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TITLE:

Parent Intervention to Encourage Growth Mindset Development in Children

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# Abstract

Growth mindset refers to the belief that skills and abilities can be improved through effort and the use of appropriate learning strategies. Students that have developed a growth mindset, are predicted to perform better in academics, and to have higher psychological well-being, when compared to others. Research suggests that children's academic mindsets are malleable, but we have limited knowledge on what parents can do to support their children in this area. In this paper I investigate whether parents can learn and are able to adapt opinions and response methods that in theory should encourage the development of growth mindsets in their children. I conduct an experiment where parents of children in elementary school are subjected to a *parental growth mindset intervention*; which consists of a growth mindset intervention, as well as guidance on how to encourage growth mindsets in their children. After the treatment, I investigate whether the intervention had an effect on four outcome measures: (1) level of growth mindset; (2) opinions on matters which would either promote or detriment growth mindsets in their children; (3) situational responses that would either promote or detriment growth mindsets in their children; and (4) time spent on supporting their children with homework. The results yield positive treatment effects on all measures, but none of them are significant. Additionally, the sample size is small and not representative. The results of this study must therefore be interpreted with caution. However, the positive treatment effects, indicate that *parental growth mindset interventions* might have the potential to become cost-effective and easily implementable interventions, that have a positive influence on children's motivation and ability to learn. More research is needed to ascertain the effect and value of *parental growth mindset interventions*.

# Preface

The motivation for this paper stems from attending a lecture on “*growth mindset*”, which was a part of one of my MBA courses at the University of Stavanger in 2019. The lecturer, and now the supervisor for my master thesis, Professor Mari Rege, explained how students with a growth mindset believe that their intellect and abilities can be improved through effort and the use of appropriate strategies, and that those with a growth mindset, perform better academically and have better psychological well-being compared to others. Having been a teacher at various schools since graduating high school in 2008, I found the topic extremely interesting, and I immediately knew that I wanted to devote my master thesis towards this topic.

I am very grateful to have had Mari Rege as my supervisor. She has been a huge resource in the development of this paper, and I have learned a lot from her through this process. I would also like to thank everyone who took the time and effort to participate in my focus groups and in my experiment. Your contribution has been invaluable and is very much appreciated.

# Table of Contents

<b>Abstract.....</b>	<b>i</b>
<b>Preface.....</b>	<b>ii</b>
<b>1. Introduction.....</b>	<b>1</b>
<b>2. Theory .....</b>	<b>5</b>
2.1. Academic Mindsets .....	5
2.2. Parents Influence on their Children's Mindsets.....	7
2.2.1 Response to Success .....	7
2.2.2 Response to Failure.....	9
2.2.3. Critical Guidance Points .....	10
2.3. Hypotheses .....	12
<b>3. Experimental Design.....</b>	<b>14</b>
3.1. Session 1.....	15
3.2. Session 2.....	21
<b>4. Sample and Procedure.....</b>	<b>23</b>
<b>5. Measures .....</b>	<b>25</b>
5.1. Hypothesis 2 – Guidance Opinion Measures .....	25
5.2. Hypothesis 3 – Guidance Response Measures .....	28
5.3. Correlation between Dependent Variables.....	31
<b>6. Empirical Strategy .....</b>	<b>33</b>
<b>7. Results .....</b>	<b>34</b>
7.1. Descriptive Statistics and Balance Test .....	34
7.2. Hypothesis 1 – Post-Treatment Growth Mindset.....	35
7.3. Hypothesis 2 – Guidance Opinions .....	36
7.4. Hypothesis 3 – Guidance Responses.....	37
7.5. Hypothesis 4 – Homework Support .....	38

<b>8. Discussion &amp; Conclusion .....</b>	<b>39</b>
<b>9. References.....</b>	<b>41</b>
<b>10. Appendix.....</b>	<b>48</b>
10.1. Appendix A: Interventions .....	48
10.1.1. Appendix A1: Treatment Intervention – Part 2.....	48
10.1.2. Appendix A2: Control Intervention .....	53
10.2. Appendix B: Recruitment Pamphlet for Schools .....	60

# List of Figures

Figure 1: Response to Success .....	8
Figure 2: Response to Failure .....	9
Figure 3: Critical Guidance Points.....	11
Figure 4: Suggested Mechanisms and Related Hypotheses.....	13
Figure 5: Research Design .....	14
Figure 6: Screenshot of Treatment Intervention - Part 1 .....	16
Figure 7: Screenshot of Treatment Intervention - Part 2 .....	18
Figure 8: Screenshot of Control Intervention - Part 1.....	19
Figure 9: Screenshot of Control Intervention - Part 2.....	20
Figure 10: Research Status and Desired Outcomes .....	40

# List of Tables

Table 1: Mindsets' Influence on Learning .....	6
Table 2: Attrition.....	24
Table 3: Guidance Check Measures .....	25
Table 4: Correlation between Guidance Check Measures .....	27
Table 5: Cronbach's Alpha for Guidance Check Measures.....	27
Table 6: Guidance Measures.....	28
Table 7: Correlation between Guidance Measures .....	30
Table 8: Cronbach's Alpha for Guidance Measures .....	31
Table 9: Correlation between Dependent Variables .....	32
Table 10: Relationship between Dependent Variables and Hypotheses.....	33
Table 11: Descriptive Statistics and Balance Test.....	35
Table 12: Correlation between and Cronbach's Alpha for Pre-Mindset Measures .....	35
Table 13: Treatment Effects on Post-Treatment Growth Mindset.....	36
Table 14: Treatment Effects on Guidance Check Average .....	37
Table 15: Treatment Effect on Guidance Average .....	37
Table 16: Treatment Effect on Homework Support .....	38
Table 17: Treatment Effect on Homework Support while Controlling for Outlier .....	38

# 1. Introduction

There is strong evidence supporting the importance of personality traits and non-cognitive skills for success in school and labor markets (Borghans et al., 2008; Brunello & Schlotter, 2011; Díaz, Arias & Tudela, 2012; Fletcher, 2013; Heckman et al., 2006; Roberts et al., 2007). Researchers have found that people with higher non-cognitive skills are more likely to improve their chances of graduating high school and college, get better employment opportunities, receive higher salaries, and have better health prospects (Brunello & Schlotter, 2011; Carneiro et al., 2007; Kautz et al., 2014). Moreover, literature has demonstrated that several non-cognitive skills are malleable (Alan et al., 2016; Bettinger, Ludvigsen, Rege, Solli & Yeager, 2018; Durlak, Weissberg, Dymnicki, Taylor & Schellinger, 2011; Kautz et al., 2014).

Bettinger et al. (2018) showed that it is possible to develop non-cognitive skills in students by focusing on their beliefs about their ability to learn. A student's belief in their ability to learn, is referred to as an academic mindset in the field of psychology (Dweck, 2006). Students' beliefs about whether their capabilities are fixed or malleable greatly influences their motivation for learning and their ability to do so (Bettinger et al., 2018; Haimovitz & Dweck, 2016).

It is common to distinguish between two different types of academic mindsets: fixed and growth mindsets (Dweck, 2006). Students with fixed mindsets, believe that their intelligence and abilities are unchangeable. On the other hand, students with growth mindsets believe that their intellectual abilities can be developed through effort, good strategies and with help from others. They demonstrate greater resilience when faced with challenges and rigorous learning opportunities, as opposed to those with a fixed mindset. Students with a growth mindset perform better in academics, have lower stress levels, and better psychological well-being, compared to those with a fixed mindset (Bettinger et al., 2018; Dweck, 2006; O'Rourke, Haimovitz, Ballweber, Dweck & Popović, 2014; Yeager & Dweck, 2012; Zeng, Hou & Peng, 2016). Several studies have shown that by using “growth mindset interventions” (also called “incremental theory of intelligence intervention”), children can adopt more of a growth mindset, and spur their motivation and ability to learn, within a short period of time (Aronson et al., 2002; Bettinger, 2018; Blackwell et al., 2007; Good et al., 2003; Paunesku et al., 2015; Yeager et al., 2016).

Haimovitz and Dweck (2017) theorize that other beliefs role models hold, such as their subjective theory of how to motivate children, could predict children's mindsets. For parents, they argue that their responses to success and responses to failure could be some of the main drivers that shape children's mindsets. Research shows that children who receive praise and criticism for the process and effort of their work (e.g. strategies, focus, and persistence) rather than results and inherent abilities, will encourage the development of a growth mindset (Gunderson et al., 2013; Kamins & Dweck, 1999; Mueller & Dweck, 1998). However, praising ineffective effort may pose an issue, as praise received for effort that was not effective, could imply that "failure is accepted", and that the child cannot learn (Barker & Graham, 1987; Meyer et al., 1979).

I hypothesize that a "*parental growth mindset intervention*", consisting of a growth mindset intervention, as well as guidance on how parents can communicate with their children to encourage growth mindsets, would in turn develop growth mindsets in their children. To my knowledge, research into this matter has not yet been conducted.

This is a pilot study, which aims to use focus groups in order to develop a potent *parental growth mindset intervention* and appropriate measures for a larger scale randomized clinical trial (RCT). This pilot forms the basis of my master thesis, which makes a large scale study, beyond the scope of this type of paper. To test whether parents can learn and are able to adapt response methods that in theory should encourage the development of growth mindsets in their children, I developed an experiment consisting of two online sessions, each lasting for about 45 minutes. The treatment group received a *parental growth mindset intervention*, consisting of a growth mindset intervention and guidance on how to encourage growth mindsets in children (*growth mindset guidance*). The content, structure, and visual layout of the growth mindset intervention was based on the intervention used in Bettinger et al. (2018), who used it to help Norwegian first year high school students adopt more of a growth mindset. To fit my experiment, I modified to the text to fit parents of elementary school children. The structure of the second part of the treatment intervention – *growth mindset guidance* – was also based on the intervention in Bettinger et al. (2018). I developed the content of this part, based on research on how parents can respond to their children in order to encourage the development of growth mindsets. The treatment consisted of reading and writing exercises which focused on three main aspects: (1) the brain's potential to grow and develop; (2) how person-praise leads to fixed mindsets, while process-praise leads to growth mindsets – as long the effort is successful; and (3) how person-criticism leads to fixed mindsets, while process-criticism leads to growth



mindsets. The control group got information about how the brain develops from childhood to early adulthood, and how the participants can support their children in their homework.

To check whether the participants had understood and internalized the treatment content, both the treatment and control participants answered six follow up questions at the end of the first session. The participants were asked how much they agreed or disagreed to six statements, which were designed to investigate whether the treatment intervention will cause parents to become more aligned with opinions that would encourage the development of growth mindsets in their children. The participants started the second session three weeks after completing the first one. In the second session; to test whether treatment intervention will cause parents to respond to their children in a way which encourages the development of growth mindsets, the participants were asked how they would respond to their children in five different situations. Each question was designed to test whether the respondents used feedback that promotes fixed or growth mindsets.

In the spring of 2020, 40 parents of children in elementary school participated in this pilot study. Due to the coronavirus pandemic, the recruitment process was interrupted, and I did not reach my target of having 100 participants in my experiment. Instead of recruiting participants through elementary schools, most of them were recruited through Facebook. Participants entered the experiment through an online link and were randomly assigned to either the control or treatment group. After completing Session 1, the participants were asked to leave their email address if they were willing to participate in Session 2. An invitation email with a new link to Session 2 was sent to each participant three weeks after completing Session 1. Due to high attrition in the control and treated group for both sessions, the data collected is not representative. The results of this study must therefore be interpreted with caution.

The experimental results suggest that the *parental growth mindset intervention* had a positive, but not significant effect, on both the parents' opinions and responses. However, due to the issues with the sample's representativeness and applied measures, we cannot make any conclusions regarding these results. They could however indicate that a *parental growth mindset intervention* might have the potential to align parents' opinions and responses with those that would encourage the development of growth mindsets in their children. A larger scale study is needed to draw any conclusions on this matter.

This paper contributes to two strands of economic literature. First, the work adds to the literature on the importance of parental background for human capital development. This

literature seeks to identify links between parental background and children's health and educational outcomes, and policies which can close these gaps (Attanasio, Meghir & Nix, 2015; Currie & Almond, 2011; Currie, 2019; Georgiadis, 2017; Heckman, 2000). This paper contributes to this topic by investigating whether parents can learn and adapt response methods that in theory should encourage the development of growth mindsets in their children, and consequently improve their academic performance and psychological well-being. Second, the work adds to the literature on behavioral economics of education, which seeks to understand how cost-effective interventions can improve children's utilization of already existing learning opportunities in the educational system (Koch, Nafziger, & Nielsen, 2015; Lavecchia, Liu, & Oreopoulos, 2016). My work on this thesis complements this topic by developing a *parental growth mindset intervention*, which might have the potential to become an easily implementable low-cost intervention, that has a positive influence on children's motivation and ability to learn. Additionally, a parent intervention such as this, has the benefit of being minimally invasive for the children, as they reap the benefits from their parent's new knowledge and behavioral modifications.

## 2. Theory

### 2.1. Academic Mindsets

In the field of psychology, an academic mindset refers to a students' belief in their ability to learn, and it is common to distinguish between fixed and growth mindsets (Dweck, 2006). Students with fixed mindsets believe that their intelligence and skills are fixed or unchangeable. While students with a growth mindset, believe that their intellect and skills can be improved through effort and the use of appropriate strategies (Bettinger et al., 2018; Dweck, 2006; Haimovitz & Dweck, 2016). Students with more of a growth mindset are predicted to perform better in academics, compared to those with a fixed mindset (Bettinger et al., 2018; Blackwell et al., 2007; Claro et al., 2016; Cury et al., 2006; Haimovitz & Dweck, 2017; Mangels, Butterfield, Lamb, Good & Dweck, 2006; O'Rourke, Haimovitz, Ballweber, Dweck & Popović, 2014; Yeager & Dweck, 2012). In their study of 385 Norwegian high school students, Bettinger et al. (2018) found that students with a higher GPA, are significantly more likely to have a growth mindset. A study of over 160,000 10th graders in Chile, showed that the more of a growth mindset a student held, the higher they scored on the national standardized test. Additionally, the researchers found this positive correlation to hold true for all levels of socioeconomic status (Claro et al., 2016). Blackwell et al. (2007) conducted a study of 373 students entering 7th grade and found that growth mindsets predicted improved grades over the following two years, while fixed mindsets predicted a flat trajectory. In addition to predicting higher academic performance, research by Zeng et al. (2016) found that students with growth mindsets have lower stress levels and better psychological well-being, compared to those with a fixed mindset.

