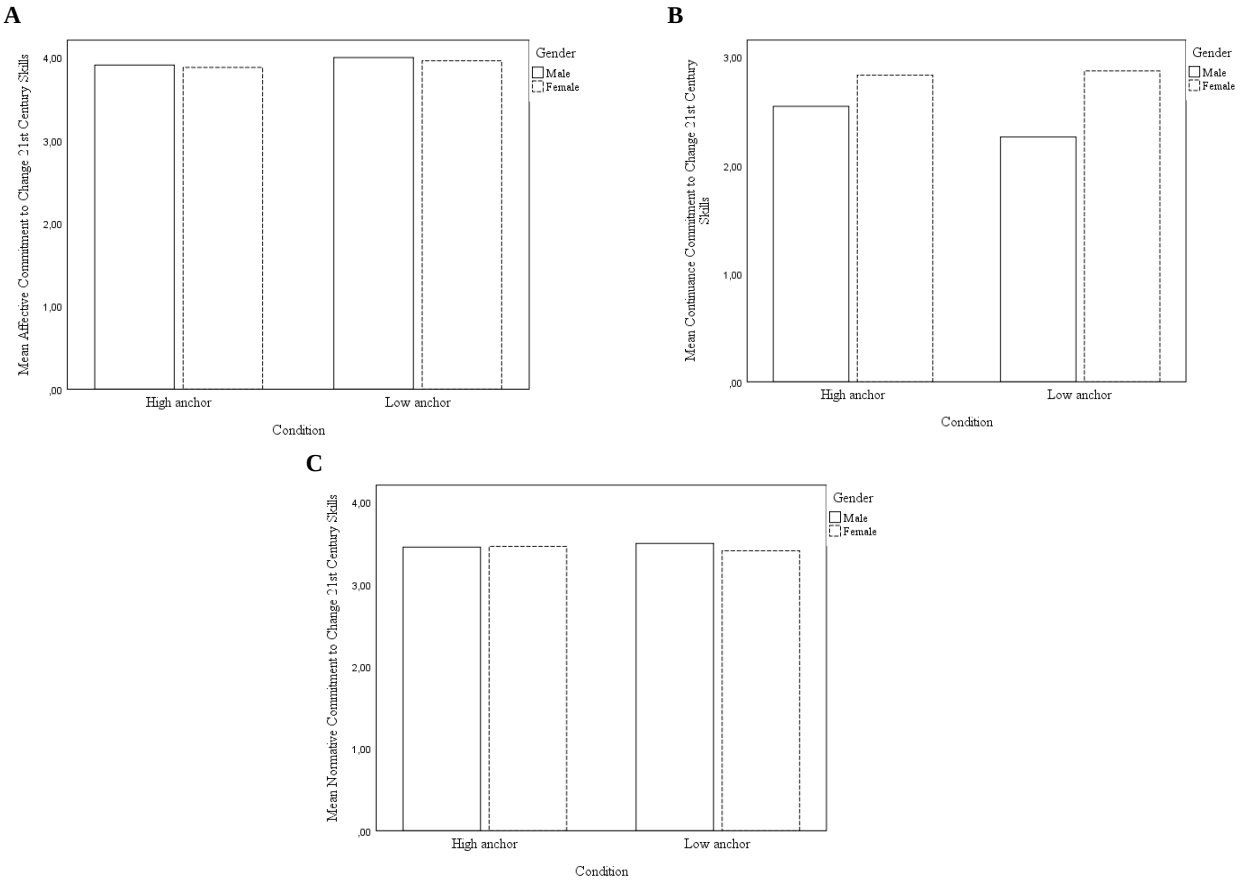

Figure 3. Differences in mean for (A) affective commitment to change (B) continuance commitment to change and (C) normative commitment to change between male and female participants for the negative impact manipulation question (scenario 21st century skills)

Concluding, although no significant differences were found between male and female teachers' affective, continuance and normative commitment to change, the data provided indications that male teachers were more prone to high anchored positive personal impact for the variable affective commitment to change, to low anchored positive personal impact for normative commitment to change, and to low anchored negative personal impact for continuance commitment to change. It must be noted that these indications were not found significant, and therefore no conclusive statements could be made.

Table 10

Summary of Multivariate Analyses for the Change Scenario 21st century skills

Predictor		Dependent variable	*F*	*p*	η_p^2
Positive impact manipulation question	Gender * Condition	Affective Commitment to Change	.44	.511	.02
		Continuance Commitment to Change	.00	.985	.00
		Normative Commitment to Change	.50	.483	.02
	Gender	Affective Commitment to Change	1.46	.236	.05
		Continuance Commitment to Change	.01	.912	.00
		Normative Commitment to Change	2.26	.143	.07
	Condition	Affective Commitment to Change	.57	.455	.02
		Continuance Commitment to Change	.07	.793	.00
		Normative Commitment to Change	.03	.864	.00
Negative impact manipulation question	Gender * Condition	Affective Commitment to Change	.00	.978	.00
		Continuance Commitment to Change	.59	.445	.01
		Normative Commitment to Change	.07	.791	.00
	Gender	Affective Commitment to Change	.03	.860	.00
		Continuance Commitment to Change	4.60	.037	.09
		Normative Commitment to Change	.05	.831	.00
	Condition	Affective Commitment to Change	.21	.650	.00
		Continuance Commitment to Change	.34	.561	.01
		Normative Commitment to Change	.00	.982	.00

Note: The given p-values need to be corrected, as there are three dependent variables. Accordingly, the p-value should be lower than 0.05/3=0.0167 in order to assume a significant effect. Significant correlations are shown in boldface.

Differentiation: Positive Impact Manipulation Question. Levene's test for equality of variances showed a non-significant value for affective commitment to change, $F(1, 33) = .94$, $p = .434$, continuance commitment to change, $F(1, 33) = .19$, $p = .905$, and normative commitment to change, $F(1, 33) = 1.78$, $p = .172$. Accordingly, the assumption of equal variances was met for all dependent variables. Box's M test was not significant, $p = .976$, which means that the assumption of equality of covariances has not been violated. Wilk's Lambda was used in the two-way MANOVA, and showed no significant effect between the interaction variable gender x condition and the dependent variables, $F(1, 33) = 1.77$, $p = .175$, $\eta_p^2 = .16$. Additionally, no effects were found between the interaction variable and the dependent variables independently (see Table 11).

Comparisons of the mean values from male and female teachers per dependent variable provided some indications for possible anchoring effects between female and male teachers for the variable continuance commitment to change (see Figure 4). With regards to continuance commitment to change, female teachers scored on average 0.25 lower than male teachers in the high anchor condition, but 0.20 higher than male teachers in the low anchor condition. Additionally, the difference in scores for female

teachers between the high anchor condition (*M* = 2.23, *SD* = 0.27) and the low anchor condition (*M* = 2.78, *SD* = .26) was large, namely 0.55, while male teachers scored approximately equal for the high anchor condition (*M* = 2.55, *SD* = 0.24) and the low anchor condition (*M* = 2.58, *SD* = 0.27). Thus, it seems that graph B (see Figure 4) provides an indication that female teachers' continuance commitment to change was more prone to anchored positive personal impact than male teachers' continuance commitment to change for the scenario differentiation in the classroom, but in the opposite direction as was hypothesized. It must be emphasized that this indication is not found significant.

