# Scaring Parenting?

*The influence of psychological control on the approach-withdrawal motivation in a performance context.*

Master Thesis

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**Abstract**

Psychological control is a parenting technique, that is described as parental controlling behaviour that intrudes on the emotional and psychological world of their child. As psychological control is suggested to create a link between the child's behaviour and relational consequences with the parent, the child may experience it's behaviour can be threatening the security of the parent-child relationship. This might specifically be true in a performance context, where the child's performance on a task may be perceived as possibly threatening the security of the relationship. It is suggested that this relational consequences still emerge up to young adulthood. For these young adults, it is hypothesized that they will show more withdrawal tendencies from a performance task. These tendencies can be measured through electroencephalogram (EEG) activity of the frontal cortices.

This thesis sought to determine whether psychological control influences the frontal brain asymmetry, that serves as a measure for approach-withdrawal motivation, in young adulthood. Baseline frontal EEG was recorded from 26 female undergraduates, preceding and after doing a time-estimation task. Approach motivation was observed preceding the task, and changed to withdrawal motivation afterwards. No influence of psychological control was found. An additional exploration of how motivation to perform well, and satisfaction with the performance, related to the approach-withdrawal motivation, yielded no significant results either.

Despite the lack of significant results, some suggestions for further research emerge from this thesis. Replication with an increased sample size and additional measurements of the characteristics of the participants in the sample could contribute to the research in the field of psychological control and cortical activity.

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## 1. Introduction

The current thesis focuses on the subject of psychological control. This is defined as parenting behaviour that is characterized by parental control attempts that intrude in both the emotional and psychological world of the child (Barber, 1996). The use of psychological control is suggested to be related to several negative developmental outcomes in young adulthood, including fear of failure. Fear of failure is behaviour that is motivated by a tendency to avoid failing, and may occur in contexts that contain a performance element. Fear of failure is suggested to lead to the motivational tendency to withdraw from such situations, in contrast to the tendency to approach a situation that might not be perceived as being threatening.

This thesis sought to determinate the interaction between psychological control, fear of failure, and motivational tendencies to either approach or withdraw from a performance task in female young adults. The aim of the research is to gain more insight in influences of parenting practices on the development of their child, up to young adulthood.

### *1.1 Influences on child development.*

*It takes a village to raise a child* is an old African expression. It refers to the idea that raising a child is not merely limited to the influence of parenting practices on the child. Both children and parents are surrounded by social systems that contribute to a broad array of developmental areas. Such areas are the development of social, scholar, and instrumental competence. Those who find this expression a bit too 'tribal', and therefore rather focus on scientifically supported prepositions on child rearing, should compare this idea to Bronfenbrenner's Ecological Systems Theory (EST; Paquette & Ryan, 2001). Bronfenbrenner identifies four systems that surround the children and their family. These four systems each influence the child's social development.

Bronfenbrenner named these systems the macro-, exo-, meso-, and microsystems. Figure 1 displays the systems surrounding the child. The system closest to the child is called the microsystem. The groups and institutions that have the most direct influence on the child's life, such as family, religion, peers, school, and neighbourhood are situated here. The context in which these microsystems function are referred to as mesosystems. This can be regarded as different contexts a child is surrounded by. For example, a Jewish child who lives in a Chassidic Jewish neighbourhood is likely to receive a religion based education, differing from a child who lives in an black neighbourhood and may or may not go to a public school.

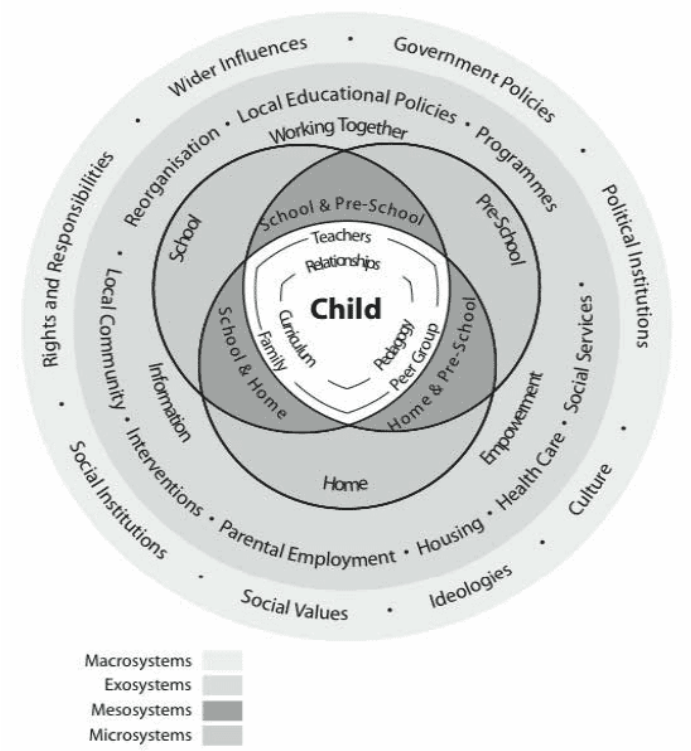


*Figure 1.* This model displays Bronfenbrenner's Ecological Systems Theory. The child is surrounded by four systems that influence and shape the child's social development. The microsystem consists of groups and institutions that have the most direct influence on the child. These groups and institutions are embedded in contexts that are referred to as mesosystems. Exosystems influence the microsystems surrounding the child, instead of having a direct influence on the child. The macrosystem is the larger context surrounding the child, including government policies and religion.
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Exosystems have no direct impact on the child's life, but influence the microsystems around the child. For example, imagine a child's parent loses his or her job as a result of the recession. This might influence the mood of the parent and as a result, the interaction between parents may change. The changes in interactions between the parents could also extend to the interactions between parents and child. The fourth system is the macrosystem, and refers to the larger cultural context the child lives in. This context is formed by culture, ideologies, social institutions, and government policies. For example, a child who lives in the slum in India is surrounded by a different set of cultural, religious, financial and educational standards than a child who is raised in a wealthy Republican family from Connecticut.

The current thesis is concerned with influences of the microsystem on the child's social development. According to Paquette and Ryan (2001), the family is the most intense, closed, most durable and most influential microsystem, as part of the mesosystem. It has the most direct influence on the child and this influence stretches over all domains of the child's

development, such as language, health, security, and beliefs. The development of these domains occurs trough the input of the family, as well as the behaviour related feedback (Paquette & Ryan, 2001). There is no standard definition of a family, as patterns of family compositions have changed in the course of time. What is regarded as a family also varies within and between cultures. For some cultures, the average family is regarded as one husband with a number of wives, living together with a large number of children. In the Dutch society, a monogamist marriage between parents is more common. The number of children in a Dutch family also varies, but is on average 1,7 child per mother (Centraal Bureau voor Statistiek [CBS], 2013). Whereas in the last half of twentieth century a heterosexual married couple with two children was regarded as most common, these patterns and compositions are different nowadays, as a result of changing standards and acceptations in society. According to Pragt (2010), one out of ten families nowadays is considered a mixed family, as divorced parents find new partners with or without children. This is an example of a change in standards and acceptance in society that influences family compositions. Regardless of those changes, in general one or more parents engage in raising the child or children in the Dutch family these days. In this thesis, the conceptualization of parents will apply to both single parents and parents that are partners.