According to researchers, mindsets influence learning by orienting students toward: different goals, different views about effort, and different reactions to setbacks; as seen in table 1 below (Bettinger et al., 2018; Blackwell et al., 2007; Dweck & Legget, 1988; Haimovitz, Wormington & Corpus, 2011; Haimovitz & Dweck, 2017; Hong, Chiu, Lin, Dweck & Wan, 1999; Mueller & Dweck, 1998; Yeager & Dweck, 2012).

**Table 1: Mindsets' Influence on Learning**

	<b>Fixed mindset</b>	<b>Growth mindset</b>
<b>Goal</b>	Validate abilities	Learn
<b>View about effort</b>	Undermine efforts	Productive efforts
<b>Reaction to setbacks</b>	Helplessness	Mastery oriented

Students with a growth mindset, view challenges as a learning opportunity, and demonstrate greater perseverance when faced with rigorous learning opportunities compared to those with a fixed mindset. On the other hand, students with fixed mindsets tend to gravitate towards challenges that are easy, which will validate their abilities (e.g. make them look and feel smart). Consequently, they are inclined to avoid academic challenges, as challenges pose a threat to their self-image of “being smart” (Bettinger et al., 2018; Blackwell et al., 2007; Dweck & Legget, 1988; Haimovitz, Wormington & Corpus, 2011; Haimovitz & Dweck, 2017; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Yeager & Dweck, 2012).

Research suggests that students with a growth mindset believe that their intelligence and abilities can be improved through effort. Consequently, a student with a growth mindset might say that “If I work hard at math, I will become smarter at math”. They are not scared of exerting effort, as they view hard work as a way to improve their intelligence and abilities. Students with fixed mindsets avoid academic challenges and have unproductive beliefs about efforts. They are under the impression that effort and hard work are proof of not being smart in a subject. For example, a student with a fixed mindset might say that “If I have to work hard at science, I am not smart at science” (Bettinger et al., 2018; Blackwell et al., 2007; Haimovitz & Dweck, 2017; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Yeager & Dweck, 2012).

Students with growth mindsets do not view potential failures or setbacks as a lack of ability, instead they increase their efforts, attempt different learning strategies, and seek help from others to learn and progress. While students with fixed mindsets believe that their intelligence and abilities are fixed, setbacks and potential failures are seen as obstacles that cannot be overcome. Without believing that they can improve their intelligence and get better, challenges are met with helplessness. Instead of asking for help and support when they struggle, students with fixed mindsets tend to hide setbacks and can even lie about their academic performances, in an attempt to seem to have higher abilities than what they actually have (Bettinger et al.,

2018; Blackwell et al., 2007; Haimovitz et al., 2011; Haimovitz & Dweck, 2017; Hong, Chiu, Lin, Dweck & Wan, 1999; Mueller & Dweck, 1998; Yeager & Dweck, 2012).

Several studies have shown that children can adopt more of a growth mindset, and spur their motivation and ability to learn within a short period of time (Aronson et al., 2002; Bettinger, 2018; Blackwell et al., 2007; Good et al., 2003; Paunesku et al., 2015; Yeager et al., 2016). The studies used growth mindset interventions (also called “incremental theory of intelligence intervention”), to cause lasting academic improvements for the students. Growth mindset interventions shape the students’ beliefs about their ability to learn, by presenting facts about the brain’s potential to grow and improve, through effort and by using the right learning strategies. The interventions are designed to counteract fixed mindsets and make the participants adopt more of a growth mindset (Aronson et al., 2002; Bettinger, 2018; Blackwell et al., 2007; Good et al., 2003; Paunesku et al., 2015; Yeager et al., 2016). Studies using growth mindset interventions have shown that a student’s mindset can be altered within a short period of time: Interventions consisting of 2-8 sessions, and lasting between 90-200 minutes in total, have shown significant increase in students’ beliefs in their ability to learn (Aronson et al., 2002; Bettinger, 2018; Blackwell et al., 2007; Good et al., 2003; Paunesku et al., 2015; Yeager et al., 2016).

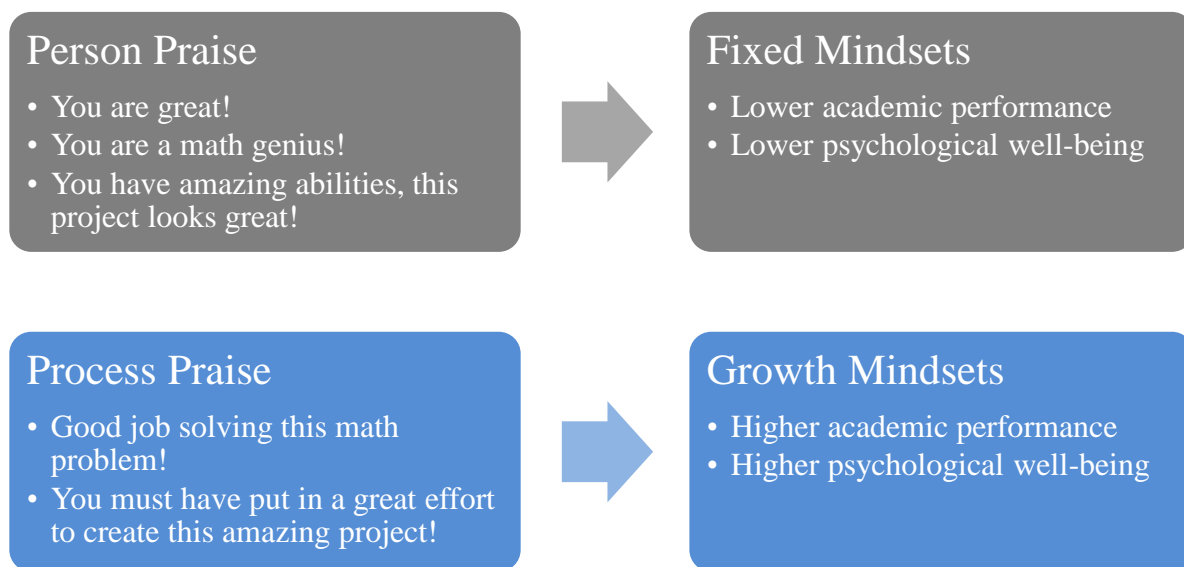
## **2.2. Parents Influence on their Children's Mindsets**

Recent research suggests that parents are not necessarily passing their mindsets on to their children (Gunderson et al., 2013; Haimovitz & Dweck, 2016, 2017). Gunderson et al. (2013) conducted a study of parents and their 7-8 year old children, while Haimovitz and Dweck (2016) studied parents and their 9-12 year old children, and both studies found no significant correlation between the parents’ and their children’s mindsets. Instead of passing on their own mindsets, research suggests that parents influence their children’s mindsets through their everyday communication. Particularly, the research indicates that parents’ response to success and response to failure can predict their children’s mindsets (Gunderson et al., 2013; Haimovitz & Dweck, 2016, 2017; Kamins & Dweck 1999; Mueller & Dweck 1998).

### **2.2.1 Response to Success**

Research has shown that parent’s use of “person-praise” and “process-praise” can predict their children’s mindset. Person-praise emphasizes the child's intelligence or abilities: “You are a

math genius". While process-praise emphasizes the work process and learning strategies: "You must have worked very hard to get this high score in math". The literature suggests that children who received person-praise, are more likely to adopt a fixed mindset, and that children who received process-praise, are more likely to develop a growth mindset, as illustrated in figure 1, below (Brummelman et al., 2014; Cimpian, Arce, Markman, & Dweck, 2007; Corpus & Lepper, 2007; Gunderson et al., 2013; Haimovitz & Corpus, 2011; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Pomerantz & Kempner, 2013; Skipper & Douglas, 2012; Zentall & Morris, 2010).

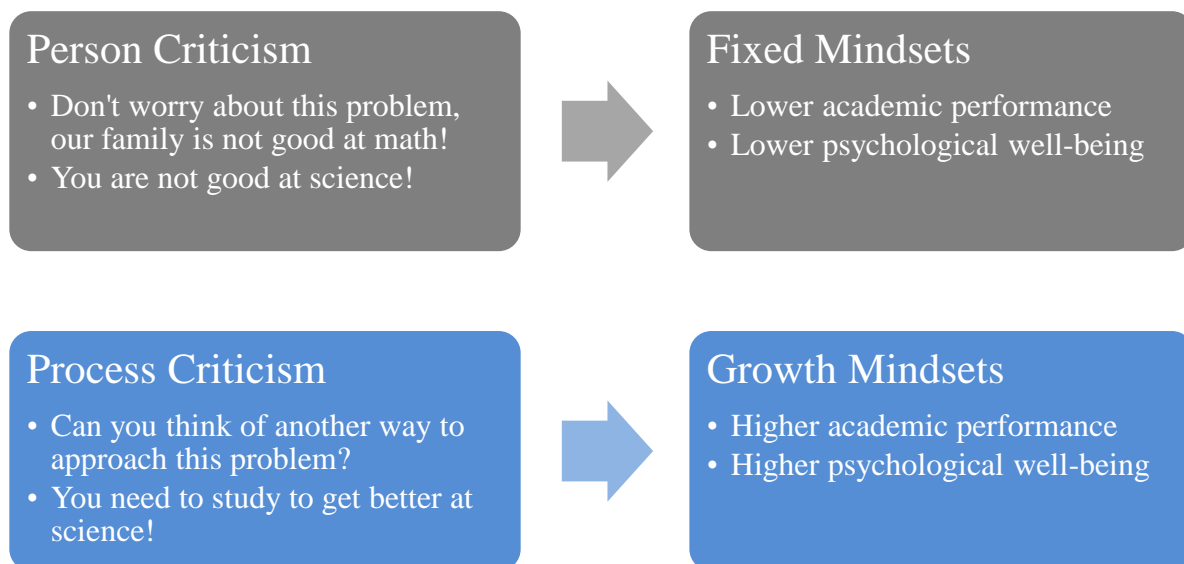


**Figure 1: Response to Success**

However, to promote the development of growth mindsets, effort should only be praised when it has been perceived as being successful: it has been effective in producing learning or yielded desirable results. If the performance was perceived as unsuccessful, process praise can be seen as a consolation prize, and imply that "failure is accepted". Accepting an unfruitful effort goes against a growth mindset, as it would encourage the use of different strategies when dealing with a challenging learning opportunity (Barker & Graham, 1987; Haimovitz & Dweck, 2017; Meyer et al., 1979). Research also suggests that it is unfruitful to use process-praise in an attempt to motivate children to work harder. This notion is especially true if the praise is seen as not being genuine, being manipulative, or when the child needs to change their learning strategies. Using process-praise in such circumstances, can according to researchers, do more harm than good (Haimovitz & Dweck, 2017; Henderlong & Lepper, 2002; Pittman, Davey, Alafat, Wetherill & Kramer, 1980).

### 2.2.2 Response to Failure

Research suggests that parents' use of “person-criticism” and “process-criticism” can predict their children’s mindset. Person-criticism emphasizes the child's intelligence or abilities: “It’s ok that you are not able to solve this problem. In our family we are not good at math”. While process-criticism emphasizes the work process and learning strategies: “I can see that you are struggling with this problem, can you think of another way to approach it?” Several research papers have found that children who received person-criticism, are more likely to adapt a fixed mindset, and that children who received process-criticism, are more likely to develop a growth mindset, as illustrated in figure 2, below (Haimovitz & Dweck, 2016, 2017; Kamins & Dweck, 1999).



**Figure 2: Response to Failure**

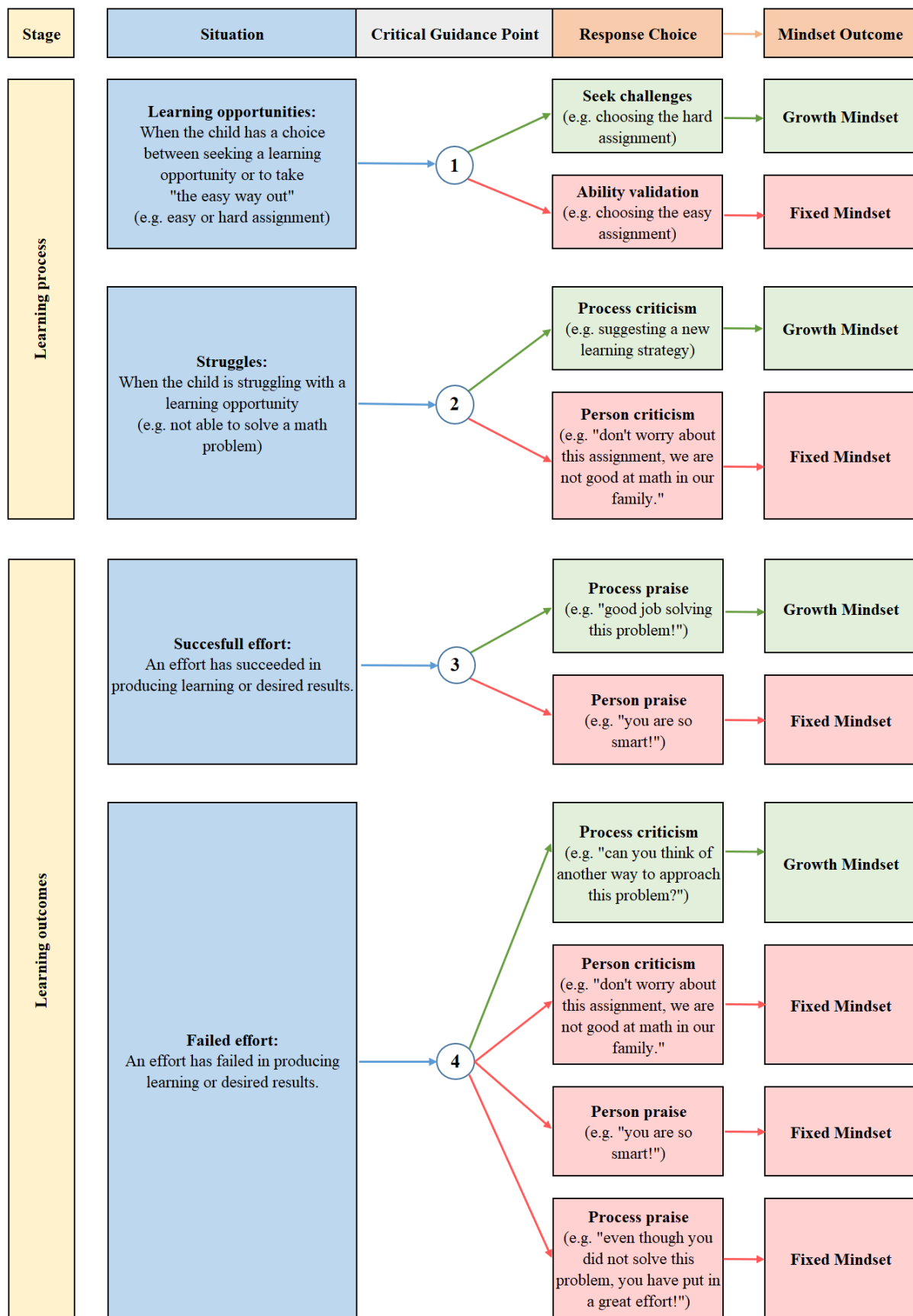
Haimovitz and Dweck (2016) found that a parent’s failure mindset can predict whether the parent uses person- or process-criticism. A failure mindset can be either debilitating or enhancing. Parents who view failure as debilitating - view failure as destructive to learning - tend to use person-criticism. Parents who view failure as enhancing - view failure as an opportunity to learn - tend to use process-criticism. Research has shown that children who received person-criticism, are more likely to adapt a fixed mindset, while children who received process-criticism, are more likely to develop a growth mindset (Haimovitz & Dweck, 2016, 2017; Kamins & Dweck, 1999).