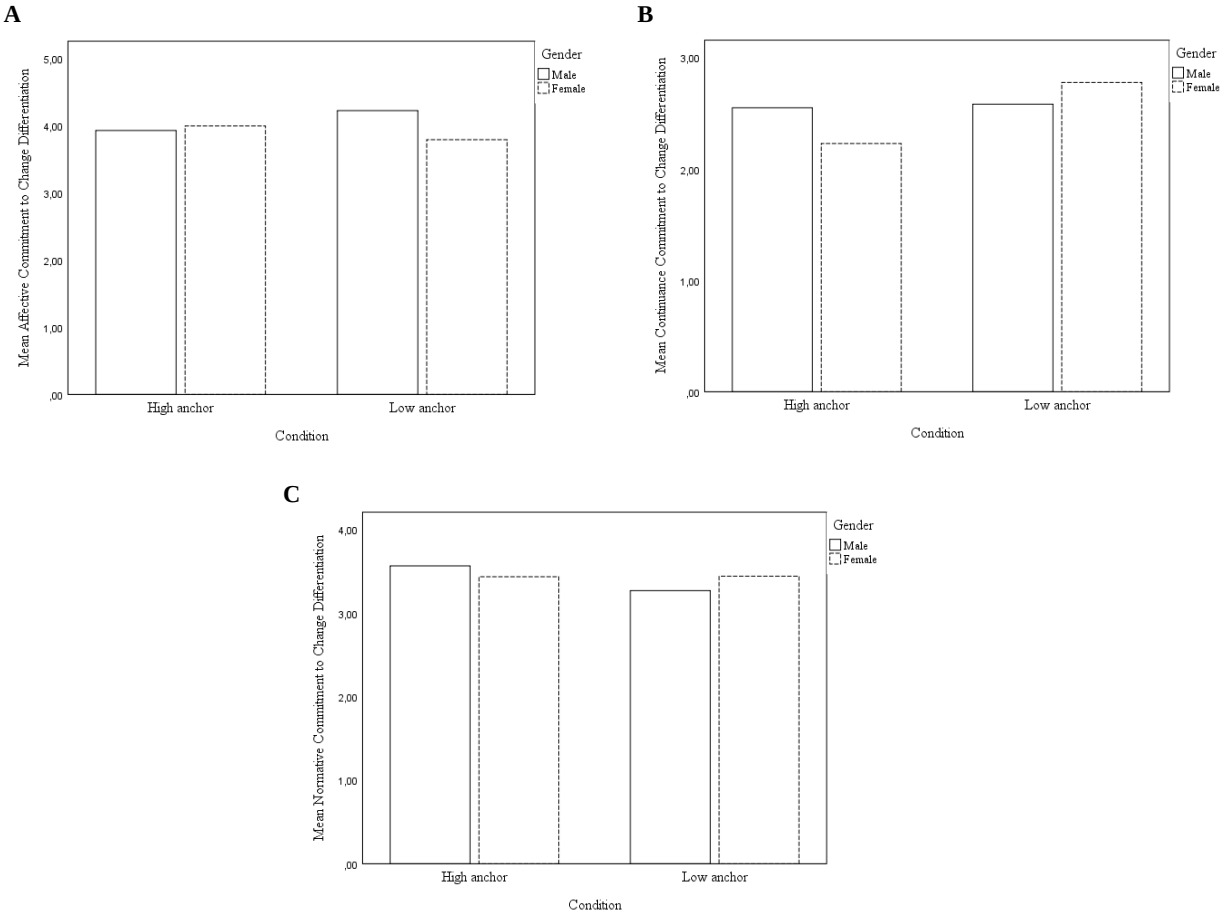

Figure 4. Differences in mean for (A) affective commitment to change, (B) continuance commitment to change, and (C) normative commitment to change between male and female participants for the positive impact manipulation question (scenario differentiation)

Differentiation: Negative Impact Manipulation Question. Levene's test showed a non-significant value for affective commitment to change, $F(1, 56) = 1.88$, $p = .144$, and for normative commitment to change, $F(1, 56) = .04$, $p = .988$. Subsequently, the assumption of equal variances was met for these two dependent variables. Levene's test revealed a significant effect for the variable continuance commitment to change, $F(1, 56) = 3.16$, $p = .032$, which means that the assumption of equal variances was violated for this dependent variable. Box's M test was not significant, $p = .280$, which means that the assumption of equality of covariances has not been violated. Wilk's Lambda was used in

the two-way MANOVA, and showed no significant effect between the interaction variable gender x condition and the dependent variables, $F(1, 56) = 1.51$, $p = .224$, $\eta_p^2 = .08$. Additionally, no effects were found between the interaction variable and the dependent variables independently (see Table 11).

Comparing the mean values of females and males per dependent variable provided some indications for differences in anchoring effects for the dependent variable normative commitment to change. Female teachers scored on average 0.33 lower than male teachers on the negative high anchor, and females scored 0.35 higher on the negative low anchor than males. Additionally, the average score of male teachers was almost the same comparing the high anchor condition ($M = 3.65$, $SD = .19$), and the low anchor condition ($M = 3.60$, $SD = .17$), while the average score of female teachers for the negative low anchor condition ($M = 3.95$, $SD = .18$) was 0.63 higher than for the negative high anchor condition ($M = 3.32$, $SD = .16$). As a consequence, it seems that there is some indication that female secondary school teachers were more prone to the negative anchors on normative commitment to differentiation in the classroom than male secondary school teachers. Although inspection of the mean values depicted in Figure 5 shows a tendency that female secondary school teachers were more prone to the negative anchors on normative commitment to differentiation in the classroom than male secondary school teachers, this tendency did not yield a significant effect.