The interpersonal relationships between family members are embedded within the family microsystems. A substantial part of these relationships is between the parents and the child. The relationship between the child and its parents serves as a safe base for the child, because it is the primary relationship the child forms. Therefore, the parent-child relationship is especially important. The manner in which parents approach their children in rearing practices is found to influence the children's functioning in later life. This approach consists of behaviours as well as attitudes. Behaviours are for example spanking or taking children to the movies, whereas an example of an attitude is a loving approach towards the child. According to Darling (1999), the total set of behaviours and attitudes have been found predictive of child well-being in different domains, such as social competence, psychosocial development, and problem behaviour. poor well-being in these domains could lead to impaired academic performance. Based on shared dimensions in these behaviours and attitudes, four parenting styles have been defined.

### *1.2 Parenting styles*

Most research regarding parenting styles relies on the work of Diana Baumrind, who identifies four different parenting styles, specifically: authoritative, authoritarian, permissive,

and neglecting. These parenting styles result from crossing two dimensions, being responsiveness and control. Responsiveness and control will be discussed first, followed by a description of the parenting styles.

Responsiveness or warmth refers to the extent to which parents show support, affection, affective warmth, and express their emotions. Parents that are highly responsive are able to build a relationship with their children that is warm and affectionate (Besharat, Azizi, & Pourshafiri, 2011). They show empathy for the concerns and needs of the child. In times of distress, they serve as a safe haven and as secure and reliable attachment figures (Soenens, 2005). Parents who are low responsive do not show sensitivity for the needs and concerns of the child, and lack warmth and affection in the relationship with the child. The dimension of control includes showing control, intense supervision and maturity demands (Besharat et al., 2011). Parents that are highly controlling provide boundaries to the child's behaviour and thereby regulate the child's behaviour. Also, they demand (age appropriate) mature behaviour of the child. When the child's behaviour is inacceptable, disciplinary consequences are applied (Soenens, 2005). As mentioned above, combining the two dimensions results in a classification of the four parenting styles, as presented in Figure 2.

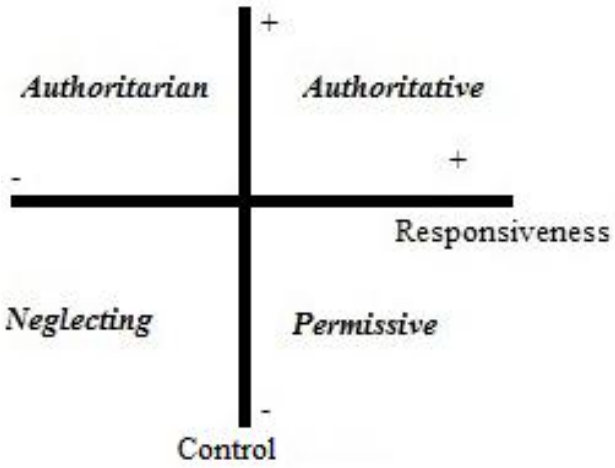


*Figure 2.*Crossing the two dimensions of responsiveness and control results in four parenting styles: Authoritarian, Authoritative, Neglecting, and Permissive. Authoritative parents are both high controlling and responsive. Permissive parents are high responsive but low controlling. The neglecting parenting style is associated with low levels of both control and responsiveness. Authoritarian parents are low responsive but highly controlling.

Authoritative parents are highly controlling, meaning they can set boundaries for the child. They are also highly responsive, by accepting that the child does not necessarily share the same standards and beliefs as the parents. As a result, they serve as a safe haven and reliable attachment figure. Authoritarian parents, on the other hand, force their rules and the

behavioural limits on the child, with low warmth and empathy for the needs and autonomy of the child. Permissive parents are the child's best friend, and therefore lack control. They do not want to force boundaries and rules, but show great amounts of affection. Therefore they are highly responsive but low controlling. Neglecting parents are neither controlling nor responsive. They might provide in basic needs, such as food, clothing, and education, but lack emotional and social support.

### *1.3 Psychological control*

The focus of the current thesis is on the dimension of parental control. Parental control can both target behaviour as well as the psychological and emotional development (Barber, 1996; Darling, 1999). Therefore, two types of control are distinguished: behavioural control and psychological control. Behavioural control refers to parental behaviours aiming to control or manage the child's behaviour. Parents can tell children what to do (*"Say hi to Grandma"*) or not to do ("*Don't hit your sister"*). Communication can also be non-verbal, for example smiling at a child for reinforcing good behaviour, or preventing the child from grabbing a hot pan from the stove. Another component of behavioural control includes being informed and involved in the child's life, for example knowing where and with who the child is.

Psychological control refers to parental behaviour that intrudes upon the psychological and emotional world of the child, in order the control the child's behaviour (Soenens, 2005). As a result of the use of psychological control, manipulation and psychological suppression of the child, in order to impose the parents personal values, may occur (Soenens, 2005). Psychologically controlling behaviours can be distinguished in three broad clusters: manipulation of the relationship between parent and child, negative expressions and criticisms, and personal control. Specific techniques that can be described are guilt induction (*"I was never able to attend school, and now you mess it up. It makes me sad to see how you spoil the chances I have never had*"), love withdrawal (*"I am so angry, I don't even like you at this point anymore*"), disappointment ("*I am disappointed that you didn't do as I told you to"*), shame ("*You should be very ashamed of yourself that you failed your exam),* possessiveness (*"I don't want you to play with friends, I want you to stay here and spend the day with mommy"*), reacting negatively on failure (*"I am not surprised you did not win the game, I told you from the start you won't win"*) and ignoring success ("*It must have been a mistake that you passed your drivers exam")*.

The main difference between behavioural and psychological control is that a link is created between behaviour and relational consequences through psychological control

(Barber, 1996; Darling, 1999). Parents can tell the child how the child's behaviour influences the parents emotional state with bad behaviour ("*If you hit your sister, mummy will be very sad*") or acceptable behaviour ("*You know how proud your dad will be if you get excellent grades in school"*). As mentioned before, the relationship between parents and child is important, because it provides a secure base. As a result, threats for the quality of this relationship are not favoured by the child, because it is important for further development and security.

While both are highly controlling, authoritative parents are able to provide a secure and warm relationship with the child, in contrast to authoritarian parents. One important difference between the two parenting styles is the use of the type of control. Authoritative parents mostly use behavioural control (Darling, 1999). Authoritarian parents, however, are more likely to use psychological control (Darling, 1999). The difference in control between an authoritative and authoritarian approach can be illustrated by an example, in which a child struggles with its homework. Behaviourally controlling parenting practices include helping with homework and preparing a working schedule. However, if the parent would emphasize the failure of the child as a supposed motivator ("*I thought you were smart and responsible enough to do something as simple as your homework, but I guess I overestimated you. Now I have to give up my free evening after working the whole day, just to help you"*), the parenting practice is referred to psychological controlling.