According to Haimovitz and Dweck (2017) parents can demonstrate to their children that failure and struggles are a part of the learning process, by using the word “yet” in their feedback: “You are not able to solve this problem ... yet”. By using the word “yet”, it implies that even though the child is not able to do something now, it does have the potential to do it. By communicating the potential for success, children become more encouraged and motivated to learn and progress.

### **2.2.3. Critical Guidance Points**

A *critical guidance point* is when a parent’s choice of situational response, will either encourage the development of fixed or growth mindsets in their children. The literature covered in the sections above, suggests that parents are met with several *critical guidance points*. In figure 3 below, I have summarized this literature, and presented the situations in which these *critical guidance points* occur, response choices parents have, and how the choice of response would affect their children mindsets in each situation. Please note that there are several other situations, and different response choices, that may or may not affect children’s mindset, which are not included in figure 3. I have only included the situations, responses, and subsequent mindset consequences for which I could find reliable research. I divide the situations in which the *critical guidance points* occur into: *learning process situations*, which happens while in the process of learning something; and *learning outcomes situations*, which happens after a learning process has ended. I have not found any research on whether parents consistently choose responses that would either promote or detriment the development of growth mindsets. Research suggests that parents are not necessarily passing their mindsets on to their children; and that some parents tend to follow “conventional wisdom” when responding to their children, without necessarily knowing the consequence of these responses. For example, “conventional wisdom” suggests that it is beneficial to praise children’s abilities. Research has however shown that praising abilities, can be detrimental to children’s motivation to learn. These findings suggest that some parents might not consciously chose responses which are in line with desired outcomes, but rather that they follow cultural norms about what is “the right thing to do” (Gunderson et al., 2013; Haimovitz & Dweck, 2016, 2017; Kamins & Dweck, 1999).





**Figure 3: Critical Guidance Points**

*Notes:* The circled numbers represent each critical guidance point. The green lines signify response choices which would promote growth mindsets; and the red lines signify response choices which would promote fixed mindsets.

## 2.3. Hypotheses

Based on the theory presented in this chapter I have developed four hypotheses:

**Hypothesis 1:** A *parental growth mindset intervention* will cause parents to adapt more of a growth mindset.

**Hypothesis 2:** A *parental growth mindset intervention* will cause parents to become more aligned with opinions that would encourage the development of growth mindsets in their children.

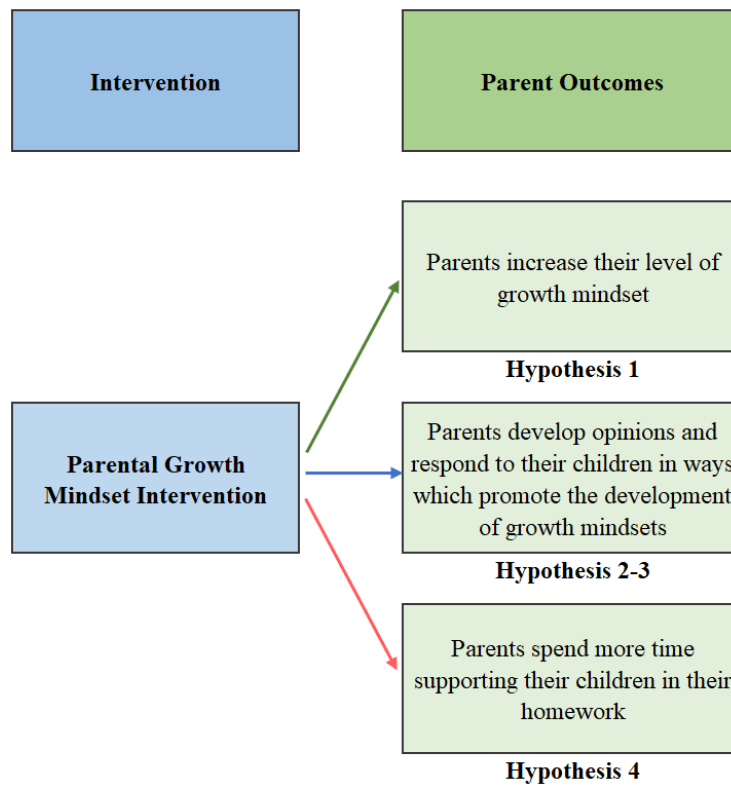
**Hypothesis 3:** A *parental growth mindset intervention* will cause parents to respond to their children in a way which encourages the development of growth mindsets.

The hypotheses are based upon the three assumptions: (1) parents perceive the content of the *parental growth mindset intervention* to be beneficial to their children; (2) parents are able to understand and internalize the content of the *parental growth mindset intervention*; (3) parents are willing to change their behavior if they perceive it to be in their children's best interest.

I am also interested to investigate whether a parental growth mindset will have any effect on how much time and support parents spend with their children, which leads to my final hypothesis:

**Hypothesis 4:** A *parental growth mindset intervention* will cause parents to spend more time supporting their children in their homework.

How the hypothesis relates to each mechanism is presented in figure 4 below.

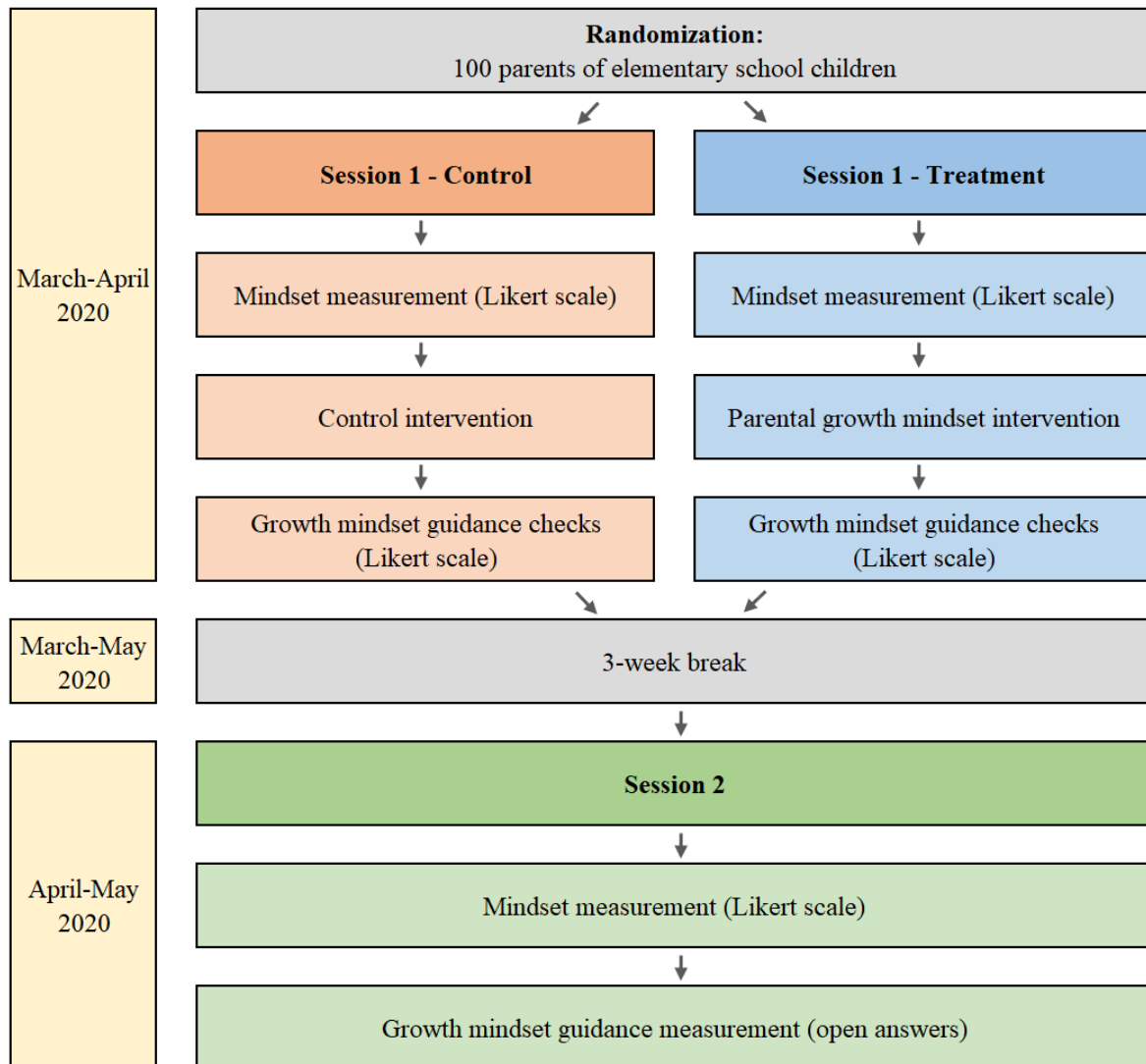


**Figure 4:** Suggested Mechanisms and Related Hypotheses

*Notes:* The green line represents the effect the intervention has on the parents growth mindsets; the blue line represents the effect the intervention has on the parents way of responding to their children; and the red line represents the effects the intervention has on time spent supporting their children with homework.

### 3. Experimental Design

To test whether parents can learn and are able to adapt response methods that in theory should encourage the development of growth mindsets in their children, I developed an experiment consisting of two online sessions, each lasting for about 45 minutes, as shown in figure 5 below.



**Figure 5:** Research Design

I used several focus groups with elementary school parents, who went through the intervention and gave feedback, before it was launched. All of them found the information to be beneficial for their children, interesting, and understandable. They also claimed that they would modify how they respond to their children in accordance with the information given in the intervention. It is possible that the participants found it difficult to criticize the treatment, as they were giving feedback directly to the maker of the intervention. However, their feedback indicates that the assumptions presented in the previous chapter (section 2.3) hold true.

### 3.1. Session 1

Session 1 consisted of four parts: pre-intervention mindset measurement; treatment- or control-intervention; post-intervention growth mindset guidance check; and demographic questions.

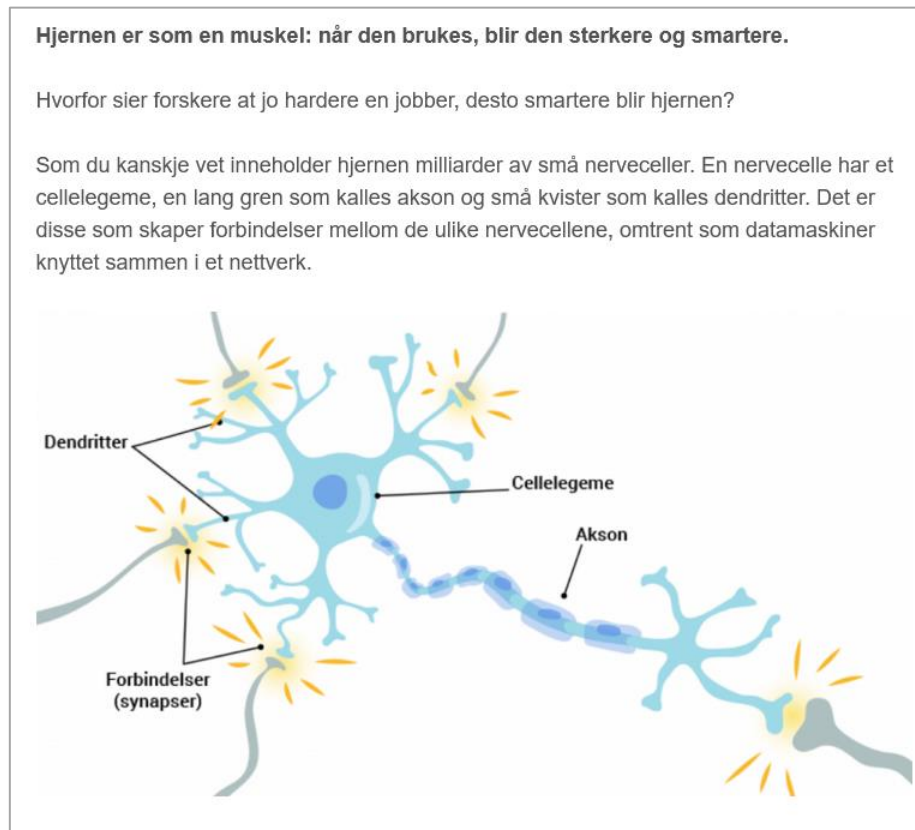
The first part of Session 1 was designed to measure the participants pre-intervention mindset. On a scale from one to six, the participants were asked how much they agreed or disagreed to four statements. These mindset measurements are taken from the experiment conducted by Bettinger et al. (2018), and have according to the researchers been validated as accurate mindset measures by numerous studies:

- “You have a certain amount of intelligence, and you really can’t do much to change it” (Fixed Mindset 1);
- “Your intelligence is something about you that you can’t change very much” (Fixed Mindset 2);
- “Being a ‘math person’ or not is something that you really can’t change. Some people are good at math and other people aren’t” (Fixed Mindset Math); and
- “When you have to try really hard in a subject in school, it means you can’t be good at that subject” (Fixed Mindset Effort).