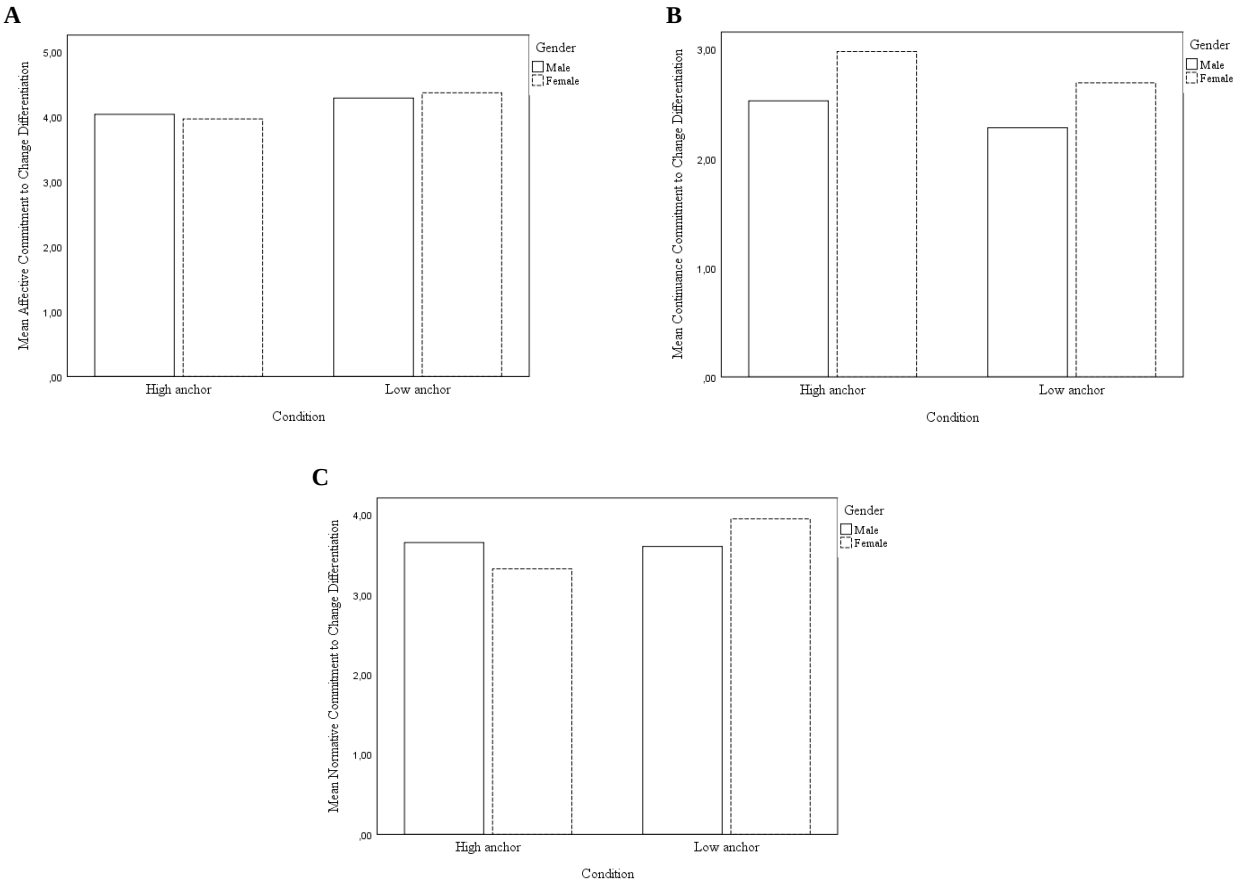

Figure 5. Differences in mean for (A) affective commitment to change, (B) continuance commitment to change, and (C) normative commitment to change between male and female participants for the negative impact manipulation question (scenario differentiation)

Concluding, despite that there was on average no significant difference in the influence of anchored personal impact between male and female secondary school teachers' commitment to change (affective, continuance, and normative commitment to change), there are some indications that female secondary school teachers were more prone to the positive impact anchoring on continuance commitment to change, and to the negative impact anchoring on normative commitment to differentiation in the classroom. It must be noted that these indications are not found significant, and therefore no exclusive statements could be made.

Table 11

Summary of Multivariate Analyses for the Change Scenario Differentiation

Predictor		Dependent variable	*F*	*p*	η_p^2
Positive impact manipulation question	Gender * Condition	Affective Commitment to Change	1.50	.231	.05
		Continuance Commitment to Change	.97	.333	.03
		Normative Commitment to Change	.39	.539	.01
	Gender	Affective Commitment to Change	.80	.377	.03
		Continuance Commitment to Change	.06	.811	.00
		Normative Commitment to Change	.01	.928	.00
	Condition	Affective Commitment to Change	.05	.823	.00
		Continuance Commitment to Change	1.23	.275	.04
		Normative Commitment to Change	.35	.557	.01
Negative impact manipulation question	Gender * Condition	Affective Commitment to Change	.23	.635	.00
		Continuance Commitment to Change	.01	.919	.00
		Normative Commitment to Change	3.70	.060	.06
	Gender	Affective Commitment to Change	.00	.977	.00
		Continuance Commitment to Change	4.49	.039	.08
		Normative Commitment to Change	.00	.965	.00
	Condition	Affective Commitment to Change	4.23	.045	.07
		Continuance Commitment to Change	1.72	.195	.03
		Normative Commitment to Change	2.71	.105	.05

Note: The given p-values need to be corrected, as there are three dependent variables. Accordingly, the p-value should be lower than 0.05/3=0.0167 in order to assume a significant effect. Significant correlations are shown in boldface.

The Influence of Work Experience

To determine whether the commitment to change of less experienced teachers was significantly more influenced by anchored personal impact than the commitment to change of more experienced teachers, a multiple linear regression was performed. This effect was tested for the dependent variables affective, continuance, and normative commitment to change individually. A multiple linear regression was performed for both educational scenarios: 21st century skills and differentiation. Per scenario, the

results for the positive impact manipulation question and the negative impact manipulation question will be described separately.

21st Century Skills: Positive Impact Manipulation Question. The three multiple linear regression analyses for the dependent variables revealed that the overall models of positive impact anchoring condition and work experience as independent variables were not significant for affective commitment to change, R^2 = .00, F(2, 31) = .00, p = .976, continuance commitment to change, R^2 = .00, F(2, 31) = .00, p = .954, and normative commitment to change, R^2 = .01, F(2, 31) = .38, p = .544. Investigation of the independent variables separately showed that both positive impact anchoring condition and work experience do not have a significant impact on the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change (see Table 12). As a result, there was no significant effect between the interaction variable work experience x positive impact manipulation condition and each of the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change. This means that work experience did not have an effect on the influenceability of anchored positive personal impact on teachers' commitment to change regarding the change scenario 21st century skills.

21st Century Skills: Negative Impact Manipulation Question. The three multiple linear regression analyses testing the overall models of negative impact anchoring condition and work experience as independent variables, and affective commitment to change, continuance commitment to change, and normative commitment to change as dependent variables revealed no significant outcomes, with affective commitment to change R^2 = .00, F(2, 48) = .10, p = .759, continuance commitment to change R^2 = .03, F(2, 48) = 1.57, p = .217, and normative commitment to change R^2 = .02, F(2, 48) = .93, p = .340. Investigation of the independent variables separately showed that both negative impact anchoring condition and work experience do not have a significant impact on the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change (see Table 12). As a result, there was no significant effect between the interaction variable work experience x negative impact manipulation condition and each of the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change.

All in all, the results indicate that for the change scenario 21st century skills, there was no significant difference in the influence of anchored positive and negative personal impact on teachers' affective, continuance and normative commitment to change when considering work experience. Accordingly, work experience did not have an effect on the influenceability of anchored personal impact on teachers' commitment to change.

Table 12

Standardized Estimates Resulting from the Multiple Linear Regression Analyses for the scenario of 21st century skills in education.