Parents that rely on high psychological controlling parenting styles, show little attention to the child's own beliefs and standards. These are an important part of psychological autonomy, that refers to the psychological independence of the child from the parent. A child with high levels of psychological autonomy can independently make own decision, hold own standards and beliefs, and develop psychologically and emotional self-sufficiency towards adulthood.

Developmental outcomes in (late) childhood, adolescence, and young adulthood that have been linked to high levels of psychological control include poor impulse control, depression (Assor & Roth, 2004), low ego strength, inability to make choices, low self-esteem (Barber, 1996), anxiety, and other behavioural patterns characterized by feelings of guilt and fear of damaging the parent-child relationship. Additionally, psychological control may relate to the development of perfectionism in children. According to Kenney-Benson and Pomerantz (2005), controlling parenting techniques embedded in a harsh authoritarian parenting style promote the idea that the child's success is essential for pleasing the parents, whereas failure is unacceptable. This view fits a perfectionists orientation.

The use of psychological control can create a link between compliance and performance on one hand, and relational consequences on the other hand (Huffmeijer, Tops, Alink, Bakermans – Kranenburg, & Van IJzendoorn, 2011). This link is created by a chain of steps, that will be explained here. The bond with the parent communicates a sense of acceptance to the child that allows the child the freedom to make independent decisions and choices, while maintaining the sense of comfort in the knowledge that the parents will support the child's behaviour (Beyers & Goossens, 2008). For parents that use high levels of psychological control, the level of affection, warmth and security that parents provide depends on the child's behaviour. However, if the child displays inacceptable behaviour, parents influence the child through the parent-child relationship by applying techniques such as guilt induction and love withdrawal. The appliance of relational strategies to discipline the child leads to the development of fear of failure. Fear of failure can be conceptualized as the motivation to avoid failure (Elliot & Trash, 2004). The link between fear of failure and relational strategies, is that children experience that the relationship between parent and child is threatened if the child fails to meet the parents expectations, for example in (inacceptable) behaviour or performances. Fear itself is undesired behaviour.

Therefore, one could argue that a performance task would provoke anxiety in children that have experienced high levels of psychological control, as performance tasks prominently contain a failure or success component. Success would contribute to the safety of the parent-child relationship, whereas failure could be threatening to this relationship. Once a situation might be threatening or harmful for a child, one could argue that the child will not be willing to approach that situation. Contrary, situations that are not harmful are more likely to be approached. This motivational tendency to either approach or withdraw from a situation is referred to the approach-withdrawal motivation. In approach motivation, behaviour is directed by a positive or desirable event or possibility. In withdrawal motivation, behaviour is directed by a negative or undesirable event or possibility (Elliot & Covington, 2001).

Children that might feel the possible failure component of a performance task can negatively influence the parent-child relationship, might want to withdraw from such tasks. Children who do not feel any negative relational consequences of their performance, however, may feel inclined to approach such performance contexts.

### *1.4 Approach-withdrawal motivation*

A tendency for approach or withdrawal can be quantified trough the measurement of frontal brain asymmetry. As early as 70 years ago it was proposed that affective behaviours were related to asymmetric activity of the prefrontal regions (Goldstein, 1939, in Harmon-Jones, Gable, & Peterson, 2010). In early studies on the differential involvement of the left and right hemispheres in emotional behaviour, sedative drugs (e.g. Amytal) were injected in the left or right hemisphere, rendering them inactive. Sedation of the left hemisphere lead to depressed affect, whereas after sedation of the right hemisphere euphoria was observed in patients (see Harmon-Jones et al, 2010). Also, in a different line of research, emotional states were related to differences in activity of the left and right frontal lobes by measuring the electroencephalogram (EEG). Initial results also suggested a valence distinction for positive emotions (related to greater left activity) and negative emotions (associated with greater right activity) (Harmon-Jones et al, 2010). Subsequent studies, however, showed that frontal asymmetries do not map nicely onto a simple positive versus negative valence distinction. Research on the topic of anger contributed to the emotional valence debate. Because anger was conceptualized as a negative emotion, it was hypothesized to be related to greater right frontal activity (Wacker, Chavanon, Leue, & Stemmler, 2008). However, research on the topic of anger suggested that anger was also related to greater left frontal activity. Thus, anger could be linked to both an approach motivation (i.e. aggression) and a withdrawal motivation (i.e. internalization of anger). Therefore, recent studies suggest these asymmetries reflect a motivational direction instead of an emotional valence (Harmon-Jones et al., 2010; Pizzagalli, Sherwood, Henriques, & Davidson, 2005).

To assess asymmetries in the brain activity, the electrical activity is measured using EEG. As brain cells or neurons communicate, both at input (postsynaptic potential) and output (action potential) an electrical signal is generated. This electrical activity can be picked up by sensors at the scalp site, and recorded as EEG waves. The brain always generates electrical activity, with different frequency bands. The four different frequency bands that can be distinguished in the EEG are: beta (13-30 Hz), alpha (8-13 Hz), theta (4-8 Hz) and delta (0.1 – 4 Hz). Alpha waves always exist, but occur relatively more when the brain is relaxed, but awake. Higher levels of alpha waves are related to less activity of the brain. Therefore, alpha serves as a measure for deactivation of underlying tissue (Broyd, Helps, & Sonuga-Barke, 2011).

In order to examine asymmetric activity of the right and left frontal cortex, differences in the alpha band of the EEG are computed. This involves the difference in alpha power that

is measured trough electrodes over the left and right frontal cortex. As alpha power is inversely related to the brain activity, high alpha power reflects low activity. Thus, if the alpha power in the left frontal cortex is higher over the alpha power in the right frontal cortex, it reflects higher right frontal cortex activity, and vice versa. As explained above, approach motivation is related to greater left frontal activity, whereas withdrawal motivation is associated with greater right frontal activity. Therefore, the level of left or right frontal activity serves as a measure for approach-withdrawal motivation.

The approach-withdrawal motivation is found to include both state and trait fluctuations (Coan & Allen, 2004). According to Coan and Allen (2004) it is estimated that the contribution of both state and trait relation variation is about 50% each. A specific measure of frontal asymmetry always reflects the sum of state and trait variation at that moment. Some situations could elicit more approach motivation (i.e. showing a video of a cute baby to a young woman) or withdrawal motivation (i.e. showing a picture of a scary spider to an arachnophobic). Children that have experienced high levels of psychological control, for example, might be subjected to more withdrawal motivation when facing a performance context. Consequently, higher levels of right frontal cortex activation are expected to be found in the EEG.

### *1.5 Research question and hypotheses*

This thesis contributes to the debate of the specific influence of parenting patterns on child development. The research question that will be examined is: how is perceived parental psychological control related to the approach-withdrawal motivation in a performance context in young adulthood?