In the second part of Session 1, the participants were randomly assigned to either the treatment or control intervention by the computer program. Like the interventions in Bettinger et al. (2018) and Yeager et al. (2016), both the treatment and control interventions used a “saying-is-believing” tactic to encourage the participants to internalize the content of the intervention. Researchers argue that “saying-is-believing” tactics increases the internalization of presented information in interventions for three reasons: (1) by making them state why the content is pertinent for them, it makes it more self-relevant, and therefore easier to recall; (2) by authoring how one can respond in different situations, it can be easier to reenact those behaviors later; and (3) when participants are asked to use the information to help someone else, it feels less controlling, compared to being asked to believe something themselves – which may lead them to accept the information as the truth in the process, via cognitive dissonance processes (Aronson et al., 2002; Bettinger et al., 2018; Yeager et al., 2016).

The treatment group received a *parental growth mindset intervention*, consisting of a growth mindset intervention and guidance on how to encourage growth mindsets in children. The content, structure, and visual layout of the growth mindset intervention was based on the

intervention used in Bettinger et al. (2018), who used it to help Norwegian first year high school students to adopt more of a growth mindset. However, the intervention in Bettinger et al. (2018) consisted of two separate online sessions, which were consolidated into one session in this experiment. A screenshot from the intervention can be seen in figure 6 below.



**Figure 6:** Screenshot of Treatment Intervention - Part 1

The participants went through three cognitive tasks. First, the participants received information about research in neuroscience on the brain's potential to grow and develop. It uses the metaphor that "... the brain is like a muscle that grows in response to challenging learning experiences" (Bettinger et al., 2018, p. 5). Second, the participants were asked to summarize the information and explain how it relates to their children's lives. Third, the "saying-is-believing" tactic was utilized by asking them how they would act or respond to their children in different situations to help them develop a growth mindset. To create lasting effects, *supportive psychologies* is utilized, by making the content: *memorable*, *credible*, *normal*, and *important*. Specifically, it is *memorable* by repeating key information, that the brain is like a muscle that grows in response to challenging tasks; it is *credible* by including quotes from celebrities and scientists, who endorse the intervention's content; it is *normal* by including quotes from "past participants" who endorse the intervention's message; and it is *important* by

using “beyond-the-self-motives”, such as helping their children, by adopting a the intervention’s content (Bettinger et al., 2018).

As the intervention in this experiment is geared towards parents, and not towards high school students, like the intervention in Bettinger et al. (2018), I modified the text accordingly. An example of how the text was modified is illustrated below:

Text from Bettinger et al. (2018) - designed towards students:

“Some students worry about not being good enough. But a growth mindset is about focusing on what makes you better today, not about whether you are as good as other students.”


Modified text - designed towards parents:

“Some children worry about not being good enough. But a growth mindset is about focusing on what makes them better today, not about whether they are as good as other children.”

By changing the subject from the participants to their children in large parts of the intervention, could affect the effect the intervention has on the participants mindsets. By making this change, the participants in this experiment compared to the participants in Bettinger et al. (2018), receives more opportunities to internalize the content through the “saying-is-believing” tactics, by relating the content to how they would help their children develop growth mindsets in different situations. However, they are not given the same chance to internalize the information by relating it to their own lives. How this modification affects the intervention effect is unknown. Some parts of the original intervention remain unchanged; for example, the facts about how the brain can grow and developed

The structure of the second part of the treatment intervention was based on the intervention in Bettinger et al. (2018), while the content was based on the theory presented in the previous chapter of this paper. First, the participants learn about how person-praise leads to fixed mindsets, while process-praise leads to growth mindsets – as long the effort is successful. If the effort has not been successful, they are reminded that they can recommend the child to try different strategies to solve the problem. Following each section of information, the participants get examples of person-praise, process-praise, and different strategies that they can recommend to their children. The “saying-is-believing” tactics is used by asking them to explain how they would praise their child’s successful effort. Second, the participants learn about how person-criticism leads to fixed mindsets, while process-criticism leads to growth mindsets. They get examples of person- and process-criticism, and the “saying-is-believing”

tactics is again utilized by asking them to explain a situation when they gave their child process-criticism while the child were struggling with a problem. A screenshot of the treatment intervention – part 2, can be seen below in figure 7 below. The full intervention is presented in Appendix A1: Treatment Intervention – Part 2, in section 10.1.1.



Forskning har vist at barn som mottar prosess-skryt vil utvikler mer lærende tankesett, som gjør at de oppsøker utfordringer og blir mer motiverte til å lære.

Prosess-skryt er tilbakemelding som fokuserer på arbeidsprosessen, strategiene og innsatsen barna legger i sitt arbeid.

Her er noen eksempler på prosess-skryt:

- Jeg er imponert over din arbeidsinnsats!
- Du har øvd veldig bra til denne matte-prøven, og forbedringene er enkle å se!
- Selv om det var utfordrende har du jobbet veldig bra og konsentrert til denne prøven!

Ved å fokusere på arbeidsprosessen, får barna den riktige oppfatningen at intelligensen og evnene deres utvikles ved god innsats, som også fører til at de fokuserer på læring.

**Figure 7:** Screenshot of Treatment Intervention - Part 2

Following the pre-intervention mindset measures, the participants in the control group got information about the brain's development and guidelines for how to support their children in their homework. The control participants were also asked to answer reflective questions but were not given any information about the brain's malleability, nor any guidelines as to how they can communicate with their children to foster growth mindsets. Like in the treatment intervention, the "saying-is-believing" tactic was utilized by asking the participants to explain how they would act or respond to their children in different situations. The first part of the control group's intervention consisted of information about how the amygdala and the frontal cortex develops during different life stages, and how this uneven development affects our way



of making choices as we grow older. It is presented that the amygdala is the part of the brain which is responsible for our fight-or-flight instincts, and that it is usually fully developed before we reach adolescence. It is this part of the brain, which reacts with emotions like fear or aggression, in situations that we deem as dangerous (American Academy of Child and Adolescent Psychiatry, 2016; Midttveit, 2020). Next, the participants learn that the frontal cortex is in charge of reasoning and logical thinking, but that it is usually not fully developed before we reach 25 years of age. As this part of the brain is developing during the early stages of our lives, it means that the younger we are, the lower our ability to foresee the consequences of our actions. Younger people therefore tend to act more on impulse, instead of thinking their choices through (American Academy of Child and Adolescent Psychiatry, 2016; Midttveit, 2020). In the last section of this part of the control intervention, it is presented that the inconsistent development of the amygdala and the frontal lobe in children, can partially explain why children might seem more forgetful about tasks like chores and homework, as they may have a stronger desire to do other things, like playing video games. As children act more on impulse, they are likely to follow their strongest desires. Adults on the other hand, can think about the consequences of different choices, and then make a logical decision about what to do. A screenshot of the control intervention – part 1, can be seen below in figure 8 below. The full intervention is presented in Appendix A2: Control Intervention, in section [10.1.2](#).



**Følelser over konsekvenstenkning**

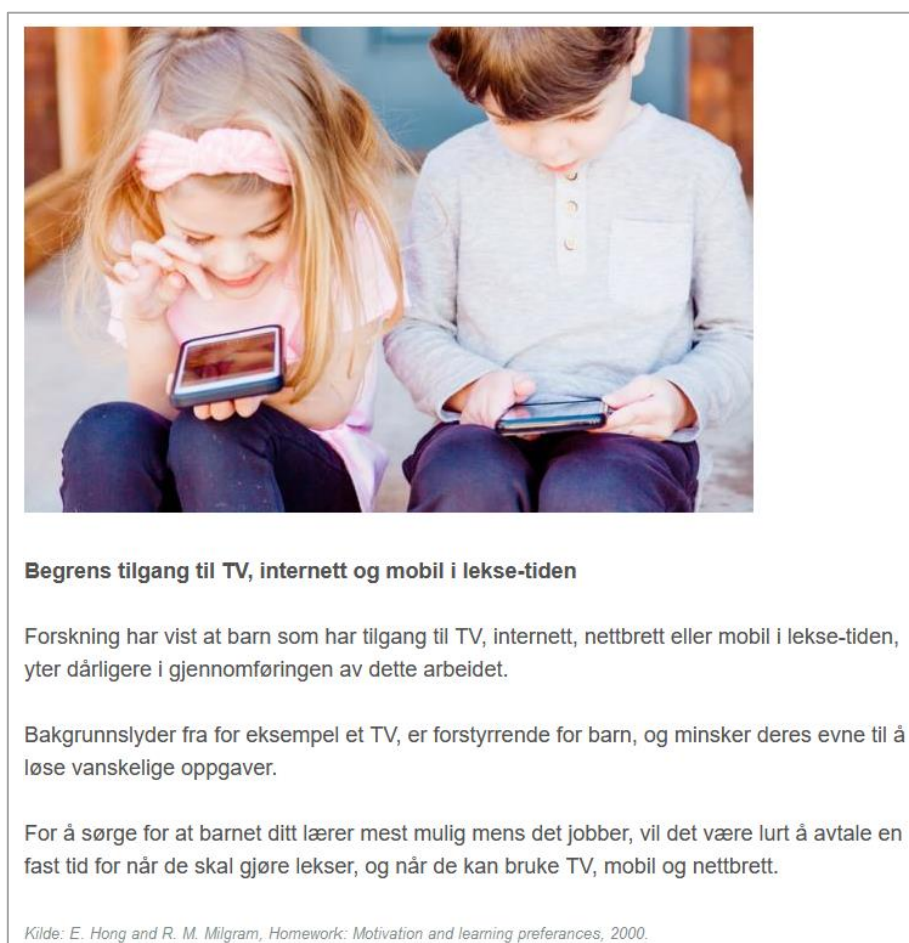
Ettersom barn ikke har en ferdig utviklet pannelapp, vil de ha problemer med å se konsekvensene av handlingene sine.

Dette betyr at barn har en annen måte å reagere og handle på enn voksne. Barns handlinger styres først og fremst av følelser som oppstår i amygdala, mens voksne kan bruke sin utviklede pannelapp til å tenke på konsekvensene av ulike handlinger før de velger hva de skal gjøre.

Kilde: The American Academy of Child and Adolescent Psychiatry, 2016

**Figure 8:** Screenshot of Control Intervention - Part 1

The core message of the second part of the control intervention was that: Parents can help their children to do their homework by designing a conducive environment in their homes (Hong & Milgram, 2000). Based on Hong and Milgram's book "*Homework: Motivation and learning preference*", the participants receive three guidelines as to how they can design a conducive homework environment tailored to their children: (1) set up a designated space for homework, (2) limit access to TV, internet, phones and games during "homework-time", (3) remind and follow up your child's homework and progress. A screenshot of the control intervention – part 2, can be seen below in figure 9 below. The full intervention is presented in Appendix A2: Control Intervention, in section 10.1.2.



**Figure 9:** Screenshot of Control Intervention - Part 2

The last part of Session 1 was designed to check whether the participants in the treatment group received new and useful information, understood the content, and accepted it to be information beneficial to their child. On a scale from one to six, the participants were asked how much they agreed or disagreed to six statements. If the treatment were successful in imparting the

information, I would expect the score to be higher for the treatment group than the control group. All participants, in both the treatment and control group, were asked these questions:

- “Parents affect children’s motivation for learning” (Guidance Check Parents);
- “It is important to praise children's abilities” (Guidance Check Abilities);
- “If your child has tried, but was not able to do a school assignment, it is still important to praise the child’s effort” (Guidance Check Effort Failure);
- “Children should choose easy assignments in school, so that they get the highest scores possible” (Guidance Check Challenges 1);
- “Children should only get assignments in school which they can solve” (Guidance Check Challenges 2);
- “Children learn by making mistakes” (Guidance Check Mistakes);

Finally, the participants were asked the grade level of their children, their gender, and their educational level. When creating the questions about the grade level of their children, I made a mistake by only allowing the participants to register one grade. One participant pointed out that they had two children, in different grades, but were not able to enter this information in the survey. Due to this mistake, I did not include this demographic in the analysis of the collected data.

## **3.2. Session 2**

Session 2 was the same for all participants and consisted of two parts: (1) post-intervention mindset measurement; and (2) growth mindset guidance measurement. A repeat of the same survey questions as the pre-intervention mindset measures in Session 1, were used to measure the post-treatment growth mindset. To measure the growth mindset guidance, the participants were asked how they would respond to their children in five different situations. Each situation was designed to test whether the respondents used feedback that promotes fixed or growth mindsets. The participants were asked to write how they would respond to their children in the following situations:

- “Imagine that your child came home from school with a diploma for making the best science fair project in the grade. You know that your child worked a lot on this project. How would you respond to your child in this situation?” (*Guidance Effort Success 1* – see *critical guidance point 3*, in section [2.2.3](#));

- “Imagine that your child is struggling with a school assignment. After a lot of effort, the child is able to solve it. Your child comes to you, to show that it was able to successfully complete the assignment. How would you respond to your child in this situation?” (*Guidance Effort Success 2* – see *critical guidance point 3*, in section [2.2.3](#));
- “Image that your child got a bad result on a math-test. You know your child had practiced a lot for the it, and that it expected to get a better score. How would you respond to your child in this situation?” (*Guidance Effort Fail* – see *critical guidance point 4*, in section [2.2.3](#));
- “Imagine that your child is struggling with some homework from its English language class, and is about to give up. How would you respond to your child in this situation?” (*Guidance Struggles* – see *critical guidance point 2*, in section [2.2.3](#)); and
- “Image that your child’s homework was to choose between three different assignments - one simple, one slightly difficult, and one difficult. The teacher recommended your child to do either the slightly difficult or difficult assignment, but your child chooses the simple one. When you ask your child why it chose the simple assignment, it responds by saying that it did so, because it is scared of making mistakes. How would you respond to your child in this situation?” (*Guidance Challenges* – see *critical guidance point 1*, in section [2.2.3](#)).

Finally, the participants were asked how much time they spend supporting their children with their homework. This was a Likert scale question with the following alternatives:

- Less than 1 hour
- 1-2 hours
- 3-4 hours
- 5-6 hours

## 4. Sample and Procedure

Due to the coronavirus pandemic the recruitment process was interrupted, and I did not reach my target of having 100 people participate in my experiment. The original plan was to recruit participants through elementary schools in Rogaland, Norway. I contacted the principle at various schools and invited them to support my experiment, by sending out invitations to the parents of the children in their respective schools. The principals got an information pamphlet which explained the details of my project and what they needed to do if they wanted to support it. The pamphlet is attached as Appendix B: Recruitment Pamphlet for Schools, in section 10.2. I got very positive responses from four schools, but to in order to send out the invitations to the parents, they needed to get permission from “Foreldrerådets arbeidsutvalg” (FAU), which is the school’s “parents committee”. According to the principals, the schools usually held meetings with the committee once a month, and they informed me that they were going to bring up my project in the next meeting. One school acquired permission at the beginning of February, but they were a school that were trying to cut all paper-communication, so they were only able to post the invitation on their school’s website. Seven participants were recruited through this school. For two of the other schools, they never got a chance to bring up my experiment in front of FAU. The meetings were supposed to happen in late February but were cancelled due to illnesses in the committee. Consequently, they were rescheduled at the end of March, and then cancelled due to the coronavirus pandemic. The fourth school did get permission to send out the invitation, but the school closed before they were able to do so. I contacted all three school which had not sent out any form of invitation, asking them if they could post the invitation on their website or send them via emails, but I was not able to get any response from them. Understandably they were busy due to the drastic changes in work environment after all elementary schools in Norway closed down 12<sup>th</sup> of March 2020.