	Dependent variables of Commitment to Change					
	Affective		Continuance		Normative	
Predictor	*β*	*p*	*β*	*p*	*β*	*p*
Positive impact anchoring condition * Work experience	.00	.976	.00	.954	.00	.544
Positive impact anchoring condition	.23	.344	.07	.794	.01	.951
Work experience	.00	.782	.01	.379	.01	.438
Negative impact anchoring condition * Work experience	.00	.759	.01	.217	.01	.340
Negative impact anchoring condition	.09	.632	-.15	.495	-.00	.997
Work experience	.00	.692	.01	.264	.01	.326

Note. * p < .05

Differentiation: Positive Impact Manipulation Question. The three multiple linear regression analyses for the dependent variables revealed that the overall models of positive impact anchoring condition and work experience as independent variables were not significant for affective commitment to change, R^2 = .01, $F(2, 32)$ = .21, p = .650, continuance commitment to change, R^2 = .00, $F(2, 32)$ = .07, p = .789, and normative commitment to change, R^2= .00, $F(2, 32)$ = .05, p = .818. Investigation of the independent variables separately showed that both positive impact anchoring condition and work experience did not have a significant impact on the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change (see Table 13). As a result, there was no significant effect between the interaction variable work experience x positive impact manipulation condition and each of the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change. This means that work experience did not have an effect on the influenceability of anchored positive personal impact on teachers' commitment to change regarding the change scenario differentiation.

Differentiation: Negative Impact Manipulation Question. The three multiple linear regression analyses testing the overall models of negative impact anchoring condition and work experience as independent variables, and affective commitment to change, continuance commitment to change, and normative commitment to change as dependent variables revealed no significant outcomes, with affective commitment to change R^2 = .03, $F(2, 54)$ = 1.45, p = .234, continuance commitment to change R^2 = .00, $F(2, 54)$ = .21, p = .645, and normative commitment to change R^2 = .01, $F(2, 54)$ = .72, p = .399. Investigation of the variables independently showed that negative impact anchoring condition has a significant impact on the dependent variable affective commitment to change, b = .32, SE = .15, $t(57)$ = 2.10, p < .05 (see Table 10). This effect was also found in the MANCOVA earlier (see Table 6). No other significant effects were found of negative impact anchoring condition or work experience on the dependent variables (see Table 13). Thus, there was no significant effect between the

interaction variable work experience x negative manipulation condition and each of the dependent variables affective commitment to change, continuance commitment to change, and normative commitment to change.

All in all, the results indicate that for the change scenario 21st century skills, there was no significant difference in the influence of anchored positive and negative personal impact on teachers' affective, continuance and normative commitment to change when considering work experience. Accordingly, work experience did not have an effect on the influenceability of anchored personal impact on teachers' commitment to change.

Table 13

Standardized Estimates Resulting from the Multiple Linear Regression Analyses for the scenario of Differentiation in the classroom.

	Dependent variables of Commitment to Change					
	Affective		Continuance		Normative	
Predictor	*β*	*p*	*β*	*p*	*β*	*p*
Positive impact anchoring condition * Work experience	.01	.650	.00	.789	.00	.818
Positive impact anchoring condition	.04	.856	.28	.293	-.14	.550
Work experience	-.00	.916	-.01	.970	-.00	.901
Negative impact anchoring condition * Work experience	.03	.234	-.00	.645	.00	.399
Negative impact anchoring condition	.32	**.040***	-.32	.121	.30	.098
Work experience	-.00	.916	.00	.985	-.00	.862

Note. * p < .05

Overview

An overview of the results per hypothesis is presented in Table 14.

Table 14

Status Summary of the Study's Hypotheses per Change Scenario, Specified per Pairwise Comparisons of the Experiment's Groups

Hypotheses	Change scenario	Condition	Groups	Status
H1a: It is expected that secondary school teachers will be more committed to the educational change when being presented with a high anchor on positive personal impact, than when being presented with a low anchor on positive personal impact.	21st century skills	Positive impact manipulation question	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	Rejected
H1b: It is expected that secondary school teachers will be less committed to the educational change when being presented with a high anchor on negative personal impact, than when being presented with a low anchor on negative personal impact.	21st century skills	Negative impact manipulation question	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: It is expected that female secondary school teachers' commitment to change will be more influenced by anchored personal impact, than male secondary school teachers' commitment to change	21st century skills	Positive impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
		Negative impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
	Differentiation	Positive impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
		Negative impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
H3: It is expected that the commitment to change of more experienced secondary school teachers will be less influenced by anchored personal impact, than the commitment to change of less experienced secondary school teachers.	21st century skills	Positive impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
		Negative impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
	Differentiation	Positive impact manipulation question	High anchor	Rejected
			Low anchor	Rejected
		Negative impact manipulation question	High anchor	Rejected
			Low anchor	Rejected

*Significant effect found for affective commitment to change.

Discussion

This experimental study has investigated the effect of using an anchor on positive and negative personal impact on the affective, continuance and normative commitment to change of secondary school teachers. Furthermore, it was investigated whether anchoring effects differed among teachers by considering gender and work experience as possible influencing factors. Results of the study will be discussed here.

Anchored Personal impact: The Manipulation

First, for the positive personal impact manipulation question, it was expected that teachers who were presented a high anchor, would be more committed to the proposed educational change than teachers who were presented with a low anchor on personal impact. Regarding the negative personal impact manipulation question, the opposite was hypothesised; teachers who were presented a high anchor, would be less committed to the proposed educational change than teachers who were presented a low anchor on negative personal impact. Results from the current study showed that the use of anchored personal impact had no influence on the commitment to change of secondary school teachers. The only significant effect found was for the negative impact manipulation question on the dependent variable affective commitment to the educational change of differentiation in the classroom. This indicates that teachers who were confronted with a high anchor on negative personal impact expressed a lower desire to provide support for the change based on their beliefs of the benefits of differentiation in the classroom. This is in line with hypothesis 1b, which stated that the commitment to change of secondary school teachers would be lower when presented a high anchor on negative personal impact, than when being presented a low anchor on negative personal impact. A possible line of reasoning for this significant effect for affective commitment to change, could be that teachers considered the high anchor on negative personal impact as starting point to base their final judgement on (as explained by Strack & Mussweiler, 1997). Teachers were confronted with the high anchor on the negative impact the change might have on them and their personal life, which possibly decreased their own beliefs of the change's benefits.

However, the same significant effect as described above was not found for affective commitment to 21st century skills in education or for other types of commitment to change. Moreover, no significant results were found for the positive impact manipulation questions. Hence, hypothesis 1a was rejected completely, and hypothesis 1b to a large extent. These results are in contrast with findings from previous research, in which evidence was found for anchoring effects on judgements (Newell & Shanks, 2014), also among teachers (Zhao & Linderholm, 2001). According to Tversky and Kahneman (1974), anchoring influences one's estimates based on the presented value, and adjust one's judgment to this value for their final estimate. Nevertheless, this effect was not found in this study, despite the use of several anchors in different directions.

An explanation for the unexpected results is that the anchor values were not extreme enough. Previous studies found evidence that anchoring effects will increase if extremity of anchoring increases

(e.g. Chapman & Johnson, 1994; Epley & Gilovich, 2006; Quattrone, Lawrence, Warren, Souza-Silva, Finkel & Andrus, 1984). Those studies suggest that everyone maintains a plausible range in which the estimate should lie. When the anchor lies within the plausible range, then there is less need for adjustment. Accordingly, anchors near the boundaries, or even just outside those boundaries, of this plausible range would result in larger anchoring effect, as there is a larger discrepancy between the anchor and the plausible value. Therefore, more adjustment is needed, and anchoring effects become more vivid. As a consequence, more extreme anchors, which are more placed towards the ends of the scale (1-10), might have resulted in significant anchoring effects.