In order to answer this research question, multiple hypotheses have been formulated. It is expected that a relationship between psychological control and approach-withdrawal motivation in the performance context exists. Moreover, the expectation is that high levels of psychological control are related to withdrawal motivation in a performance context.

As the use of psychological control is expected to influence the emotional consequences of the performance on a task, it may be possible that participants feel more motivated to perform well. This motivation to perform well is a different aspect of motivation than approach-withdrawal motivation. It solely focuses on the desire to perform well on the task, instead of being motivated to approach or withdraw from a situation. In the same line of thought, it can be hypothesized that experiences of high levels of psychological control may

influence the satisfaction with the task, as the performance situation might be experienced as being threatening to the parent-young adult relationship. Thus, the performance should be very good in order to prevent this relationship from being damaged. Therefore, one might expect that participants who perceived high levels of psychological control will not be easily satisfied with the performance, as they might feel they have not performed well enough in order to preserve the parent-young adult relationship.

Therefore, the possible influence of psychological control on the approach-withdrawal motivation will also be analyzed when controlling for the influence of motivation to perform well and satisfaction with the performance.

## 2. Method

### *2.1 Participants*

The current sample (N = 26) is a subsample of participants from a larger study focusing (among others) on the reliability of EEG and ERP measures. Only female participants were included in the study. They were recruited trough the Leiden University recruitment website. Participation in studies is mandatory for undergraduate psychology students. In return, they receive a combination of money and college credits. This combination ranged from €0 and 40 credits, to €40 and 0 credits. The exchange for one credit was €4. From all participants joining the ERP study, the subsample of 26 female undergraduates, who performed a time-estimation task during the first session, were selected for the present study. Their age ranged from 18 to 27 (M = 20.04, SD = 2.30). One participant's data was excluded from analyses, because the electrode net was not fitted correctly and as a result, EEG data were not usable. Furthermore, 7 participant's data were deleted from analysis because of insufficient artefact-free EEG data. The total sample for analysis consisted of 18 females (M = 19.72, SD = 1.84).

Participants were assessed on psychometric measures and EEG measures twice, separated by four weeks. Participants were instructed to abstain from alcohol and excessive physical activity in the twenty-four hours preceding the start of each session, and to abstain from caffeine on the day the assessments took place. Informed consent was signed prior to the first session. Exclusion criteria were colour blindness, smoking, alcohol and/or drug abuse, psychiatric and neurologic disorders, pregnancy, nursing and use of medication (except oral contraceptives). This thesis uses only data that was collected in the first session.

### *2.2 Procedure*

The experiment consisted of two sessions, that were separated by four weeks. First, the student was welcomed and shown around the EEG laboratory by the experimenter. The participant was briefly informed about the course of the sessions by the experimenter and an informed consent form was signed. Next, the questionnaire measuring psychological control was filled out. More information about the psychometric measurements is provided in section 2.3. Next, the electrode net was fitted, a procedure that could take up to half an hour. During this time, the experimenter chatted with the participant in order to make her feel comfortable. After the electrode net was fitted, the participant was brought to the experiment room, where the net was connected to an amplifier and impedances were measured. If necessary, the

impedances were adjusted (see section 2.5). The participant was seated in a comfortable chair 70 centimetres from a computer screen. A camera was placed in the experiment room that allowed the experimenter to see the participant, and they could communicate through an intercom system.

Next, the practice block of the time-estimation task was started. The goal of this task is for participants to estimate the duration of a second. This was done by presenting a grey picture of a gift-wrapped present to the participant. After 1500 – 2000 milliseconds, the picture changed colour to red-and-yellow. The participant was instructed to push the button on the response box when she thought a second has elapsed since the picture turned red-and-yellow. Feedback was given to the participant by photographs of adult faces that were coloured either green or red. After a correct (in time) response, a green picture was presented. False responses could either be too soon or too late, and were followed by a red picture. Criteria for a correct (on time) response were individually adjusted to ensure an error rate of 50% for each participant. Therefore, the task does not reflect the ability of the participant to estimate the duration of a second, but provides a framework to investigate participants positive and negative affect towards the task.

After the practice block was conducted, baseline EEG was recorded. In this baseline measure, the participant was instructed to look at the fixation cross that was presented on the computer screen for two minutes. The purpose of this fixation cross was to minimize movements of the head or the eyes. Both head movements and eye-blinks cause artefacts in the EEG data. Subsequently, participants were instructed to close their eyes for another two minute baseline recording with closed eyes. Next, the time-estimation task was started.

Each session contained eight blocks, separated by a pause in between the fourth and fifth block. After each block, the participant could start the next one by pressing a button on the response box. If necessary, the experimenter could adjust electrodes with bad signals or high impedances during these short breaks. During the pause between the blocks, the participant filled out two questionnaires. Also, she was informed that she could earn points in the next four blocks for correct answers and lose points for incorrect responses. A reward would be given to the participant with the most points after all participants' sessions were conducted.

Following the final block, two baseline measures were recorded with eyes closed and opened, each for a two-minute period. These baseline measures were recorded following the same procedure as described for the baseline measures preceding the task. When all the recordings were finished, the net was removed from the participant's head and the participant

filled out the final questionnaires, including the short 20-question post-task questionnaire (see section 2.3).

### *2.3 Psychometric measurements*

*CRBPI.* Experiences of psychological control were assessed using the Child's Report of Parental Behaviour Inventory (CRBPI; Beyers & Goossens, 2003; Schludermann & Schludermann, 1988), that has been found to have excellent reliability and concurrent, criterion and convergent validity (Locke & Prinz, 2002). This 30-item questionnaire consists of prepositions about parental behaviour rated on a five-point scale, varying from 1 (not applicable) to 5 (very applicable). Questions are answered separately for father and mother. The CRBPI was administered for the present experiences of the participant. The CRBPI consists of three scales: Psychological Control, Firm Control, and Acceptance. Each scale contained 10 statements, leading to a minimum score of 10 and a maximum score of 50 per scale. For the purpose of this thesis, only the scores on Psychological Control were used. Higher scores reflect greater experienced use of psychological control by the parent. Example items of the Psychological Control scale are: "*My mother is a person who tells me of all the things she had done for me*" and "*My father is a person who keeps rules when it suits him*". Scores were computed separately for mother and father by summing the scores for each parent. Additionally, a summed score was computed for estimating Psychological Control of both parents. The internal consistency was high (Cronbach's alpha = .91) for this scale.