In a second attempt to recruit participants for my experiment, I went through Facebook. I posted an invitation with a direct link to my experiment on my wall, which was shared by my supervisor, family, and friends. I also posted the invitation on several Facebook groups related to parenting. Through this recruitment method I was able to get 120 people to start the experiment, but only 33 of them finished Session 1.

Participation in the experiment was anonymous, and after making the consent decision, the participants were randomly assigned to either the control or treatment group. After completing Session 1 – contents of which is detailed in section 3.1. – the participants were asked to leave

their email address if they were willing to participate in Session 2. In total 40 people completed Session 1, and they all left their email address. Three weeks after completing Session 1, the participants received an email invitation for Session 2 – the contents of which is detailed in section 3.2. Two of emails in the control group bounced, while the remaining 38, were sent successfully.

Table 2 presents the attrition for this experiment’s sample. In total 40 out of the 127 people who started Session 1, completed the whole session: 15 in the treated group and 25 in the control group. The attrition for Session 1 was 63 percent for the control group, and 75 percent for the treatment group. These numbers suggest that only “very interested” participants completed the session, which raises concerns about the representativeness of the data. The reason why the treatment group had 12 percent higher attrition than to the control group for Session 1, could be because the treatment intervention was more than three times as long as the control intervention. The control intervention consisted of 12 information slides, while the treatment intervention consisted of 42. The lengthier treatment intervention makes it likely that only participants with an exceptional interest in the intervention content completed the whole session. 22 people completed Session 2: 11 for both the control and treatment group. This session also saw high attrition: 52 percent for the control group and 27 percent for the treatment group. Based on these numbers I conclude that the data collected in this experiment is not representative, the sample too small and unbalanced. The evidence from this experiment must therefore be interpreted with caution. However, I will still discuss the planned analysis, and present the results. Even if no conclusion can be drawn, this study can be considered a carefully constructed pilot study for a larger scaled up field experiment.

**Table 2: Attrition**

	Session 1			Session 2		
	Started	Completed	Attrition	Started	Completed	Attrition
Control	67	25	63%	23	11	52%
Treatment	60	15	75%	15	11	27%
Total	127	40	69%	38	22	42%

*Notes:* The columns provide the number of people who started and completed each session; and the attrition rate for each session.

## 5. Measures

In this chapter I will introduce the measures used to test each hypothesis. To test the validity of *Hypothesis 1*, the *Post-Treatment Growth Mindset* measure is used. This measure is collected at the beginning of Session 2, and calculated by reversing and averaging the four fixed mindset measures introduced in section 3.1. *Hypothesis 4* was tested by using the *Homework Support* measure introduced in section 3.2. As I could not find any other studies which have conducted a *parental growth mindset intervention*, I created my own measures for *Hypothesis 2* and *Hypothesis 3*. These measures will be presented in the following two subsections. Thereafter we will look at how all the four measures are correlated.

### 5.1. Hypothesis 2 – Guidance Opinion Measures

**Hypothesis 2:** A *parental growth mindset intervention* will cause parents to become more aligned with opinions that would encourage the development of growth mindsets in their children.

To investigate *Hypothesis 2*, I created a variable called *Guidance Check Average*, which represents the average of all *Guidance Check* measures introduced in section 3.1. These measures were designed to check whether the participants understood and internalized the treatment content. The measures are reversed, apart from *Guidance Check Parents* and *Guidance Check Mistakes*, so that a high score for any *Guidance Check* measure represents an opinion that would encourage the development of growth mindsets in the participant’s children. Table 3 below presents which part specifically, each of these *Guidance Checks* were designed to measure.

**Table 3:** Guidance Check Measures

Measure	Designed to measure:
<i>Guidance Check Average</i>	How strongly parents' opinions align with opinions that would encourage growth mindsets in their children.
<i>Guidance Check Parents</i>	How strongly parents believe that they affect their children's motivation for learning.
<i>Guidance Check Abilities</i>	How strongly parents believe they should not praise children's abilities.

Table 3 (continued)

<i>Guidance Check Effort Failure</i>	How strongly parents believe that they should only praise children’s effort if that effort was successful in producing learning or the desired result.
<i>Guidance Check Challenges 1 &amp; 2</i>	How strongly parents believe that children should be challenged in school.
<i>Guidance Check Mistakes</i>	How strongly parents believe that children learn by making mistakes.

I expected *Guidance Check Challenges 1* and *Guidance Check Challenges 2* to be measuring the same aspect: whether parent’s saw challenges as conducive and a way for children to learn, or whether they saw challenges as unnecessary or “harmful” for their children.

However, by conducting a correlation test, I found that the correlation between them was quite low and not statistically significant ( $r = 0.206$ ,  $p = 0.202$ ,  $n = 40$ ). I suspect the reason for them not being significantly correlated is due to the difference in implied consequence “challenges” have in each statement:

- *Guidance Check Challenges 1*: “Children should choose easy assignments in school, so that they get the highest scores possible.”
- *Guidance Check Challenges 2*: “Children should only get assignments in school which they can solve.”

*Guidance Check Challenges 1* implies that a challenge leads to lower scores, while *Guidance Check Challenges 2* implies that a challenge leads to a struggle or that the children is not able to solve a problem. Hence, there is no “negative consequence” to *Guidance Check Challenges 2*, while there is a “negative consequence” of not getting high scores in *Guidance Check Challenges 1*. I suspect this difference leads to the different opinions and attitudes among the parents on whether challenges are “good” or “bad” for their child. However, the sample size is small ( $n = 40$ ), so I cannot make any definitive conclusion regarding these measures. As they were designed to measure the same aspect, I have decided to combine them as one averaged measure going forward in this pilot study.

Table 4 presents a correlation matrix of the *Guidance Check* measures. All *Guidance Checks* are positively correlated, apart from the correlation between *Guidance Check Parents* and *Guidance Check Effort Failure*, which has zero correlation. The correlation between the



measures ranges from 0.053 to 0.371. There is a significant correlation between: *Guidance Check Effort Failure* and *Guidance Check Abilities* ( $r = 0.277$ ,  $n = 40$ ,  $p < 0.10$ ); and *Guidance Check Mistakes* and *Guidance Check Challenges* ( $r = 0.371$ ,  $n = 40$ ,  $p < 0.05$ ).

**Table 4:** Correlation between Guidance Check Measures

	GC Parents	GC Abilities	GC Effort Failure	GC Challenges
GC Abilities	0.099			
GC Effort Failure	0.000	0.277 <sup>+</sup>		
GC Challenges	0.214	0.123	0.131	
GC Mistakes	0.238	0.251	0.053	0.371*

Notes: GC = Guidance Check. <sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ . Session 1 sample ( $n = 40$ ).

Table 5 shows the Cronbach's Alpha and the Cronbach's Alpha with missing items for the *Guidance Check* measures. Gliem and Gliem (2003) suggests that an Alpha below 0.6, represents a poor level of internal consistency, which is the case for all variations of calculating Cronbach's Alpha for these measures. Notably, all 40 participants in Session 1 provided inconsistent responses for the *Guidance Check* measures: at least one opinion which is promotional, and at least one which is detrimental towards growth mindsets. Suggesting that the measures are unclear or faulty, or that parents do not know, or have not thought about, how their responses affect their children. Regardless of the reason, this inconsistency makes it difficult to create measures with high internal consistency, and it could explain the low Alpha and low correlation between the measures. As the sample size is small, it is futile to make any conclusion about the *Guidance Check* measures. I will therefore include all the *Guidance Check* measures when calculating the *Guidance Check Average* in this pilot study. A limitation with this parameter is that it assumes that all *Guidance Check* measures have an equal effect on growth mindset guidance. Whether they do or do not cannot be concluded from this study.

**Table 5:** Cronbach's Alpha for Guidance Check Measures

Cronbach's Alpha	0.529
<hr/>	
Cronbach's Alpha with missing item	
GC Parents	0.506
GC Abilities	0.475
GC Effort Failure	0.528
GC Challenges	0.431
GC Mistakes	0.411

Notes: GC = Guidance Check

## 5.2. Hypothesis 3 – Guidance Response Measures

**Hypothesis 3:** The treatment will cause parents to communicate with their children in a way which encourages the development of growth mindsets.

To investigate *Hypothesis 3*, I created a variable called *Guidance Average*, which represents the average of all *Guidance* measures introduced in section 3.2. These measures were designed to test whether the respondents used feedback that would promote fixed or growth mindsets. Table 6 below presents what each *Guidance* measure were designed to investigate.

**Table 6:** Guidance Measures

Measure	Designed to measure:
<i>Guidance Average</i>	Whether parents respond to their children in a way which encourages the development of growth mindsets.
<i>Guidance Effort Success 1 &amp; 2</i>	Whether parents respond to their children’s successful efforts in producing learning or desired results, in a way which encourages the development of growth mindsets.
<i>Guidance Effort Fail</i>	Whether parents respond to their children’s failed efforts in producing learning or desired results, in a way which encourages the development of growth mindsets.
<i>Guidance Struggles</i>	Whether parents respond to their children when they are facing a challenging learning situation, in a way which encourages the development of growth mindsets.
<i>Guidance Challenges</i>	Whether parents encourage their children to seek challenges and learning opportunities.

I graded each *Guidance* response on a scale from 1 to 5: a low score represents an answer that would promote a fixed mindset; and a high score represents a response that would promote a growth mindset:

- **Score 1:** A response that only contains elements that would be detrimental to growth mindsets: e.g.: “You are a smart kid” or “I can see that you are struggling with this math assignment, but we are not good at math in our family, so don’t worry if you are not able to solve it.” These responses contain person-praise and person-criticism, which are both detrimental to growth mindsets.
- **Score 2:** A response that mostly contains elements that would be detrimental to a growth mindset, but also elements that would promote it, e.g.: “Even though you failed, you have worked very well. You are a smart kid, so you can learn from your mistakes.” In this

example, praising a failed effort and for being “a smart kid” are two factors that are detrimental to growth mindsets; while emphasizing that the child can learn from their mistakes promotes growth mindsets.

- **Score 3:** A response that either contain no elements that detriment or promotes growth mindsets (e.g.: “Good!” or “Great!”), or a response that contain an equal amount of detrimental and promotional elements, e.g.: “You should always do the difficult assignments, because you are a smart kid, and the reason you go to school is to learn.” This answer contains person-praise “You are a smart kid” which would be detrimental to growth mindsets. However, the response also indicates that it is ok to make mistakes, and that making mistakes is a part of learning, which would promote growth mindsets.
- **Score 4:** A response that mostly contain elements that would promote growth mindsets, but also elements that would be detrimental to them, e.g.: “Even though this test didn’t go as you hoped, you are a smart kid, so you can learn from your mistakes. Perhaps you should try a different approach, the next time you study for a math test?” In this example, using person-praise for being “a smart kid” is one factor that are detrimental to growth mindsets; while emphasizing that the child can learn from their mistakes, and that the child should attempt a different strategy, are two elements that would promote growth mindsets.
- **Score 5:** A response that only contains elements that would be promote growth mindsets: e.g.: “Great effort overcoming this problem!” or “I can see that you are struggling with this assignment, is there another way that you can approach it?”. These responses contain process-praise and process-criticism, both of which promotes growth mindsets.

I am unable to find any theory on how mixed responses - which contains detrimental and promotional elements to growth mindsets - affects mindset development. I therefore decided to grade such responses as having equal impact, e.g.: a response with one detrimental and one promotional element would signify neutral score of 3. However, I assume that responses with only detrimental or promotional elements have a stronger affect than mixed ones, as the effect of mixed elements are unknown. Hence, only detrimental, or only promotional elements, are graded as stronger than mixed ones, even when the mixed ones are unevenly matched.

*Guidance Effort Success 1* and *Guidance Effort Success 2* were designed to measure the same aspect: Whether parents respond to their children’s successful efforts in producing learning, in a way which encourages the development of growth mindsets. These two measures are

positively and significantly correlated ( $r = 0.598$ ,  $n = 22$ ,  $p < 0.05$ ) and will be combined as one averaged measure going forward.

Table 7 presents the correlation between the *Guidance* measures. There is no uniformity of correlation between these measures, and the correlation coefficients range from -0.190 to 0.225.

**Table 7:** Correlation between Guidance Measures

	Guidance Effort Success	Guidance Effort Fail	Guidance Struggles
Guidance Effort Fail	-0.068		
Guidance Struggles	0.225	0.175	
Guidance Challenges	-0.014	-0.190	-0.161

Notes: +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ . Session 2 sample ( $n = 22$ ).

Table 8 shows the Cronbach's Alpha and the Cronbach's Alpha with missing items for the *Guidance* measures. Gliem and Gliem (2003) suggests that an Alpha below 0.5 is an unacceptable level of internal consistency, which is the case for all variations of calculating Cronbach's Alpha for these measures. The Alpha does increase to 0.203 when excluding *Guidance Challenges*, and further to 0.364 when additionally, excluding *Guidance Effort Fail*. However, after this exclusion process, we are only left with two measures, for a mechanism that consist of at least four parts – as explained in section 2.2.3. Notably, seven of the 22 participants (four in the control and three in the treated group) provided inconsistent responses in the *Guidance* measures: at least one response which were promotional and at least one which were detrimental towards growth mindsets. For the remaining 15 participants: 14 gave a mix of neutral and promotional responses; and one gave only promotional responses. It is a very small sample size ( $n = 22$ ), but this inconsistency might indicate that the measures are unclear or faulty, or that parents do not know, or have not thought about how their responses affect their children. Regardless of the reason, this inconsistency makes it difficult to create measures with high internal consistency, and it could explain the low Alpha and low correlation between the measures. More work and research into this mechanism is needed. The sample size is very small, which makes it hard to make any conclusions about the *Guidance* measures. There is a high level of inconsistency in the participants answers, poor correlation between the measures, and poor internal consistency for the measures, which means that more work needs to be done in developing the treatment intervention, and in investigating and developing the appropriate measures for this mechanism. In this pilot study, I will assume that all *Guidance* measures have

an equal effect on growth mindset guidance and include all these measures when calculating the *Guidance Check Average*.