Another possible explanation could be that participants might have been too personally and emotionally involved with the proposed changes, as a result of incorporating personal impact in the manipulation question. The manipulation question was designed to let participants consider the impact of the change for them personally, by considering their workload, their ability to maintain their work, and how they would feel when the change would be implemented. Previous studies suggest that low personal involvement and relevance with a change is associated with stronger anchoring effects (e.g. Van Exel, Brouwer, Van den Berg, & Koopmanschap, 2006; Wegener et al., 2010). This could be the result of *compliance bias*: respondents may accept cues of information from another source in order to limit their cognitive effort, especially in case of low involvement in the topic (e.g. Kanninen, 1995; Liljas & Blumenschein, 2000; Wegener et al., 2001). On the contrary, people who are highly personally involved and the relevance of the topic for them is high, will comply less, and therefore it is less likely that anchoring effects occur. Consequently, incorporating personal impact in the manipulation question possibly made participants feel personally involved in the change subject, and made the anchor highly relevant for them personally.

Furthermore, a possible other explanation is that the relative high level of familiarity with the proposed changes might have mitigated the influence of the anchors. Originally, the variable familiarity with the proposed changes was used as covariate variable; to control for the expected variance in this variable in the analyses. However, the data from this study showed that there was an above-average familiarity with the proposed changes 21st century skills in education, and with differentiation in the classroom in all conditions. Familiarity with a change is operationalized in this study in terms of frequent, almost automatic use/application of the proposed change in practice. Accordingly, teachers in this study, on average, already had experience with the proposed changes. Research suggests that high levels of experience with a certain task reduce anchoring effects (Newell & Shanks, 2014; Thomas & Handley, 2008). An explanation for this effect is that people use information from previous experience with the familiar task to base their judgement on (Thomas & Handley, 2008). People without information from previous experience are more likely to rely on the anchor information. Hence, this means that the relative high familiarity with the proposed changes of teachers in this study could be an indication that teachers were less susceptible to anchoring effects.

The Influence of Gender

Regarding gender, it was expected that female teachers would be more influenced by the anchor in personal impact than male teachers. The hypothesis was not confirmed, as the results showed that there is no significant difference in the influence of anchored personal impact between male and female secondary school teachers' commitment to change. This is in contradiction with previous research which stated that women are more susceptible to anchoring effects than men (Kudryavtsev & Cohen, 2011), as women seem to pay more attention to details than men (Gerrans & Clark-Murphy, 2002), and women tend to follow suggestions made by others more than men (Feingold, 1994; Rajdev & Raninga, 2016).

However, the argument that women tend to follow suggestions made by others more than men might not account for actual change in their views and judgements. Previous research suggests that women are more sensitive to suggestions of others in order to feel socially accepted (Feingold, 1994). Additionally, Eagly and Carli (1981) suggest that the influenceability of women is greater in social group situations than the influenceability of men. Yet, this would imply that women should be as resistant to influencing factors as men in situations where their judgements are made privately. To substantiate, evidence shows that women are not necessarily more agreeable than men in situations where their judgements are confidentially and made individually (e.g., Berg, Stephan, & Dodson, 1981; Gould & Slone, 1982). Accordingly, women seem to follow suggestions made by others more in order to feel socially accepted and to appear agreeable, but this might not reflect actual change in women's judgements. In this experiment, the participants were not answering the questions in a social environment, but rather individually. Therefore, their judgements might not have been influenced by the anchor, as they did not feel the need to be appear agreeable and comply to what was suggested.

Additionally, previous research by Beblo, Beninger and Markowsky (2017) state that males and females do not differ in their reaction to anchoring, which is in contrast to findings of Kudryavtsev and Cohen (2011). Previous findings from Kudryavtsev and Cohen (2011) on differences in anchoring effects between males and females could possibly be allocated to differences in education, as men have more often a University degree than women (McNabb, Pal, & Sloane, 2002). In the current sample, almost all women (and men) had obtained a University of applied sciences degree. Research suggests that the influence of anchoring decreases with higher cognitive ability (Bergman, Ellingsen, Johannesson, & Svensson, 2010; Oechssler, Roider, & Schmitz, 2009). This means that people with higher cognitive ability show less biased responses and decision-making when presented with an anchor than people with lower cognitive abilities. The reasoning behind this is that people with higher levels of cognitive capacity have developed more advanced reasoning and information processing skills, which could result in observing the anchor faster and deliberating on its use (Bergman et al., 2010). Additionally, Beblo, Beninger & Markowsky (2017) found that participants with higher levels of education show a significantly lower anchoring bias than participants with lower levels of education. Since the sample contained mostly highly educated women, this could account for the lack of effects found, and thus for the rejection of the hypothesis.

Although no significant effects were found to support the hypothesis, the results provided some subtle indications for possible differences in anchoring effects on commitment to change between female and male teachers. Regarding 21st century skills, the data provided indications that male teachers were more prone to high anchored positive personal impact for affective commitment to change, to low anchored positive personal impact for normative commitment to change, and to low anchored negative personal impact for continuance commitment to change. For the change scenario differentiation, the data showed indications that female teachers were more prone to the positive impact anchoring on continuance commitment to change, and to the negative impact anchoring on normative commitment to differentiation in the classroom. Surprisingly, these indications suggest that male teachers seem to be more susceptible to particular anchors than female teachers regarding the change scenario 21st century skills, and female teachers seem to be more susceptible to particular anchors than male teachers regarding differentiation in the classroom. This is in contrast with hypothesis 2, which argued that it was expected that female teachers would be more prone to anchored personal impact than male teachers. These indications would imply that women are not necessarily more prone to anchoring effects than men.

However, the results did not provide indications of possible effects for all conditions in both change scenarios. Additionally, previous research was more often pointed towards women, in a way that female respondents are more susceptible to anchoring effects than male respondents (Kudryavtsev & Cohen, 2011; Hügelschäfer & Achtziger, 2014; Ladenburg & Olsen, 2006). Therefore, these indications are questionable. Future research could dive deeper into these differences regarding commitment to change in order to clarify this effect more. In either case, it must be noted that these findings are just indications, and that inferences of causality cannot be made based on current findings. Therefore, future research cannot take these findings as a solid base, just to provide suggestions.

The Influence of Work Experience

Regarding work experience, it was expected that more experienced teachers would be less influenced by the anchor in personal impact than less experienced teachers. The hypothesis was not confirmed, as the results show that there are no significant differences in the influence of anchored personal impact based on teachers' work experience. Accordingly, work experience did not have an effect on the influenceability of anchored personal impact on teachers' commitment to change. This finding is in contrast with previous studies which found that experienced professionals seem to be less susceptible by presented anchors than novices in the field (e.g. Furnham & Boo, 2011; Dünnebier et al., 2009), as experienced professionals have more knowledge (Welsh et al., 2014), and more information based on previous experience of the topic or change at hand (Dünnerbier et al., 2009).