*Post-task questionnaire.* In order to assess the participant's own feelings about their task performance, the participants were asked to fill out a short 20-item questionnaire at the end of the second session. This post-task questionnaire contained questions that could be answered on either 5- or 7-point Likert scales, regarding satisfaction with achievement (e.g. ranging from "*I am very satisfied with my performance*" to "*I am very unsatisfied with my performance*") and motivation (e.g. "*How much did you want to be the best*", rated from "very much" to "not at all"). Two subscales were constructed: Motivation and Satisfaction. Motivation measures how motivated participants felt about performing well on the task, whereas Satisfaction reflects how satisfied the participants were with their performance. The Motivation scale consisted of 4 questions with possible answers ranging from 1 to 5. The Satisfaction scale consisted of 5 questions with possible answers ranging from 1 to 5. Higher scores reflect greater motivation and satisfaction. Cronbach's Alpha was acceptable for Motivation (.73) and high for Satisfaction (.86). As participants' error rates were manipulated to be approximately 50%, all participants performed equal on the task. Because participants

were not aware of the equal error rates, a well-fit framework was provided for assessing the participants' evaluation of their performance, instead of the actual ability to estimate the duration of a second. Appendix 1 provides an overview of the questions that formed each scale.

### *2.4 EEG measurements*

EEG was recorded using HydroCell Geodesic Sensor nets containing 129 electrodes. The signal was amplified using a NetAmps300 amplifier, and filtered with a 125 Hz low-pass filter. The signal was recorded with a sampling rate of 250 samples per second using NetStation software (Electrical Geodesics, Inc.). Where possible, electrode impedances were kept below 50 kΩ. Data was further processed offline with BrainVision Analyzer 2 (BVA, Brain Products GmbH). Before exporting to BVA, the EEG was filtered using a 0.3 Hz high-pass filter.

The EEG was filtered in BVA using a 30 Hz low-pass filter. The slope was 48 dB/octave, leaving signal in the alpha-band frequency (8-12 Hz) unaffected. During the recording of the EEG, markers were written into the data using E-Prime (Psychology Software Tools, Inc.), labelling the two-minute baseline measure preceding and following the ERP measures, for both the 'Eyes opened' and 'Eyes closed' condition. This resulted in four markers (BO, BC, EO, EC) that indicated the beginning of each baseline measure. Two-minute (120000 ms) segments following each marker were cut out from the filtered EEG data. Each two-minute segment was divided into 2000 ms segments, with 1000 ms overlap, resulting in 119 segments per baseline measure per participant. These were inspected for artefacts caused by eye-movements, blinking, or bad signal, using an automatic artefact detection algorithm. The maximal allowed voltage step was set to 50 μV/ms. Over the 2000 ms interval an absolute difference greater than 200 μV between the maximum and minimum value within that segment was considered an artefact as well. Also, segments with low activity (a difference between the maximum and minimum value in that segment smaller than |0.50| μV) were deleted from analysis. At this point, participant's data with less than 60 usable segments (50%) in more than two baseline conditions were deleted from further analysis. This resulted in excluding the data of 2 participants from further analyses, as none of the baseline conditions contained more than 60 usable segments.

After segments containing artefacts were removed, a Fast Fourier Transform (FFT) was performed on the 2000 ms segments, with a resolution of 0.5 Hz in a 100% Hamming window. Resulting power is expressed in $\mu V^2$. Subsequently the average of power in the alpha

band (8 – 12 Hz) of each channel over all the 2000 ms segments was computed. This data was exported for further statistical analyses.

During the EEG recording, some channels were not attached correctly or let loose, and as a result did not record EEG. These channels were coded as missing values. The natural logarithm (ln) of the power values was computed in order to normalize the data distribution. Data of five more participants was not included for analyses, as their ln-transformed EEG data did contain more than 60 usable segments, but these usable segments contained too many artefacts due to loose or bad channels. Acceptable EEG data contained over 50% of artefact free segments. All together, data of seven participants was deleted due to artefacts in the EEG.

To acquire measure of the frontal alpha activity, ln-tranformed values were averaged across sets of ten electrodes at left-frontal (19, 20, 23, 24 [F3], 26, 27, 28, 29, 33 [F7], 34) and right-frontal (2, 3, 4, 111, 116, 117, 118, 122 [F8], 123, 124 [F4]) sites. Figure 3 displays the location of the electrodes that were used for this thesis. Asymmetry values were computed by subtracting left alpha activity from right alpha activity (ln[right alpha] – ln[left alpha]). More positive values reflect greater alpha power over the right than over left frontal cortex. As alpha power reflects deactivation of the cortical tissue, positive values reflect greater left activity, thus approach motivation. More negative values reflect greater right frontal brain activity, thus withdrawal motivation. A zero value indicated no alpha asymmetry.

Cronbach's alpha's for the ten electrodes of alpha power were high for the Begin Open (.85), Begin Closed (.88) and End Closed (.84) conditions, and acceptable for the End Open condition (.60).

### *2.5 Analyses*

Statistical analyses were performed using IBM SPSS Statistics (version 20). Data inspection was conducted using descriptive analyses in SPSS. All variables were numerical and continuous. The mean, standard deviation, and range were investigated. In order to test assumptions of normality, the standardized kurtosis and standardized skewness were computed by dividing the skewness and kurtosis by their corresponding standard error. A standardized kurtosis and standardized skewness not exceeding plus or minus 3 are indicative of a normal distribution. Additionally, the Kolmogorov-Smirnoff (KS) test was used to test normality (alpha = .05).

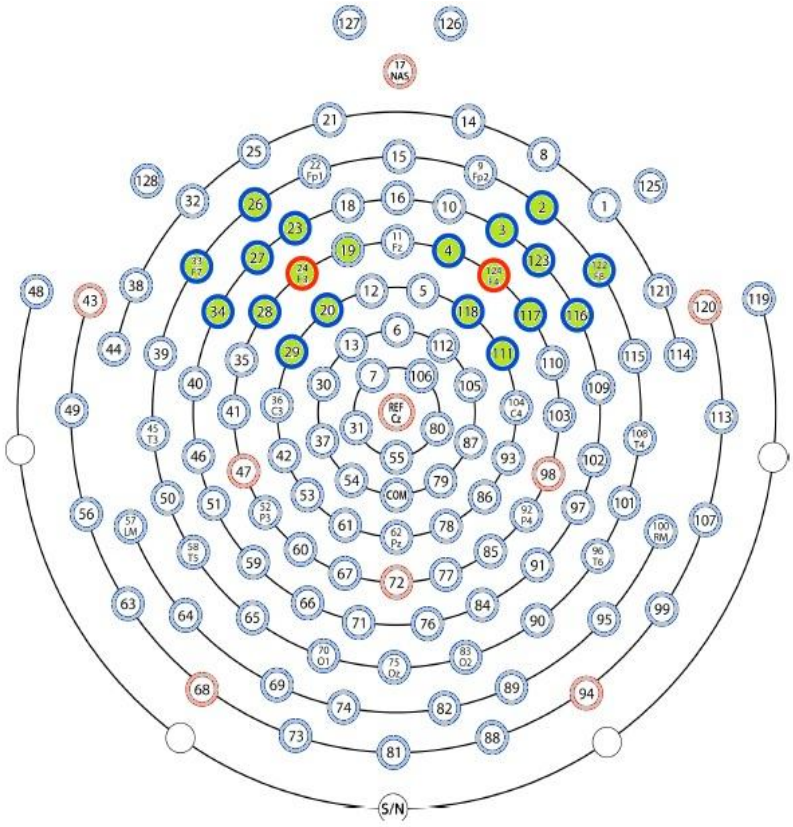


*Figure 3.* Map of the sensor net with channel positions. Green coloured channels are placed over the left (19, 20, 23, 24 [F3], 26, 27, 28, 29, 33 [F7], 34) and right (2, 3, 4, 111, 116, 117, 118, 122 [F8], 123, 124 [F4]) frontal sites.