**Table 8:** Cronbach's Alpha for Guidance Measures

Cronbach's Alpha	0.043	Cronbach's Alpha	0.203
Cronbach's Alpha with missing item		Cronbach's Alpha with missing item	
Guidance Effort Success	-0.007	Guidance Effort Success	0.260
Guidance Effort Fail	0.143	Guidance Effort Fail	0.364
Guidance Struggles	-0.264	Guidance Struggles	-0.133
Guidance Challenges	0.203		

### 5.3. Correlation between Dependent Variables

Table 9 presents the correlation between the dependent variables in this study, as well as the correlation between the dependent variables and *Baseline Growth Mindset* (introduced in section 3.1). We can see that there is a positive and significant correlation between both growth mindset measures and *Guidance Average: Baseline Growth Mindset* and *Guidance Average* has a correlation coefficient of 0.697 ( $n = 22$ ,  $p < 0.01$ ); and *Post-Treatment Growth Mindset* and *Guidance Average* has a correlation coefficient of 0.589 ( $n = 22$ ,  $p < 0.01$ ). The strong and significant correlation between the growth mindset measures and *Guidance Average*, suggests that a higher level of growth mindset predicts responses that would encourage the development of growth mindsets, for this sample. There is also a positive and significant correlation of 0.541 ( $n = 22$ ,  $p < 0.01$ ) between *Guidance Check Average* and *Guidance Average*. Both these parameters were designed to test the parents would encourage fixed or growth mindsets in their children, so the strong and significant correlation between these parameters is not surprising. The other measures are neither strongly, nor significantly correlated. I expected *Baseline Growth Mindset* and *Post-Treatment Growth Mindset* to have a positive correlation. However, the correlation coefficient between them is close to zero. When investigating the data, I found two possible reasons for this unexpected result. First, the mindset score for the participants in the control group was expected to be similar pre- and post-intervention, as they did not receive any information that would suggest a change in mindset. However, five out of the 11 participants had a reduced growth mindset score in Session 2. Second, one participant in the treatment group went from the maximum score of 6.00 pre-treatment, to a score of 3.25 post-treatment. Why several participants had a reduced growth mindset score in Session 2 is unknown, but it has a substantial impact on the results with such a small sample ( $n = 22$ ). When

correlating *Homework Support*, there is one outlier which stated to spend between five and six hours while supporting their child with homework, while the rest of the participant stated to spend two hours or less. This outlier has a big effect on a small sample such as this (n = 22) and is therefore given the treatment group's *Homework Support* average score. Due to the issues with the sample size, gender difference, uniformity of educational level, and attrition, we cannot make any conclusions regarding these results.

**Table 9:** Correlation between Dependent Variables

	Baseline Growth Mindset	Post-Treatment Growth Mindset	Guidance Check Average	Guidance Average
Post-Treatment Growth Mindset	-0.021			
Guidance Check Average	0.107	0.138		
Guidance Average	0.697**	0.589**	0.541**	
Homework support	-0.224	0.149	0.077	-0.037

Notes: GC = Guidance Check. + p < 0.10, \* p < 0.05, \*\* p < 0.01. Session 2 sample (n = 22).

## 6. Empirical Strategy

To test *Hypothesis 1-4*, I will investigate whether the treatment had a significant effect on each of the dependent variables presented in table 10.

**Table 10:** Relationship between Dependent Variables and Hypotheses

<b>Hypothesis</b>	<b>Dependent variable</b>	<b>Section</b>
H1: The treatment will cause parents to adapt more of a growth mindset.	<i>Post-Treatment Growth Mindset</i>	3.1 / 3.2
H2: The treatment will cause parents to become more aligned with opinions that would encourage the development of growth mindsets in their children.	<i>Guidance Check Average</i>	3.1 / 5.1
H3: The treatment will cause parents to communicate with their children in a way which encourages the development of growth mindsets.	<i>Guidance Average</i>	3.2 / 5.2
H4: The treatment will cause parents to spend more time supporting their children in their homework.	<i>Homework Support</i>	3.2

*Notes:* Each row presents the hypothesis, related dependent variable, and in which section the variable is presented.

I estimate the following model for each of the hypotheses:

$$(1) \text{ Dependent Variable H1-H4} = \alpha + \beta_1 \text{Treatment}$$

Where the *Dependent Variable* represents the each of the dependent variables presented in table 10 above. A high and significant value of  $\beta_1$  would indicate that *Hypothesis 1-4* is supported.

To increase the precision of my analysis, I will then control for gender, educational level, and baseline mindset by estimating the following model:

$$(2) \text{ Dependent Variable H1-H4} = \alpha + \beta_1 \text{Treatment} + \beta_2 \text{Female} + \beta_3 \text{Education} + \beta_4 \text{BL Mindset}$$

Where *Female* measures the effect of being female on each *Dependent Variable*; *Education* measures the effect a higher educational level has on each *Dependent Variable*; and *BL Mindset* measure the effect baseline growth mindset has on each *Dependent Variable*. Each of these covariates are presented in section 3.2.

## 7. Results

This chapter will summarize the results of my analysis. While interpreting the following results, please note that: the sample size is small (Session 1:  $n = 40$ ; and Session 2:  $n = 22$ ); there is a high uniformity in the participant's educational level (38 out of the 40 participants has a university degree, and 2 has completed high school); there is a skewed distribution of gender (no males in the treated group); there is high attrition (27 to 75 percent) for the treated and control group in both sessions; and the measures perform poorly on validation tests. The results and representativeness of this analysis are highly questionable due to these issues.

### 7.1. Descriptive Statistics and Balance Test

Descriptive statistics and balance test for the sample are shown in table 11. The four fixed mindset measurements are introduced in section 3.1. They are standardized with a mean of zero and standard deviation of one, using the sample from Session 1. A positive score for these measures indicates a fixed mindset. The *Baseline Growth Mindset* has been calculated by standardizing and reversing the four fixed mindset measurements and taking the mean of these scores. Accordingly, a positive score indicates a growth mindset for this measure. Summary statistics for the control and the treatment group for each session is presented in the columns. The columns labeled *Difference* shows the resulting coefficient and robust standard error from regressing each covariate against the treatment status. The *Education Level* represents the participants completed education. The participants were asked to choose between three levels: no formal education (score of 1); high school diploma (score of 2); and university degree (score of 3). Only two participants stated to have high school diplomas, while all other participants stated to have a university degree. There is no significant difference in educational level between the treated and control group in either of the sessions.

As shown in table 11, there are no males in the treatment group, and significantly more females in the treated group for both Session 1 ( $p < 0.05$ ) and Session 2 ( $p < 0.05$ ). Due to the small sample size, the significant gender difference, the high uniformity of education, and the high level of attrition for both the treatment and control group (described in chapter 4), I conclude that the randomization process was not successful and that the results of this analysis is not representative.



**Table 11: Descriptive Statistics and Balance Test**

	Session 1			Session 2		
	Control (1)	Treatment (2)	Difference (3)	Control (4)	Treatment (5)	Difference (6)
Female	0.800 (0.400)	1.000 (0.000)	0.200* (0.080)	0.636 (0.481)	1.000 (0.000)	0.364* (0.145)
Education Level	2.960 (0.196)	2.933 (0.249)	-0.027 (0.075)	3.000 (0.000)	2.909 (0.287)	-0.091 (0.087)
Fixed Mindset 1	0.080 (1.330)	-0.133 (0.998)	-0.213 (0.370)	0.273 (1.553)	-0.273 (0.793)	-0.545 (0.526)
Fixed Mindset 2	0.025 (1.265)	-0.042 (1.204)	-0.067 (0.401)	0.182 (1.527)	-0.182 (1.157)	-0.364 (0.578)
Fixed Mindset Math	-0.060 (1.113)	0.100 (0.748)	0.160 (0.295)	-0.091 (1.240)	0.091 (0.862)	0.182 (0.455)
Fixed Mindset Effort	-0.020 (1.040)	0.033 (0.869)	(0.053) (0.306)	0.045 (0.979)	-0.045 (0.750)	-0.091 (0.372)
Baseline Growth Mindset	-0.006 (0.943)	0.010 (0.711)	0.017 (0.263)	-0.102 (1.095)	0.102 (0.678)	0.205 (0.388)
N	25	15	40	11	11	22

Notes: The columns provide: the mean (and standard deviation) for the control- and treatment-group; and the estimated coefficient (and robust standard error) from regressing each covariate against treatment status. \* p < 0.10, \* p < 0.05, \*\* p < 0.01.

Table 12 presents a correlation matrix between and the Cronbach's alpha for the pre-mindset measures. As expected, they are all significantly correlated, and have a Cronbach's alpha of 0.776. Gliem and Gliem (2003) suggests that an Alpha above 0.7 is an acceptable level of internal consistency. The combination of these measures in the *Baseline Growth Mindset*, will be the preferred mindset measure going forward.

**Table 12: Correlation between and Cronbach's Alpha for Pre-Mindset Measures**

	Fixed Mindset 1	Fixed Mindset 2	Fixed Mindset Math	Fixed Mindset Effort
Fixed Mindset 2	0.870**			
Fixed Mindset Math	0.399*	0.419**		
Fixed Mindset Effort	0.339*	0.351*	0.328*	
Baseline Growth Mindset	-0.877**	-0.887**	-0.672**	-0.624**

Notes: \* p < 0.10, \* p < 0.05, \*\* p < 0.01. Session 1 sample (n = 40).

Cronbach's Alpha	0.776
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## 7.2. Hypothesis 1 – Post-Treatment Growth Mindset

**Hypothesis 1:** The treatment will cause parents to adapt more of a growth mindset.

Table 13 presents the treatment effect on the *Post-Treatment Growth Mindset* parameter. This parameter is calculated in the exact same way as the *Baseline Growth Mindset*. Both variables are based on the same mindset measures and were gathered at the beginning of each session. As being female was significantly different in the treatment and the control group, and

educational level was extremely uniform, I have done the regression analyses including (column 2) and excluding both these covariates (column 3 and 4). As shown in table 13, the treatment did not have a significant effect on the *Post-Treatment Growth Mindset*. However, we can see from column 1 that the treatment did increase the score by 41 percent of a standard deviation. These are suggestive evidence, but due to the issues with the sample we cannot make any conclusions regarding these results.

**Table 13:** Treatment Effects on Post-Treatment Growth Mindset

	Post-Treatment Growth Mindset			
	(1)	(2)	(3)	(4)
Treatment	0.409 (0.310)	0.441 (0.378)	0.370 (0.310)	0.488 (0.366)
Female		-0.201 (0.397)		-0.201 (0.397)
Education		-0.526 <sup>+</sup> (0.255)	-0.526 <sup>+</sup> (0.254)	
Baseline Growth Mindset		-0.031 (0.197)	-0.043 (0.190)	-0.030 (0.199)
R-squared	0.074	0.104	0.096	0.084

*Notes:* First row lists the dependent variable. Each column presents a separate regression and reports the estimated coefficient (and robust standard error) for all included covariates. Sample (n = 22). <sup>+</sup> p < 0.10, \* p < 0.05, \*\* p < 0.01.

### 7.3. Hypothesis 2 – Guidance Opinions

**Hypothesis 2:** The treatment will cause parents to become more aligned with opinions that would encourage the development of growth mindsets in their children.

The *Guidance Check Average* parameter is the average score of the *Guidance Check* measures, as described in section 5.1. A limitation with this parameter is that it assumes that all *Guidance Check* measures have an equal effect on growth mindset guidance. Whether they do or do not cannot be concluded from this study.

In table 14, the *Guidance Check Average* have been regressed on treatment status and controlled for gender, education, and baseline growth mindset. In column 1, we can see that the treatment significantly increases the score of the *Guidance Check Average* by 31 percent of a standard deviation. There is a positive effect of the treatment when including the covariates, but it reduces its significance. Due to the issues with the sample and measurements we cannot make any conclusions regarding these results. However, they do indicate that a *parental growth mindset intervention* might have the potential to align parents' opinions with those that would encourage the development of growth mindsets in their children.

**Table 14:** Treatment Effects on Guidance Check Average

	Guidance Check Average			
	(1)	(2)	(3)	(4)
Treatment	0.305*	0.253	0.291 <sup>+</sup>	0.261
	(0.173)	(0.177)	(0.166)	(0.182)
Female		0.191		0.219
		(0.240)		(0.240)
Education		-0.510**	-0.531**	
		(0.198)	(0.183)	
Baseline Growth Mindset		-0.006	0.011	-0.010
		(0.093)	(0.090)	(0.092)
R-squared	0.077	0.136	0.124	0.093

Notes : First row lists the dependent variable. Each column presents a separate regression and reports the estimated coefficient (and robust standard error) for all included covariates. Sample (n = 40). <sup>+</sup> p < 0.10, \* p < 0.05, \*\* p < 0.01.

## 7.4. Hypothesis 3 – Guidance Responses

**Hypothesis 3:** The treatment will cause parents to communicate with their children in a way which encourages the development of growth mindsets.

The *Guidance Average* is the average score of all *Guidance* measures, as described in section 5.2. A limitation with this parameter is that it assumes that all *Guidance* measures have an equal effect on growth mindset guidance. Whether they do or do not cannot be concluded from this study.

In table 15, the *Guidance Average* have been regressed on treatment status and controlled for gender, education, and baseline growth mindset. In column 1, we can see that the treatment increases the score of the *Guidance Average* by 14 percent of a standard deviation. However, this result is not significant. Due to the issues with the sample and measurements we cannot make any conclusions regarding these results.

**Table 15:** Treatment Effect on Guidance Average

	Guidance Average			
	(1)	(2)	(3)	(4)
Treatment	0.136	0.288	0.169	0.222
	(0.233)	(0.267)	(0.226)	(0.266)
Female		-0.338		-0.337
		(0.265)		(0.265)
Education		0.730**	0.729**	
		(0.166)	(0.165)	
Baseline Growth Mindset		0.184 <sup>+</sup>	0.164	0.183
		(0.092)	(0.100)	(0.093)
R-squared	0.015	0.202	0.160	0.130

Notes : First row lists the dependent variable. Each column presents a separate regression and reports the estimated coefficient (and robust standard error) for all included covariates. Sample (n = 40). <sup>+</sup> p < 0.10, \* p < 0.05, \*\* p < 0.01.