On the contrary, other researchers found that expert and novices are equally susceptible to anchoring (e.g. Englich, Mussweiler, & Strack, 2006; Enough & Mussweiler, 2001; Northcraft & Neale, 1987), which is in line with rejection of the hypothesis. A possible explanation for rejection of the hypothesis, is that more experienced teachers and less experienced teachers had approximately the same

amount of previous experience with the proposed changes 21st century skills and differentiation. As mentioned before, research showed that high levels of task experience reduce anchoring effects (Newell & Shanks, 2014; Thomas & Handley, 2008). Accordingly, people use information about previous experience with the familiar task to base their judgement on (Thomas & Handley, 2008). In the current study, there was an above-average familiarity with the proposed change 21st century skills in education (M = 3.49, SD = .73), and with differentiation in the classroom (M = 3.46, SD = .77). The data showed that familiarity with the proposed changes was, on average, approximately equal for more experienced and less experienced teachers. There were no signs that more experienced teachers had more previous experiences with 21st century skills or differentiation than less experienced teachers or vice versa. That means that teachers, no matter how much years of work experience, had roughly the same amount of knowledge and information from previous experience with the changes to base their judgements on. Accordingly, the argument that experienced teachers should be able to choose adequate information based on previous experience, and therefore avoid biases, seems to vanish, as there seems to be no difference in previous experience with the proposed changes between novice teachers and more experienced teachers. Subsequently, the equal (high) levels of familiarity with the proposed changes might have resulted in no differences in anchoring effects between more experienced and less experienced teachers.

Theoretical and Practical Implications

The current study contributes to educational science by providing a new perspective to the teacher-centred approach in educational change literature (e.g. Armstrong, 2008; Goh, 1999). This study was the first to investigate the influence of anchored personal impact on the commitment to change of teachers. Current results provide little evidence for the hypothesis that teachers' commitment to change could be influenced by anchored personal impact. Hence, previous findings on anchoring could not be generalized to the context of this study to a large extent (e.g. Tversky & Kahneman, 1974; Strack & Mussweiler, 1997). Therefore, there is currently little reason to assume that teachers commit to a proposed change in an unconscious manner. Accordingly, this study did not provide solid support for the rationale that the theory of Doyle and Ponder (1977) could be challenged. This might implicate that unconscious influences caused by anchoring do not occur in teachers' decision-making towards committing to a change initiative. Additionally, it was attempted to provide more insights into differences in anchoring effects based on gender and work experience. Regarding gender, the current study found subtle hints of possible anchoring effects on commitment to change. However, these hints are inconclusive evidence. Although very little evidence was found to support the hypothesis in the current study, that does not mean we can rule out the possibility that anchoring on teachers' commitment to change does not work. Therefore, educational change research should give more attention to how teachers' commit to change initiatives, when investigating factors that influence change implementation processes. Consequently, this study calls for future research on the topic of influencing factors on the commitment to change of teachers in order to be able to make more reliable statements and conclusions.

Whereas this research is mainly focused to gain scientific insights into the unconscious influences on teachers' commitment to change considering anchored personal impact, it has some practical implications as well. Research on anchoring bias (or other biases) of teachers in change processes is important, as it could cause significant risks to the quality of judgement and subsequent decision-making by teachers, especially when the anchor value is unreliable, irrelevant or no longer pertinent (Caputo, 2014). In case this is true, this may enhance our understanding why implementation failure occurs from a teacher's perspective. This study demonstrates that there is little reason to assume that teachers' commitment to change is prone to influencing factors in change processes. Therefore, there is no immediate concern to revise current change implementation strategies. Currently, schools boards could emphasize the practicality of a change in order to develop teachers' commitment to change (Doyle & Ponder, 1977), which encompasses clearly communicating about factors regarding the instrumentality, congruence and costs of the change.

Limitations

The current study had a couple of limitations which need to be emphasized. The first limitation is that in the current study, the method of convenience sampling has been used. Participation in the sample was based on accessibility and willingness to participate, rather than on chance (Dörnyei & Griffee, 2010). The researcher selected schools and approached them to propose a request for participation, and the teachers in the sample choose to participate, for instance because they were already interested in the topic. This indicates that the current sample is not a complete representation of the total population of Dutch secondary school teachers (Etikan, Musa, & Alkassim, 2015).

The second limitation is that the variable work experience has not been operationalized properly. In the current study, work experience was operationalized as years of work experience as a teacher in secondary education. However, work experience cannot only be operationalized by years of experience in the field, but also by factors such as experience with a specific task or procedure (Lance, Hedge, & Alley, 1989; Vance, Coovert, Maccallum, & Hedge, 1989). Evidence shows that people with an equal amount of years spent in a particular job can differ enormously in experience (Ford, Quinones, Sego, & Speer-Sorra, 1992). A novel teacher might have gained knowledge and experience on 21st century skills or differentiation in the classroom due to the curricula in their education, whereas experienced teachers might not have experienced the implementation of 21st century skills or differentiation yet. Therefore, novel teachers might have an equal amount of (or more) experience on the proposed changes as more experienced teachers. Malhotra, Lee, and Khurana (2007) even argued that years of experience is an imperfect indicator, and that the best indicator of expertise is breadth of experience. As described by Tesluk and Jacobs (1998), work experience is a complex, multidimensional concept, including contextual and individual factors. Concluding, the construct work experience is more complex than how it was operationalized in this study, and therefore the operationalization is too loosely established here.

Thirdly, the variable personal impact was very simple incorporated in the questionnaire. Personal impact is defined in this study as the impact a change initiative could have on one's (work)

life. This is a subjective process of sense-making, in which individuals evaluate the personal value of the change for themselves (Rafaeli, 2006), and the perceived consequences that the change might have on their personal life, either negative or positive. Although the construct consists of more items, personal impact was included in one question. This question contained more aspects of personal impact, such as expected workload, feelings of (in)capability to execute one's work, and the emotion one feels when the change would be implemented. As a consequence, participants could have interpreted the construct differently. Accordingly, this could have affected the validity of the variable personal impact (Drost, 2011).

Finally, the factor analysis for the dependent variables affective, continuance and normative commitment to change revealed different results as shown in the study of Herscovitch and Meyer (2002). In the current study, the items did not load on the same factors as described in the study of Herscovitch and Meyer (2002). For instance, for affective commitment to the change 21st century skills, item 14 'Stimulating the 21st century skills of my students is a good strategy for our school' did not load on the same factor as the other items for affective commitment to change. Furthermore, item 27 'I wouldn't feel bad if I resisted stimulating the 21st century skills of my students' did not load for any of the factors when considering the threshold >.30 (for both change scenarios 21st century skills and differentiation). This means that the questionnaire caused unclarity in what was meant by the questions. Consequently, the questionnaire was less accurate than proven, and stable results could not be entirely ensured. Accordingly, despite validation of the questionnaire on commitment to change by Herscovitch and Meyer (2002), the reliability of the questionnaire is affected (Drost, 2011).