Distributions were inspected for outliers by standardizing the values. If standard scores exceeded plus or minus 3, a case was considered an outlier. The correlations between psychological control (PC), Motivation, and Satisfaction were analyzed.

For the EEG data, several conditions were created during data collection. Time (pre- or post task) and Eyes (Open versus Closed) were possible influences of the frontal asymmetry values (FBA). The influence of these conditions on FBA was investigated with repeated measures ANOVA's. Asymmetry scores were entered as dependent variables and Time and Eyes were entered as independent variables.

To explore whether PC is related to FBA, correlations were computed between PC on the one hand, and pre- and post-task FBA on the other. Correlations were also computed between PC and a new variable: changing FBA during the task. To investigate whether PC related to FBA when controlling for potential effects of Motivation and Satisfaction on FBA and PC, a repeated measures ANCOVA was performed with FBA as dependent variable, Time as within subject factor, and PC, Motivation and Satisfaction as covariates.

## 3. Results

### *3.1 Descriptives*

The mean score on PC was 40.88 (*SD* = 13.54) for both parents. This mean is quite low, given that the possible scores ranged from 20 to 100. The mean score on Satisfaction was 12.19 (*SD* = 2.85). The possible scores ranged from 4 to 20. Thus, the mean score on Satisfaction was medium. Possible Motivation scores ranged from 5 to 25. With a mean score for Motivation of 17.88 (*SD* = 3.56), the scores were medium as well.

Table 1 provides an overview of the basic characteristics. Missing values resulted from participants who had no father or did not attend the second session. Because of the small sample size, it was decided that missing values on behavioural measures were replaced by the mean score of the sample. All variables are normally distributed, as both standardized skewness and standardized kurtosis did not exceed plus or minus 3 (all $\leq |3|$). Additionally, the *p*-value of the Kolmogorov-Smirnoff on all variables exceeded .05, which means that these variables were normally distributed. Figure 4 displays the histograms with normal curves of PC, FBA pre-task, and FBA post-task.

**Table 1.** Basic characteristics of the sample (*N* =18).

| | Mean | *SD* | Range | Standardized skewness | Standardized kurtosis | Kolmogorov-Smirnoff test[1] |
|---|---|---|---|---|---|---|
| Psychological control | 40.88 | 13.54 | 21 - 69 | .51 | -.69 | .200 |
| Satisfaction | 12.19* | 2.87 | 4 - 16 | -2.33 | 2.64 | .200 |
| Motivation | 17.88* | 3.56 | 11 - 25 | -.11 | .15 | .200 |
| Frontal asymmetry pre-task | .05 | .16 | -.20 - .43 | 1.18 | .56 | .200 |
| Frontal asymmetry post-task | -.06 | .14 | -.37 - .13 | -1.02 | -.20 | .200 |
| Change in Frontal asymmetry | -.11 | .14 | -.47 - .07 | -2.39 | 1.81 | .068 |

** Missing values of two participants were replaced by the mean sample score*

[1] $\alpha = .005$

In order to detect outliers, Z scores were computed for all variables. Outliers were defined as values deviating 3 or more standard deviations from the mean. According to this criterion, no univariate outliers were found.

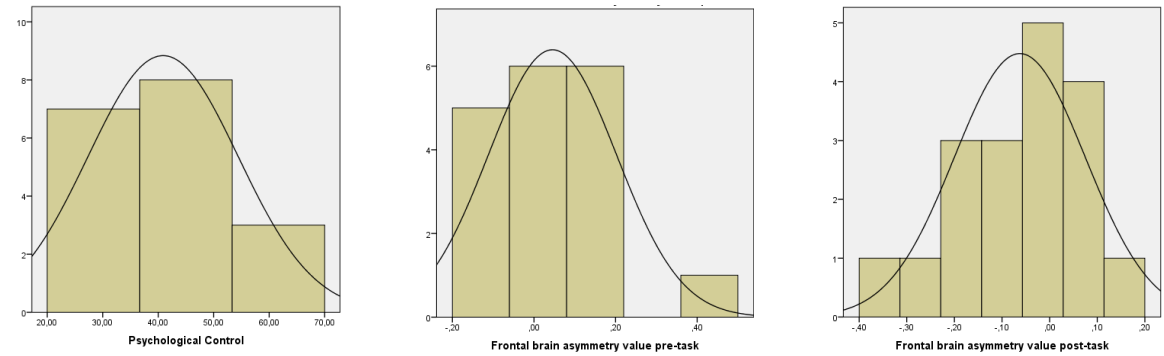

*Figure 4*. Histograms with normal curves of PC, FBA pre- task, and FBA post-task

### *3.2 Preliminary analysis.*

*Behavioural data*

Correlations between PC, Motivation, and Satisfaction were utilized to investigate the coherence between these measures. PC was not correlated with Satisfaction ($r$ = .00, $p$ = 1), but showed a trend toward a correlation with Motivation ($r$ = .46, $p$ = .06). The correlation between Satisfaction and Motivation was very weak and not significant ($r$ = .19, $p$ = .46). Changes in Motivation and Satisfaction were not related to each other.

*EEG data*

A repeated measures ANOVA was used to analyze whether Time (pre- or post-task) and Eyes (opened or closed) influenced FBA. A significant main effect was found for Time ($F$(1,17) = 11.26, $p$ = .00). This effect was moderate ($\eta^2$ = .40). No main effect was found for Eyes ($F$(1,17) = 3.57, $p$ = .14). The interaction effect of Time x Eyes was not significant either ($F$(1,17) = .83, $p$ = .37). This means that the asymmetry values did differ pre- and post task ($M_{\text{pre-task}}$= .5; $SD_{\text{pre-task}}$ = .16; $M_{\text{post-task}}$ = -.06, $SD_{\text{post-task}}$ = .14). The post-task values were more negative than pre-task. Thus, more right frontal activation was observed post-task than pre-task. As more positive values reflect approach motivation, participants showed more approach motivation pre-task and more withdrawal motivation post-task. Whether the eyes of the participant were opened or closed did not influence the FBA value. Therefore, the mean scores for Eyes open and Eyes closed were computed, resulting in one factor, being Time (pre-task or post-task).

### *3.3 Analyses*

*Correlational analyses*

Correlational analyses were performed to investigate whether PC predicted FBA. Figure 5 displays the scatter plots and correlation line between PC and both pre- and post-task

FBA. In both figures (A and B), higher values of PC seem related to lower FBA values. Thus, higher levels of PC suggest more withdrawal motivation.