## 7.5. Hypothesis 4 – Homework Support

**Hypothesis 4:** The treatment will cause parents to spend more time supporting their children in their homework.

In table 16, *Homework Support* has been regressed on treatment status and controlled for gender, education, and baseline growth mindset. We can see that treatment does have a strong positive effect on *Homework Support*. This effect is significant when controlling for gender, which we already know is significantly skewed in this sample. Additionally, one participant in the treated group stated to spend between five and six hours, while the rest of the participant stated to spend two hours or less on supporting their child with their homework. This outlier has quite a big effect on this small sample (n = 22). Table 17 shows the same regression as in table 16, but here the outlier is given the treatment groups average *Homework Support* score. When controlling for this outlier the treatment effect is greatly reduced. Again, we get a significant effect when controlling for gender, which we know is skewed. Due to the issues with the sample we cannot make any conclusions regarding these results.

**Table 16:** Treatment Effect on Homework Support

	Homework Support			
	(1)	(2)	(3)	(4)
Treatment	0.955 (0.545)	0.878 <sup>+</sup> (0.444)	0.644 (0.457)	0.879* (0.416)
Female		-0.666 (0.384)		-0.666 (0.384)
Education		-0.011 (0.366)	-0.012 (0.361)	
Baseline Growth Mindset		-0.446 (0.322)	-0.486 (0.323)	-0.446 (0.322)
R-squared	0.067	0.289	0.244	0.289

Notes : First row lists the dependent variable. Each column presents a separate regression and reports the estimated coefficient (and robust standard error) for all included covariates. Sample (n = 22). <sup>+</sup> p < 0.10, \* p < 0.05, \*\* p < 0.01.

**Table 17:** Treatment Effect on Homework Support while Controlling for Outlier

	Homework Support			
	(1)	(2)	(3)	(4)
Treatment	0.145 (0.206)	0.421* (0.197)	0.132 (0.202)	0.461* (0.191)
Female		-0.822** (0.151)		-0.823** (0.151)
Education		-0.442** (0.142)	-0.443** (0.139)	
Baseline Growth Mindset		-0.081 (0.061)	-0.130 (0.144)	-0.080 (0.063)
R-squared	0.022	0.435	0.115	0.401

Notes : First row lists the dependent variable. Each column presents a separate regression and reports the estimated coefficient (and robust standard error) for all included covariates. Sample (n = 22). <sup>+</sup> p < 0.10, \* p < 0.05, \*\* p < 0.01.

## 8. Discussion & Conclusion

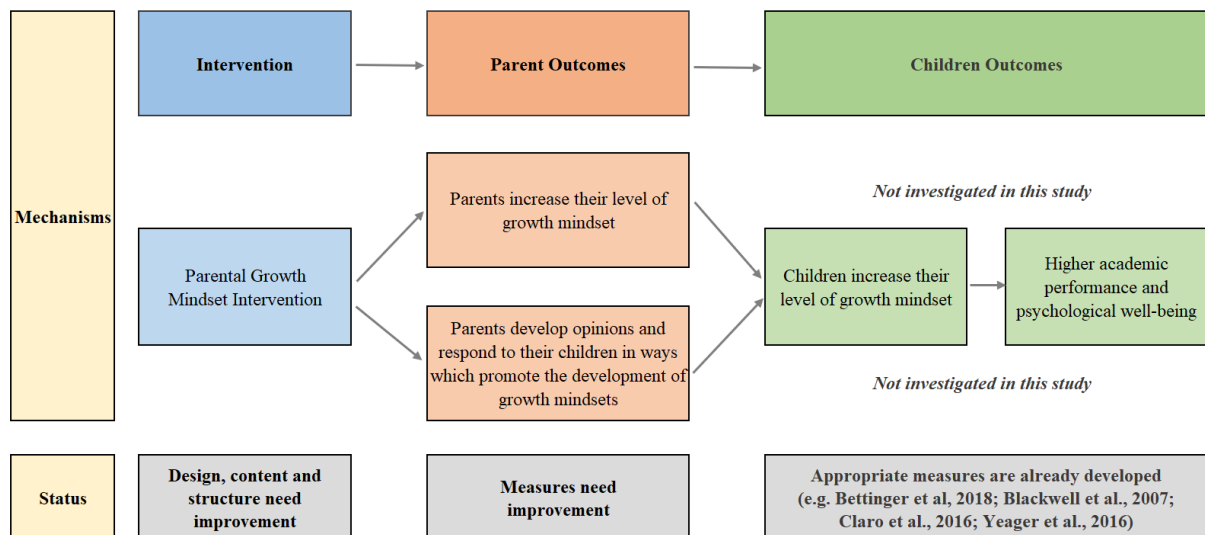
This pilot study aimed to develop a potent *parental growth mindset intervention* and appropriate measures, which can be used for a larger scale RCT. Even though the results are not significant, we find positive treatment effects for all outcome measures. These results indicate that it might be possible to help parents better support their children in their motivation and ability to learn through a *parental growth mindset intervention*. However, there are issues with this study's sample and applied measures.

The sample in this study had high attrition, and I would argue that there are two main reasons for this issue: (1) the length of the treatment intervention; and (2) the recruitment method. Rosen, Carrier and Cheever (2013) showed that students using a computer, averaged less than six minutes working on a task, before switching to texting or social media. Participants in the study were 263 students ranging from middle school to university, however I assume that similar results would be found with adults who have children in elementary school. Based on these findings, I argue that dividing the treatment intervention into three or four separate parts, to reduce the time and attention required to complete one session, would reduce the attrition. Additionally, I believe that changing the recruitment method, would also contribute to lower attrition levels. Due to the coronavirus pandemic, the schools involved in my original recruitment plan closed. Instead, the vast majority of the participants were recruited through wall-posts on various parent-related Facebook groups. I argue that it would be better to recruit participants through schools, rather than Facebook, for two reasons. First, I believe that most people found the invitation to participate in the experiment by browsing on Facebook. These people would therefore not be in the "right frame of mind" or might not have enough time to complete the whole first session – causing many people to just "check out" the experiment, but not completing it. Second, I think another issue has to do with trust. I believe more parents would be comfortable participating in an experiment which is endorsed by your child's school, compared to an unexpected invitation on Facebook. Especially when the experiment claims to concern their child's well-being. Due to the reasons explained above, I believe that more and shorter sessions, as well as recruitment through schools, would reduce the attrition experienced in this study.

Due to issues with the sample, we cannot make any conclusion about the effectiveness of the treatment intervention or the precision of the related measures. However, I would argue that both the intervention and measures should be further developed. A *parental growth mindset*

*intervention* consists of a growth mindset intervention and guidance on how parents should communicate with their child to encourage the development of growth mindsets. The growth mindset intervention part has already been extensively developed (e.g. Bettinger et al. 2018; Dweck, 2006; Yeager et al. 2016), but the guidance part and related measures used in this study, is to my knowledge the first of its kind. Research into how to best present the guidance content is necessary to maximize the benefit of such an intervention. The related measures also need improvement as they performed poorly on validation tests.

Even though more research is needed to be able to conduct a proper *parental growth mindset intervention*, it is necessary to investigate the effect it has on the parents' children to be able to ascertain its true value. In figure 10 I have illustrated what I believe to be the desired outcomes of a *parental growth mindset intervention*, and the status of research and improvements needed for each area to reach these outcomes. The focus of a larger scale RCT should be to: further improve the *parental growth mindset intervention* in terms of design, content, and structure; develop more precise and appropriate measures; obtain a representative sample which can lead valid results; and to investigate the effect it has on the children's mindset, and consequently their academic performance and well-being.



**Figure 10:** Research Status and Desired Outcomes

*Notes:* The grey lines represents the relationship between *parental growth mindset interventions* and desired outcomes. Orange and green boxes present the desired outcomes. The grey boxes suggest the research status of each area.

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# 10. Appendix

## 10.1. Appendix A: Interventions

### 10.1.1. Appendix A1: Treatment Intervention – Part 2

#### Treatment Intervention Part 2 – Page 1/9:



#### Hvordan kan du hjelpe barnet ditt utvikle et lærende tankesett?

Nyere forskning viser at foreldres kommunikasjon og tilbakemeldinger har stor innvirkning på om barna deres utvikler lærende tankesett eller ikke.

Forskningen hentyder spesielt til at foreldres måte å gi skryt og tilbakemelding på fører til utvikling av ulike tankesett.

På de neste sidene skal vi se på hvordan du kan hjelpe ditt barn til å utvikle lærende tankesett.

#### Treatment Intervention Part 2 – Page 2/9:

Forskning har vist at person-skryt, hvor man skryter av barns egenskaper og resultater, kan gjøre at de utvikler en tro på at deres intelligens er fastsatt. Dette fører til at barna unnværer og sliter med å overkomme utfordringer.

Her er noen eksempler av person-skryt:

- Du er smart!
- Du er flink i naturfag!
- Du er et geni!
- Så bra! Du fikk alt riktig på matematikk prøven.

Men hvordan kan skryt som "Du er smart!" føre til at barn sliter med og unnværer utfordringer?

Barn som mottar person-skryt kan identifisere seg med skryten de får. Får et barn for eksempel høre at de er et matematikk geni, vil en utfordrende matte-oppgave kunne ses på som en trussel for barnets geni. Denne trusselen kan dermed føre til at barnet unngår utfordringer og velger enklere oppgave slik at de kan opprettholde sin identitet som et matte-gen.

Siden hjernen utvikles og forbedres gjennom utfordringer, vil barn som mottar person-skryte kunne miste flere verdifulle utfordringer og hindre deres mentale utvikling.

Men hvilken form for skryt og tilbakemelding vil føre til at barn blir motiverte til utfordre seg selv?

## Treatment Intervention Part 2 – Page 3/9:



Forskning har vist at barn som mottar prosess-skryt vil utvikle mer lærende tankesett, som gjør at de oppsøker utfordringer og blir mer motiverte til å lære.

Prosess-skryt er tilbakemelding som fokuserer på arbeidsprosessen, strategiene og innsatsen barna legger i sitt arbeid.

Her er noen eksempler på prosess-skryt:

- Jeg er imponert over din arbeidsinnsats!
- Du har øvd veldig bra til denne matte-prøven, og forbedringene er enkle å se!
- Selv om det var utfordrende har du jobbet veldig bra og konsentrert til denne prøven!

Ved å fokusere på arbeidsprosessen, får barna den riktige oppfatningen at intelligensen og evnene deres utvikles ved god innsats, som også fører til at de fokuserer på læring.

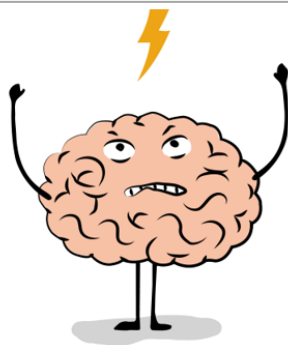
## Treatment Intervention Part 2 – Page 4/9:



**Hva tenker du?**

Kan du fortelle om en gang du gav skryt til ditt barn for prosessen de gikk gjennom for å lære noe nytt?

## Treatment Intervention Part 2 – Page 5/9:



MEN vi må allikevel være litt forsiktige med bruken av prosess-skryt.

Forskning har vist at det kan føre til problemer hvis man gir prosess-skryt når innsatsen og arbeidsmetoden ikke har vært vellykket. I tilfeller hvor barnet ikke har vært vellykket i sin læringsprosess, vil prosess-skryt kunne gi barnet en oppfatning av at det er greit at barnet ikke klarer å lære noe.

I slike tilfeller vil det være bedre å diskutere med barnet om de bør arbeide mer på samme måte eller om de bør prøve en ny lærings-strategi.

Her er noen strategier som kan være nyttige å anbefale barn når de står fast på en oppgave eller har problemer med å lære noe nytt:

- Tenke gjennom hva som må gjøres og hvordan det skal gjøres
- Spørre en medelev som kan det de holder på med
- Be læreren eller foreldre om hjelp
- Se gjennom liknende eksempler og oppgaver
- Gå tilbake noen steg og se om de forstår hva de har gjort og hvorfor de har gjort det
- Prøv å løse oppgaven sammen med andre elever

## Treatment Intervention Part 2 – Page 6/9:



**Hva tenker du?**

Kan du fortelle om en gang du hjalp barnet ditt løse et problem de hadde slitt med ved å anbefale ny strategi?



### Treatment Intervention Part 2 – Page 7/9:

På samme måte som person-skryt kan føre til at barn utvikler et fastlåst syn på egne evner og et negativt forhold til utfordringer, kan person-kritikk gjøre det samme.

Forskning har vist at barn som mottar person-kritikk har mindre "stå-på-vilje" når de møter utfordringer enn andre barn.

Her er noen eksempler på person-kritikk:

- Du er ikke flink til dette!
- Det var et dårlig resultat på denne prøven!
- Du er ikke smart
- Vi er ikke en "matematikk-familie"

Hvordan kan vi da gi kritikk som fører til at barna utvikler et mer lærende tankesett og et positivt forhold til utfordringer?

### Treatment Intervention Part 2 – Page 8/9:



Forskning hentyder at barn som mottar prosess-kritikk utvikler et mer lærende tankesett, som gjør dem motivert til læring og ser på utfordringer som en mulighet til å forbedre seg.

Her er noen eksempler på prosess-kritikk:

- Denne oppgaven har galt svar. Kan du tenke deg en annen måte å løse den på?
- Denne matematikk oppgaven er feil. Hvordan gikk du frem for å løse den? Kan det gjøres på en annen måte?
- Dette ordet er ikke stavet riktig. Hvordan kan du finne ut hvor feilen er?

Ved å kritisere arbeidsprosessen til barn når de gjør en oppgave feil, begynner de å revurdere denne prosessen. Det fører til at barna utvikler en tro på at oppgaver kan løses med riktig strategi og innsats, og et mer lærende tankesett.



**Hva tenker du?**

Kan du beskrive en gang du gav prosess-kritikk til ditt barn da de ikke fikk til en oppgave eller ikke gjorde det så bra på en prøve som de hadde håpet på?

## 10.1.2. Appendix A2: Control Intervention

Control Intervention - Page 1/13:



### Hjernens utvikling

Forskning har vist at hjernens deler utvikles ulikt over tid. Noen deler utvikles fort, mens andre deler utvikler seg over lengre tid.

Noen deler av hjernen er utviklet i barnealderen, mens andre ikke er ferdig utviklet før man er 25 år gammel.

Det betyr at barn har en hjerne som fungerer litt anderledes enn det den gjør for voksne.

Vi skal nå se litt nærmere på noen av disse forskjellene.