Suggestions for Future Research

The current study was a first attempt to explore the possible effects of anchoring on secondary school teachers commitment to change. Although no solid grounds were provided for anchoring effects in this context, it is recommended to replicate this study in order to ensure more reliable and valid results and conclusions. A couple of suggestions are described for future replications of this study.

First, future research should consider more extreme anchor values, in order to be able to find significant anchoring effects. An anchor value is considered extreme enough when it lies outside the plausible range of values. As a consequence, there is more need for adjustment towards the anchor (e.g. Chapman & Johnson, 1994; Epley & Gilovich, 2006). It is important for future research to explore which anchor values need to be used in a manipulation question. Additionally, it is recommended to adopt different levels of anchor extremity in further research. This knowledge would substantiate previous research on which type of anchor extremity works best (Wegener et al., 2010).

Second, future research should attempt to collect a more diverse sample. In the current context, it may be inevitable to use a non-probability sampling method, such as convenience sampling. However, further researchers on this topic should make an effort to enhance accessibility and willingness to participate of possible participants, in order to make a more representative sample of the total population of Dutch secondary school teachers (Etikan et al., 2015). For instance, one could extend the data

gathering timeline by multiple weeks or months. In addition, it is recommended to plan data gathering in a period of time which is optimal convenient for teachers. A lot of teachers asked for this study did not want to participate in the sample, as they were overloaded with work due to the approaching end of the school year. In secondary education, the weeks before summer holiday can be extremely hectic, and teachers feel pressured and experience time constraints due to arranging exams, and finalizing the last tasks before the end of the school year. Future researchers should be cautious of the timing of data gathering.

Third, a more suiting operationalization of work experience is needed in future research. The concept work experience should not be operationalized as years of experience in the field, but as experience with a specific task or procedure (e.g. Lance et al., 1989), as people with equal amount of years spent in a particular job can differ drastically in experience (Ford et al., 1992). In addition, it is advisable for future research to focus on one explicit factor of personal impact in the manipulation question. This will result in a more clear conceptualization of the concept of personal impact. As a consequence, it is more likely that the concept personal impact is correctly interpreted, and thus the validity of the manipulation question will be improved.

Fourth, it is recommended for future research on commitment to change to re-evaluate and verify the questionnaire on commitment to change based on the findings from the factor analysis. Despite validation of the questionnaire by Herscovitch and Meyer (2002), current results show some deviations in factor loadings which affected the validity of the questionnaire. Verifying the commitment to change questionnaire of Herscovitch and Meyer (2002) with corrections from the current study's factor analyses could enhance the validity of the questionnaire.

Moreover, future research could investigate other influencing techniques on commitment to change further, for instance affective priming. As already stated in the introduction, increasing research on educational change is focused on teachers as key factors in educational reform (e.g. Armstrong, 2008; Goh, 1999). In addition to that, more research on judgement and choice is focusing on the influence of affect and emotions on judgements (e.g. Bodenhausen, 1993; Bower, 1991; Forgas, 1995; Loewenstein, 1996; Zajonc, 1998). By combining both streams of research, it could be interesting to investigate the influence of affect on teachers' judgements regarding commitment to change more. One technique to do so, is affective priming. Affective priming influences judgments and choice decisions through automatic evaluation of emotional information by individuals (either positive or negative) (Bower, 1991; Forgas, 1995). In comparison with anchoring, affective priming is also a way of unconsciously influencing individuals' judgements, by presenting a priming stimulus. For affective priming, an emotion-based stimuli is being used to elicit a specific emotion in order to prime subsequent information processing, and eventually judgements (Bower, 1991; Forgas, 1995). For instance, watching movies, enjoying sunny weather, or experiencing a stressful exam are found to be influencing stimuli that could influence judgements of unrelated topics (see e.g. Bodenhausen, 1993; Clore, Schwarz, & Conway,

1994; Forgas, 1995; Forgas & Bower, 1988; Schwarz & Clore, 1996). Future research could investigate the influence of affective priming on teachers' commitment to change, for example by designing an experiment in which participants are presented with an affective stimulus first, such as a joyful versus a somber video or performing the experiment on a sunny versus a rainy day, before filling out the commitment to change questionnaire.

Finally, future research needs to focus on other ways to enhance implementation processes. This is essential considering that many change initiatives fail due to implementation failure (Klein & Sorra, 1996; Kotter, 1996; Schein, 1999). For instance, readiness for change is perceived as an important factor influencing successful implementation of change (By, 2007; Holt & Vardaman, 2013), and a multitude of studies on readiness for change has been performed already (e.g. Holt, Armenakis, Field, & Harris, 2007; Oreg, Vakola, & Armenakis, 2011; Weiner, Amich, & Lee, 2008). Readiness for change can be described as a cognitive process in which the beliefs, attitudes and intentions of members of the organization toward the necessity of the change and the organization's capacity for successful implementation of the change initiative are held (Armenakis et al., 1993; Weiner, 2009). Accordingly, readiness for change can be seen as a set of forces for supporting or resisting the change (Kondakci, Beycioglu, Sincar, & Ugurlu, 2017; Self, 2007). Hence, it is important to establish supportive attitudes, beliefs and intentions towards the change, which will lead to positive feelings and thoughts, and subsequently positive behaviours of employees. Readiness for change is often impaired due to beliefs of employees that they are not capable of dealing with the change, that the change is not appropriate in their context, that the management team does not support the change, and that employees themselves do not personally benefit from the change (Armenakis et al., 1993; Armenakis & Harris, 2009; Holt et al., 2007). Future research could consider exploring the unconscious influence on readiness for change as an important factor in educational change processes.

Conclusion

The current study made an attempt to gain more insights into the unconscious influences on teachers' choices and judgements in educational change processes, by investigating the influence of anchored personal impact on teachers' commitment to change. Although results did not provide solid grounds for the hypotheses, it is recommended to conduct further research on this topic. Future research could dive deeper into the topic of influencing factors on teachers' commitment to change in order to provide more reliable statements and conclusions. Consequently, more insights into the potential influencing factors in change processes could enhance our understanding on how teachers commit to educational changes, and possibly brings us a step closer to understand implementation failure better from a teacher's perspective.

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Appendix

Appendix A Factor Analyses

Table 2

Factor Analysis 21st Century Skills items

Item	Factor			
	1	2	3	4
Familiarity Items				
1 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik vaak doe	**.70**	.17	-.01	.24
2 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik automatisch doe	**.89**	.03	-.10	-.01
3 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik doe zonder dat ik mezelf eraan hoef te herinneren	**.84**	-.06	-.08	-.02
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	**.67**	.04	.08	.14
5 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik zonder nadenken doe	**.82**	.01	-.05	-.03
6 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat me moeite zou kosten om het niet te doen	**.60**	-.10	**.30**	-.22
7 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat hoort bij mijn dagelijkse routines	**.84**	-.03	.04	.02
8 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik al doe voordat ik me realiseer dat ik het doe	**.85**	.01	-.10	.01
9 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets waarvan ik het moeilijk zou vinden om het niet te doen	**.70**	-.16	**.38**	-.25
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	**.84**	-.01	.02	-.02
11 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat typisch bij mij hoort	**.78**	.05	.03	.13
12 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is iets wat ik al lange tijd doe	**.81**	.03	-.10	.02