To test this suggestion, the correlation between PC and pre-task FBA values were computed. This correlation was weak ($r$ = .27) and not significant ($p$ = .28). The correlation between PC and post-task FBA values was computed. The correlation again was weak ($r$ = .28) and not significant ($p$ = .26).

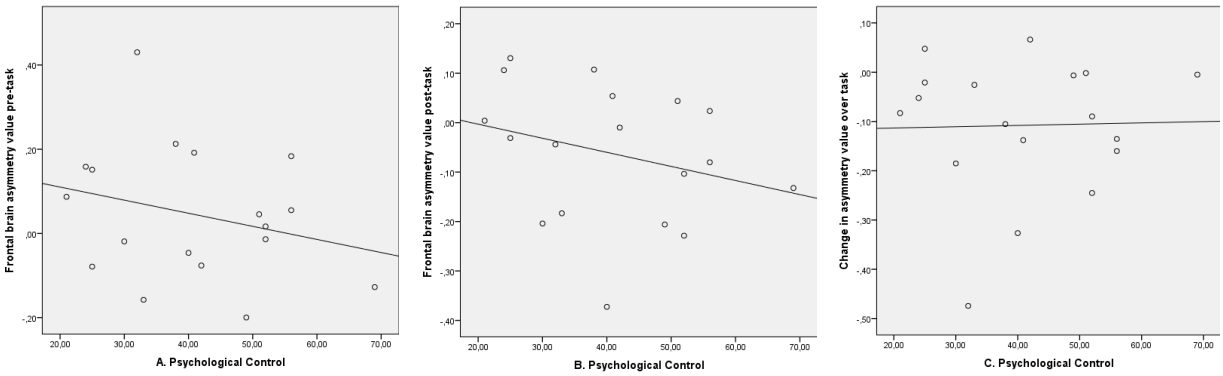


*Figure 5*. Scatter plots with correlation line for PC, asymmetry values pre- (A) and post-task (B), and change in asymmetry values during task (C).

As PC was no significant predictor of FBA values pre- or post task, it was investigated whether the change in FBA values could be predicted by PC. Therefore, the pre-task asymmetry values were subtracted from post-task asymmetry values, resulting in a new variable (Change in asymmetry values over task (cFBA)). In Figure 5, the scatter plot and correlation line between PC and cFBA are presented. The flat line suggests no relation between PC and cFBA. Thus, changes in PC seem unrelated to changes in FBA during the task.

To test this assumption, correlational analysis was performed with the cFBA. The correlation between PC and cFBA was very weak ($r$ = .03) and insignificant ($p$ = .92).

*Analyses of covariance*

A repeated measures analysis of covariance (ANCOVA) was utilized to investigate whether PC predicted FBA, when controlling for possible influences of Motivation and Satisfaction. In the repeated measures ANCOVA, FBA was the dependent variable, Time was the factor, and PC, Motivation and Satisfaction served as covariates.

As mentioned before, the effect of Time on FBA was significant ($F$(1,17) = 11.26, $p$ = .00) in the repeated measures ANOVA. However, when PC, Motivation, and Satisfaction

served as covariates (in the repeated measures ANCOVA), the significance disappeared ($F(1,14) = 2.67$, $p = .13$). No significant main effect was found for PC ($F(1,14) = 1.03$, $p = .33$), Motivation ($F(1,14) = 1.57$, $p = .23$) or Satisfaction ($F(1,14) = .07$, $p = .79$). The interaction effects of Time x PC ($F(1,14) = .10$), Time x Satisfaction ($F(1,14) = .04$) and Time x Motivation ($F(1,14) = .74$) were not significant either (all $p > .05$). Thus, PC did not predict FBA, when controlling for possible influences of Motivation and Satisfaction.

## 4. Discussion and conclusion

This thesis attempts to provide an answer to the question: how is perceived parental psychological control related to the approach-withdrawal motivation in a performance context in young adulthood? Therefore, it was investigated whether the frontal asymmetry values, serving as a measure for approach-withdrawal motivation, were related to parental use of psychological control in a performance context. Additionally, it was investigated how satisfaction with the performance, and motivation to perform well, possibly influenced the relation between psychological control and to the approach-withdrawal motivation.

Psychological control related (at trend level) to motivation, but not to satisfaction. Motivation and satisfaction did not relate to each other. Participants showed more approach motivation before the task, as frontal asymmetry scores were more positive. After the task, more withdrawal motivation was observed, reflected by more negative frontal asymmetry values. Psychological control did not predict the approach-withdrawal motivation before as well as after the task. Psychological control also did not predict the change from approach to withdrawal motivation in the performance context. Even when controlling for the potential influences of motivation and satisfaction, no influence of psychological control on approach and withdrawal motivation was found. Thus, no relation between psychological control and the young adults approach-withdrawal motivation in a performance context is found.

The relationship between psychological control and frontal brain asymmetry values, reflecting the approach-withdrawal motivation, is in line with our expectations. However, this relationship was not significant. The main explanation for the lack of significance is the poor statistical power, resulting from the small sample size. This sample size was small for two reasons: due to artefacts in the data, and resulting from selection criteria for the participants. Unfortunately, eight participants' data were not usable due to an incorrect fitted net, or insufficient artefact-free data. However, it is inevitable that artefacts occur in data (Luck, 2005). By increasing the sample size, the sample contains more participants with usable data and as a result the statistical power of the sample increases. Furthermore, only participants that performed the time-estimation task in the first lab session were included in the sample. By adding participants that performed this task in the second session, the sample would be larger. However, we wanted participants to be unaware of the performance element of the task, in order to control for learning effects. Therefore we did not include participants who performed this task in the second session.

Besides the sample size, other factors could have influenced the absence of a relation between psychological control and frontal brain asymmetry. Four factors that will be discussed here are: environmental factors, the construct of anxiety, participant's characteristics, and measurement characteristics.

The experiment environment can influence the approach-withdrawal motivation. In the present study, the motivation changed from approach-motivation preceding the task, to withdrawal motivation afterwards. Participants felt medium motivated to perform well, and medium satisfied with the performance. Thus, as the approach-withdrawal motivation is not influenced by the parental psychological control, motivation to perform well, and satisfaction with the performance, other environmental factor(s) influenced the change in motivational direction.

For example, Blackheart, Kline, Donohue, LaRowe, and Joiner (2000) measured participants mood and affect before and after applying the EEG net. They found participants felt significant less positive after applying the net, that could result in extra great right frontal activity. However, in the present sample, more approach motivation was found, instead of withdrawal motivation. It is possible that any possible influence of netting the participant on the approach-withdrawal motivation disappeared after performing the practice block. However, in the present experiment design, the EEG recording and measurement of frontal brain asymmetry started approximately fifteen minutes after the netting process. It is unclear if the affective responses that Blackheart and colleagues (2000) related to the netting process can still be observed, or that the experiment environment could have influenced the approach-withdrawal motivation.