Kilde: Læringsmiljøsentret, Universitetet i Stavanger, 2020

Control Intervention - Page 2/13:

### Amygdala

Amygdala er en del av hjernen som utvikles i ung alder. Det er her overlevelsesinstinktet til mennesker sitter. Det er denne delen av hjernen som responderer, med for eksempel frykt eller aggressivitet, i en situasjon som vi føler er farlig.

Det er beskyttende for mennesker å ha en fungerende amygdala, men det kan føre til noen utfordringer ettersom andre deler av hjernen ikke er særlig utviklet i ung alder.

En del av hjernen som ikke er særlig utviklet i ung alder er pannelappen. Vi skal nå se på hvilke funksjoner denne delen av hjernen har, og hvordan dens sene utvikling påvirker barns beslutninger.

Kilde: The American Academy of Child and Adolescent Psychiatry, 2016

## Control Intervention - Page 3/13:

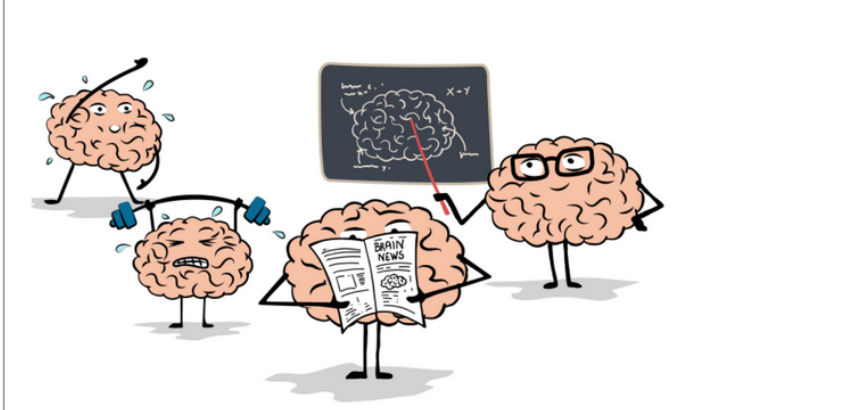
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*Kilde: The American Academy of Child and Adolescent Psychiatry, 2016*



## Control Intervention - Page 4/13:

### Pannelappen

Pannelappen er en del av hjernen som ikke er fredig utviklet før man er 25 år gammel.

Denne delen av hjernen er i utvikling hos barn, men den har ikke samme kapasitet som den har hos en voksen person.

Pannelappen styrer blant annet:

- personlighet
- planlegging
- beslutningstaking
- problemløsning
- fremtidstenkning
- definering av mål

Dette betyr at barns ferdigheter til planlegging, beslutningstaking, problemløsning, fremtidstenkning og definering av mål ikke er være særlig utviklet i barneskole alderen.

## Control Intervention - Page 5/13:



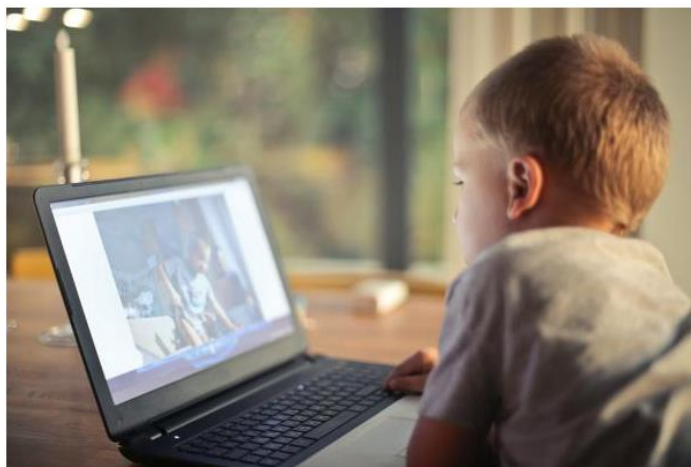
### Følelser over konsekvenstenkning

Ettersom barn ikke har en ferdig utviklet pannelapp, vil de ha problemer med å se konsekvensene av handlingene sine.

Dette betyr at barn har en annen måte å reagere og handle på enn voksne. Barns handlinger styres først og fremst av følelser som oppstår i amygdala, mens voksne kan bruke sin utviklede pannelapp til å tenke på konsekvensene av ulike handlinger før de velger hva de skal gjøre.

*Kilde: The American Academy of Child and Adolescent Psychiatry, 2016*

## Control Intervention - Page 6/13:



### Hva betyr dette for ditt barn?

Ettersom barn ikke har en ferdig utviklet pannelapp, vil de ikke ha samme muligheten til å tenke seg om før de handler, slik voksne kan. Barn handler med andre ord mer på impuls enn det voksne gjør.

Dette kan delvis forklare hvorfor barn ikke klarer å følge opp lekser eller andre planlagte gjøremål, som for eksempel å huske å rydde etter seg eller å ta ut av oppvaskmaskinen, like godt som voksne. Det kan være at barna ikke har noe imot å gjøre disse tingene, men at de har et sterkere ønske om å gjøre noe annet, som for eksempel å leke eller spille PC-spill. Da blir det vanskelig for barna å gjøre «det de skal».

Dette er fordi de klarer ikke å se konsekvensene av å ikke gjøre lekser eller å ikke rydde rommet. De handler mer på impuls, og følger det sterkeste ønsket som er i dem på et gitt tidspunkt.

## Control Intervention - Page 7/13:



Etersom barn har problemer med å tenke gjennom konsekvensene av valgene de tar, så vil det ofte hjelpe å sette gode rammer rundt leksearbeid.

Nå skal vi se på hvordan du som foreldre kan hjelpe ditt barn å bli mer motivert til å gjøre lekser.

## Control Intervention - Page 8/13:



### Motivasjon og lekser

Forskning har vist at du kan hjelpe barnet ditt å bli mer motiverte til lekser ved å lage et støttende hjemmemiljø. Dette er noen tiltak som kan hjelpe ditt barns motivasjon:

- Sett opp et tilegnet sted for leksearbeid som passer til ditt barn
- Begrens tilgang til tv, internett, spill og mobil i lekse-tiden
- Oppfølging og påminnelse av leksearbeidet

Vi skal nå se nærmere på hver av disse tiltakene.

## Control Intervention - Page 9/13:



### Sett opp et tilegnet sted for leksearbeid som passer til ditt barn

Å ha et tilegnet sted for skolearbeid i hjemmet, som passer ditt barn, vil være med på å øke barnet ditt motivasjon til å gjøre lekser. Forskning viser at barn som har et komfortabelt område til skolearbeid, har en større sans for å være positivt innstilt til dette arbeidet.

Barns preferanser varierer. Det er derfor viktig å samarbeidet med barnet ditt for å utvikle et gunstig sted for skolearbeid.

De fleste barn er ikke helt klar over hvilke preferanser de har. Det kan derfor ta tid før du og barnet ditt finner oppsettet som fungerer best. La barnet ditt prøve forskjellige ting og følg med på hva som fungerer på en god måte.

Kilde: E. Hong and R. M. Milgram, Homework: Motivation and learning preferences, 2000.

## Control Intervention - Page 10/13:



### Begrens tilgang til TV, internett og mobil i lekse-tiden

Forskning har vist at barn som har tilgang til TV, internett, nettbrett eller mobil i lekse-tiden, yter dårligere i gjennomføringen av dette arbeidet.

Bakgrunnslyder fra for eksempel et TV, er forstyrrende for barn, og minsker deres evne til å løse vanskelige oppgaver.

For å sørge for at barnet ditt lærer mest mulig mens det jobber, vil det være lurt å avtale en fast tid for når de skal gjøre lekser, og når de kan bruke TV, mobil og nettbrett.

Kilde: E. Hong and R. M. Milgram, Homework: Motivation and learning preferences, 2000.

## Control Intervention - Page 11/13:

### Hva tenker du?

Hva kan du gjøre for å hjelpe ditt barn å bli mer motivert til å gjøre lekser?

*Skriv et par setninger.*

## Control Intervention - Page 12/13:



### Oppfølging og påminnelse av leksearbeidet

Lekser er en god måte for barn å utvikle selvstendighet og evne til å ta ansvar. Men husk at barn hovedsakelig tar valg basert på følelser, så selv om det settes faste og gode rammer rundt lekser, så er det ikke sikkert at de alltid følger dem. Kontinuerlig oppfølging og påminnelser vil derfor være nødvendig i mange tilfeller.

Prøv forskjellige metoder som kan hjelpe barnet ditt å huske å gjøre leksene, og se hva som fungerer best. Dette er noen metoder du kan prøve:

- Verbal påminnelse - helt enkelt si til barnet ditt at de må huske å gjøre leksene sine
- Visuell påminnelse - legg frem skolesakene og se om barnet ditt forstår at det er på tide å begynne på lekse-arbeidet
- Lag en uke-planlegger sammen med barnet ditt - her kan dere legge inn leksetid, fritidsaktiviteter og fritid til TV, mobil og nettbrett

Kilde E. Hong and R. M. Milgram, *Homework: Motivation and learning preferences*, 2000.



## Control Intervention - Page 13/13:

**Hva tenker du?**

Hvordan kan du hjelpe ditt barn å huske å gjøre sine lekser?

*Skriv et par setninger.*

## 10.2. Appendix B: Recruitment Pamphlet for Schools

Pamphlet - Page 1/5:



### **WE-TEACH**

ET FORSKNINGSPROSJEKT FOR Å STYRKE BARNES TRO PÅ EGEN MULIGHET TIL Å LÆRE

## WE-TEACH

WE-TEACH er et forskningsprosjekt som ønsker å styrke barns tro på egne mulighet til å lære. Gjennom prosjektet ønsker vi å undersøke om foreldre til barn på barneskolen kan få opplæring i å kommunisere med barn på en måte som øker deres motivasjon til læring.

### Tankesett og læring

Forskning har vist at det er en høy korrelasjon mellom barns tankesett og deres motivasjon for læring. Et tankesett omhandler hvordan elever oppfatter at evnene og intelligensen deres er tilegnet. Det er vanlig å skille mellom låste og lærende tankesett.

Barn med låste tankesett tror ikke at evnene deres kan utvikles. Barn med låste tankesett har en tendens til å unngå utfordringer, som kan føre til at både evnene og intelligensen deres ikke utvikles optimalt.

Barn med lærende tankesett tror derimot at evnene og intelligensen deres kan utvikles gjennom øving og hardt arbeid. Lærende tankesett er forbundet med positive skoleresultater, økt evne til å takle utfordringer og bedre psykisk helse.

Hensikten med prosjektet er å identifisere kommunikasjonsmetoder som foreldre kan bruke for å bidra til at barna deres utvikler større tro på at de kan lære det de vil - et lærende tankesett.



## Innholdet i WE-TEACH

Nyere forskning antyder at rollemodellens kommunikasjon har en innvirkning på hvilken type tanke sett barna utvikler. Forskningen hentyder spesielt til at rollemodellens reaksjoner i medgang og motgang er faktorer som fører til utviklingen av ulike tanke sett hos barn.

WE-TEACH inneholder to spørreundersøkelser som vil forsøke å gi opplæring til foreldrene om hvordan de kan kommunisere og gi tilbakemelding til barna sine på en måte som fremmer lærende tanke sett.

### *Foreldres reaksjon på medgang*

Forskning har vist at barn som mottar skryt for vellykket arbeid, hvor det fokuseres på arbeidsprosessen og innsatsen deres, i stedet for resultatene og iboende egenskaper, fører til utvikling av lærende tanke sett.

### *Foreldres reaksjon på motgang*

Forskning har vist at foreldre som ser på motgang og utfordringer som en mulighet til å lære noe nytt, fører til at barna utvikler lærende tanke sett. Når barna får et positivt syn på utfordringer blir de heller ikke redde for å gjøre feil, men oppfatter det som en del av læringsprosessen.

Gjennom WE-TEACH vil foreldrene som deltar i forskningsprosjektet motta retningslinjer på hvordan de kan kommunisere med barna sine på en måte som fremmer lærende tanke sett. Formålet med dette er å gi støtte til barna slik at de utvikler en større tro på at de kan lære det de vil.



### **Hvordan fungerer prosjektet?**

Foreldrene som ønsker å delta i prosjektet, vil gå gjennom to spørreundersøkelser. De vil motta informasjon om hvordan barns tankesett utvikles, svare på noen spørsmål om hvordan de kommuniserer med sine barn, og hva de kan gjøre for å hjelpe barna utvikle lærende tankesett og mer motivasjon til å lære.

Deltakelse er frivillig og anonymt. Det vil ikke være mulig å vite hvem som har deltatt i undersøkelsen, eller hvilke svar en enkelt deltaker har gitt.

Prosjektet er godkjent av NSD (Norsk Senter for Forskningsdata) med referansenummer 150773. NSD har godkjent at databehandlingen blir gjort i henhold til personvernlovene i Norge.

### **Hva trenger vi fra dere?**

Vi trenger hjelp til å nå foreldrene som vil være med på prosjektet. Vi ønsker å sende et skriv hjem med barna, hvor vi inviterer foreldrene til å være med på forskningsprosjektet (se vedlegg «Invitasjon til forskningsprosjekt»). Hvis foreldrene ønsker å være med, melder de seg på ved å sende en e-post til oss.

Dette vil være en mulighet for foreldrene til å lære kommunikasjonsmetoder som kan hjelpe barna deres i skolearbeidet. Vi ønsker å invitere så mange foreldre som mulig til å være med i prosjektet, slik at vi kan lære mest mulig og forbedre hverdagen til flest mulig barn.



### **Hva skjer etter at prosjektet er ferdig?**

Når prosjektet er over, vil vi gjerne dele resultatene og funnene våre med din skole. Hvis ønskelig, kan vi også komme til skolen din å presentere funnene og forskningen vi har brukt

for å utvikle dette prosjektet. Dette kan presenteres for lærere og/eller foreldre etter deres ønske. Selv om dette prosjektet er rettet mot foreldre, er innholdet like relevant for lærere.

### **Tentativ tidsplan**

25. mars 2020 (uke 10)	Påmeldingsfrist for foreldre
30. mars - 3. april 2020 (uke 14)	Spørreundersøkelse del 1
20. april - 24. april 2020 (uke 17)	Spørreundersøkelse del 2
15. juni 2020 (uke 25)	Deling av prosjektets resultater

### **WE-TEACH håper at dere vil være med på laget!**

Vi håper at dere vil være med å få dette prosjektet gjennomført slik at vi får mer kunnskap om hvordan vi kan styrke barns tro på egne muligheter til å lære.

Ikke nøl med å ta kontakt hvis dere har noen spørsmål.

Vennlig hilsen,

Espen Sagen

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