Affective Commitment to Change Items				
13 Ik geloof in de waarde van het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.40	.03	.15	**.53**
14 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen is een goede strategie voor onze school	**.55**	-.00	**.31**	.28
15 Ik denk dat onze directie een fout begaat door de 21ste eeuwse vaardigheden van mijn leerlingen te willen stimuleren (R)	.04	-.23	-.00	**.70**
16 Het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen dient een belangrijk doel	**.33**	-.10	.23	**.34**
17 Dingen zouden beter gaan als ik de 21ste eeuwse vaardigheden van mijn leerlingen niet stimuleer (R)	.11	-.20	-.15	**.59**
18 Het is niet nodig om de 21ste eeuwse vaardigheden van mijn leerlingen te stimuleren (R)	.08	-.16	-.01	**.74**
Continuance Commitment to Change Items				
19 Ik heb geen keus: ik moet meegaan in het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	-.06	**.48**	.20	.06
20 Ik voel druk om mee te gaan in het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.00	**.71**	.02	-.13
21 Er staat voor mij te veel op het spel om weerstand te bieden tegen het stimuleren van 21ste eeuwse vaardigheden van mijn leerlingen	.04	**.83**	-.12	-.17
22 Het zou mij teveel kosten om weerstand te bieden tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.01	**.83**	-.16	-.13
23 Het zou risicovol zijn om mij uit te spreken tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.07	**.79**	-.12	-.15
24 Weerstand bieden tegen het stimuleren van 21ste eeuwse vaardigheden van mijn leerlingen is geen werkbare optie voor mij	.02	**.36**	.27	.18
Normative Commitment to Change Items				
25 Ik voel een plichtsbesef om te werken aan het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.05	.04	**.60**	.07
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	.19	.17	.26	.18

27 Ik zou me niet slecht voelen als ik me verzet tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen (R)	.12	-.15	.13	.28
28 Het zou onverantwoordelijk van mij zijn als ik weerstand bied tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.12	.03	**.37**	**.38**
29 Ik zou me schuldig voelen als ik me verzet tegen het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen	.04	-.05	**.80**	-.10
30 Ik voel geen enkele verplichting om het stimuleren van de 21ste eeuwse vaardigheden van mijn leerlingen te Ondersteunen (R)	-.13	-.00	**-.32**	**.38**
Eigen values	10.64	4.13	2.49	1.36
% of Explained variance	35.46	13.76	8.30	4.53

Note. Factor loadings over .30 are reported

R = reversed scores.

Table 3
Factor Analysis Differentiation items

Item	Factor			
	1	2	3	4
1 Differentiëren tussen mijn leerlingen is iets wat ik vaak doe	**.66**	.13	-.05	.33
2 Differentiëren tussen mijn leerlingen is iets wat ik automatisch doe	**.84**	.13	-.13	.15
3 Differentiëren tussen mijn leerlingen is iets wat ik doe zonder dat ik mezelf eraan hoef te herinneren	**.84**	-.07	-.06	-.01
4 Differentiëren tussen mijn leerlingen is iets waarvan ik het raar zou vinden als ik het niet zou doen	**.59**	.03	.12	.09
5 Differentiëren tussen mijn leerlingen is iets wat ik zonder nadenken doe	**.86**	-.08	-.01	-.19
6 Differentiëren tussen mijn leerlingen is iets wat me moeite zou kosten om het niet te doen	**.74**	-.04	.06	-.17
7 Differentiëren tussen mijn leerlingen is iets wat hoort bij mijn dagelijkse routines	**.87**	-.00	-.06	.07
8 Differentiëren tussen mijn leerlingen is iets wat ik al doe voordat ik me realiseer dat ik het doe	**.84**	-.05	.07	-.09
9 Differentiëren tussen mijn leerlingen is iets waarvan ik het moeilijk zou vinden om het niet te doen	**.76**	.10	.14	-.02
10 Differentiëren tussen mijn leerlingen is iets waarover ik niet hoef na te denken of ik het moet doen	**.75**	.01	.05	.02
11 Differentiëren tussen mijn leerlingen is iets wat typisch bij mij hoort	**.69**	-.03	-.02	.16
12 Differentiëren tussen mijn leerlingen is iets wat ik al lange tijd doe	**.74**	-.07	-.02	.13
Affective Commitment to Change Items				
13 Ik geloof in de waarde van differentiëren tussen mijn leerlingen	.16	.05	-.02	**.75**
14 Differentiëren tussen mijn leerlingen is een goede strategie voor onze school	.11	-.06	.08	**.58**
15 Ik denk dat onze directie een fout begaat door het differentiëren tussen mijn leerlingen te willen stimuleren (R)	-.11	**-.44**	.09	**.59**
16 Het differentiëren tussen mijn leerlingen dient een belangrijk doel	.18	-.07	.21	**.58**

17 Dingen zouden beter gaan als ik niet differentieer tussen mijn Leerlingen (R)	.04	**-.42**	.09	**.46**
18 Het is niet nodig om tussen mijn leerlingen te differentiëren (R)	-.03	-.19	.07	**.66**
Continuance Commitment to Change Items				
19 Ik heb geen keus: ik moet meegaan in het differentiëren tussen mijn leerlingen	.05	**.56**	.06	.26
20 Ik voel druk om mee te gaan in het differentiëren tussen mijn leerlingen	-.23	**.58**	.05	-.16
21 Er staat voor mij te veel op het spel om weerstand te bieden tegen het differentiëren tussen mijn leerlingen	.08	**.82**	-.01	-.15
22 Het zou mij teveel kosten om weerstand te bieden tegen het differentiëren tussen mijn leerlingen	.01	**.77**	-.02	-.13
23 Het zou risicovol zijn om mij uit te spreken tegen het differentiëren tussen mijn leerlingen	-.08	**.67**	.01	-.05
24 Weerstand bieden tegen het differentiëren tussen mijn leerlingen is geen werkbare optie voor mij	-.06	.32	**.43**	.11
Normative Commitment to Change Items				
25 Ik voel een plichtsbesef om te differentiëren tussen mijn leerlingen	-.00	.17	**.48**	.28
26 Ik denk dat het niet goed van mij zou zijn als ik me verzet tegen het differentiëren tussen mijn leerlingen	-.07	.10	**.59**	.26
27 Ik zou me niet slecht voelen als ik me verzet tegen het differentiëren tussen mijn leerlingen (R)	.22	-.10	.14	.19
28 Het zou onverantwoordelijk van mij zijn als ik weerstand bied tegen het differentiëren tussen mijn leerlingen	.01	-.16	**.88**	-.12
29 Ik zou me schuldig voelen als ik me verzet tegen het differentiëren tussen mijn leerlingen	.17	-.00	**.70**	-.09
30 Ik voel geen enkele verplichting om het differentiëren tussen mijn leerlingen te ondersteunen (R)	.17	.09	.13	.37
Eigen values	9.95	3.84	3.22	1.37
% of Explained variance	33.17	12.79	10.74	4.55

Note. Factor loadings over .30 are reported in Bold

R = reversed scores.