Another factor that could have contributed to the insignificance of the relationship between approach-withdrawal motivation and psychological control can relate to described inconsistent findings in the field of anxiety related traits and relative right-frontal cortical activation in rest (Crost, Pauls, & Wacker, 2008). The main critique point applies to the construct of anxiety. This construct is important, as it was suggested to be one of the negative outcomes of the experience of psychological control (Barber, 1996). According to Crost and colleagues (2008), Coan and Allen (2003) find it unclear whether anxiety is related to the withdrawal construct. They argue that anxiety is associated with increases in attention and behavioural inhibition, but both behaviours do not inevitably lead to a withdrawal response. Additionally, two thought-related components of anxiety (anxious apprehension and anxious arousal) may be associated with frontal EEG asymmetry in a different way. Furthermore, Davidson, Marshall, Tomarken, and Henriques (2000) found that greater right frontal activity

was found in social phobics only in those context that were highly threatening for them. The sample used for this thesis did not contain social phobics, as they did meet some of the exclusion criteria. However, from the conclusion of Davidson and colleagues (2000), it can be derived that the performance context in our study was not threatening enough for our participants.

Regarding participant's characteristics, the sample consisted of mostly female undergraduate psychology students. For these participants, demographical data were not collected. This data could gain more insight in the question whether the students moved away from their parents, to live on their own, or still lived with their parents. This would raise the question, whether young adults would rate their parents perceived use of psychological control in the same manner if they would live at home, or live on their own. The logic behind this argument, is that once young adults physically move away from the parents, the relationship between parents and their child changes. Rearing practices are changing into more equality between the parents and young adult.

Additionally, the perceived use of parental psychological control was quite low in the present sample, consisting mostly of female undergraduate psychology students. A possible factor moderating the level of psychological control in the sample is the socio-economic status (SES) of these participants and their families. Socio-economic conditions influence both parental psychological distress and parenting behaviour and shape the stressful life events children are exposed to, as well as their social and learning opportunities (El-Sheikh, Hinnant, Kelly, & Erath, 2010). Masten and colleagues compared children with lower SES to controls and found that low SES children who experienced less positive parenting qualities and more stressful life events displayed more problematic behaviour at school (Masten, Garmezy, Tellegen, Pellegrini, Larkin & Larsen, 1988). Results from a different study suggested that higher SES may protect for the influence of maternal psychological control on symptoms of anxiety, depression, and sleep disturbances (El-Sheikh et al., 2010). Additionally, Pettit, Bates, and Dodge (1997) concluded that supportive parenting has a buffering effect on the impact of lower SES on problematic behaviour of children. As higher levels of SES are related to exposure of social and learning opportunities, it is possible that the participants (and their families) SES were higher. Therefore, SES could moderate the influence of parental psychological control on the approach-withdrawal motivation, resulting in an insignificant relation in the present thesis.

Furthermore, the educational background of the sample could influence the scores on the psychological control measures. As the participants are psychology students, it can be

expected that they value behaviour in a different way than participants who are not involved with human behaviour on a professional or educational level. As a result, they might rate the measurement on psychological control in a social accepted manner, instead of perceived experiences. This could be a possible explanation for the low perceived psychological control scores.

Regarding instrument features, the measures of psychological control reflected *perceived* psychological control from the students. As the perception of psychological control is important for the study, these measures actually attempt to reflect how the students felt their parents applied psychological control in their parenting style. Nevertheless, a broader observation of parenting behaviours could be implemented in the study. For example, parents could fill out a questionnaire themselves, that rated use of psychological control. Additionally, observations of parent-young adult behaviour could be included in equal studies. This suggestion was earlier on supported by Barber (1996), who states that the most valid way to measure psychological control are children's self reports. However, he suggested to determine if those controlling behaviours can be observed. To investigate this suggestion, a study was conducted in which an additional measure for psychological control was created (Psychological Control Scale – Observer Rating; PCS-OBS) that could be applied to the videotaped family problem-solving task (Fotgatch, 1989; Robin & Foster, 1989; in Barber, 1996). In a sample of 158 families (children's mean age = 12), the PCS-OBS was found to be an additional advantage in observing psychological control in parent-child interactions.

Like every other research, this research has some limitations. The main limitation is the small sample size. The initial sample size was decreased due to insufficient artefact free data or an incorrectly fitted net. Moreover, it was decided that missing data in paternal psychological control measures would be replaced by the mean sample score on that measure. This decision could raise discussion, as these participants probably did not have a father. In a bigger sample size, preferably another decision would be made to handle this specific missing data. However, to preserve the sample size, this decision was made. Nevertheless, the present sample was too small to have statistical power. It is recommended to replicate the study with a larger sample.

Also, this research included mostly female undergraduate participants. By investigating the SES of the participants, and expanding the sample with participants from lower SES, it could be expected that psychological control experiences will be more present. Other limitations concern collecting demographical data. Moreover, the construct of anxiety and its correlate in brain activity is still up to debate.

Suggestions for further research involve increasing the sample size, that has been discussed above. Another suggestion concerns the measurement of psychological control. As argued before, a questionnaire based on solely the participant's answer can be a good reflection of the perceived psychological control. Yet, there is no subjective observation and it remains unclear whether participants are influenced by social acceptable answers. Therefore it is suggested to add an objective observation of psychological control through either or both a) parental questionnaires and b) parent and young adult interaction task. During a problem solving task, for example preparing a short presentation together, the interaction between parent and young adult can be observed and rated. Combined with demographical data and SES measures, a broader measurement of psychological control can be assessed. The rates on perceived psychological control can be analyzed embedded in the broader array of measurements.

Altogether, this thesis has contributed to the debate of the influence of parenting patterns on child development. Although no influence of parental psychological control on the approach-withdrawal motivation was found in young adults, the results suggest an influence of the environment or environmental factors in the change of approach-withdrawal motivation. Based on the results of the present study, it supports the African expression at this point: raising a child is not merely limited to the influence of parenting practices on the child. However, what extra influences were contributing in the present study, should be investigated in further research.

**Appendix: Questionnaire items for Satisfaction and Motivation scales**

***1.1 Questionnaire items forming the Satisfaction scale***

| I think I have | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| *performed very well* | | | | *performed very bad* |
| I am | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *very satisfied with my performance* | | | | *very unsatisfied with my performance* |
| I have | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *performed much worse than I expected* | | | | *performed much better than I expected* |
| I think I | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *performed much worse than others* | | | | *performed much better than others* |

***1.2 Questionnaire items forming the Motivation scale***

| How important was it for you to perform well on the task? | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| *Very important* | | | | *Absolutely not important* |
| How motivated were you to earn points? | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *I wanted to earn points very badly* | | | | *I did not care whether I would earn points* |
| How motivated were you not to lose points? | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *I absolutely did not want to lose points* | | | | *I did not care whether I would lose points* |
| How motivated were you to react on time? | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *I absolutely did not want to react too late* | | | | *I did not care whether I would react on time or too late* |
| How badly did you want to be the best (earn the most points)? | | | | |
| 1 | 2 | 3 | 4 | 5 |
| *Very badly* | | | | *Not at all* |

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