

RUNNING HEAD: When I think of you

University Utrecht
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THESIS

When I think of you: choking and facilitating effects of close important others

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Abstract

To date barely any research has investigated the influence of important others on performance in pressure situations. It was hypothesized that important others can induce choking and facilitation depending on timing. Facilitation was expected when names of important others were primed before skill execution, whereas choking was expected when primed during skill execution. Two experiments were performed to test the hypotheses, using an arithmetic problem solving and a basketball shooting task. While important others were previously thought to facilitate performance, the present research suggests that they can also distract, and thereby harm performance. Moreover, a facilitating effect of close important others was found when individual differences are considered. The mechanism that is proposed is that important others induce distracting goal-directed behaviour, instead of task-directed behaviour. Findings and implications are discussed in the light of current literature and suggestions for future research are given.

Introduction

To excel, or to choke, that is the question, a question occasionally asked by spectators of professional sports and performances. Choking refers to performing more poorly than can be expected given one's skill level and history of achievements (Beilock & Carr, 2001). It is common in high pressure performance settings, especially in athletics, and academics. Besides, in the presence of audiences one can also achieve optimal performance (i.e. facilitation). This paper will focus on the choking and facilitating effects of close important others. This will be empirically tested in both a cognitive and a motor-skill task. Before the experiments are laid out, a brief introduction on the history of choking research and their two most important theories in choking literature are covered, namely the distraction and the self-focus theory. Further on, social insights on the effect of audiences and close important others are related to performance.

During the last century the link between performance and pressure was empirically investigated. Mainly, social psychology has contributed evidence for the link between pressure and performance. A curvilinear inverted-U relation between pressure and performance was proposed (Baumeister & Showers, 1986). Only optimal levels of pressure are proposed to result in successful performance. Under low pressure conditions, people are said to perform worse because arousal is low, and the beneficial energizing effect is not present. Arousal over stimulates in high pressure conditions and thereby decreases attention to performing the task at hand. The second part of the inverted-U relation between pressure and performance resembles the mechanism that is proposed to underlie choking. However, the exact psychological mechanism by which pressure hinders attention, memory or problem-solving is not clear. Either choking is the result of a heightened self-focus, or a lack of attention (Baumeister & Showers, 1986).

Distraction theory takes the position that choking in high pressure situations is due to lack of attention to performance. In high pressure situations it is believed that pressure triggers a shift in attentional focus to irrelevant cues, such as worries about failure or success (Beilock et al., 2001). This distraction results in suboptimal performance, because insufficient

attention is paid to task relevant cues (Beilock, Kulp, Holt & Carr, 2004). The battle for working memory resources between relevant and irrelevant cues harms the overall performance, because attention can only be invested in one at a time (Beilock et al., 2004).

Self-focus theory or alternatively named the explicit monitoring theory proposes a different mechanism for choking. Focus on step-by-step well learned skills is thought to disrupt the execution of a skill (Beilock, Carr, MacMahon, & Starkes, 2002; Masters, 1992). Continuous online control becomes counterproductive in high demanding situations, resulting in choking. Continuous online monitoring was found to be more disruptive than performing a dual task in golf putting, especially for well-learned golfers (Beilock et al, 2002). This finding was confirmed in a study by Gray (2004). A simulated baseball batting task was set up to compare effects of attending to irrelevant cues (i.e. distraction) and attending to step-by-step skill execution (i.e. explicit monitoring) on performance. The effects were evaluated between novice and expert batters. Results indicated that novice batters were hindered by attending to irrelevant cues, but expert batters were not. However, in the explicit monitoring task, expert batters made significant more errors, but novice batters did not (Gray, 2004). These findings underlie that focus of attention varies a great deal across and within performers with different levels of skill.

To date, most empirical evidence supports the explicit monitoring theory (Beilock et al, 2004; Beilock et al. 2001; Gray, 2004). However, both theories are validated. Beilock, Kulp, Holt and Carr (2004) also found evidence for the distraction theory. Choking under pressure occurred in a cognitive task, only when one is barely trained in performing the task. When one is well practiced in a task evidence is found for the explicit monitoring theory (Beilock et al., 2004). In complex and unfamiliar tasks, a higher level of pressure hinders performance because cognitive processes like attention and memory can not withstand higher levels of stress. In particular, a link was found between higher levels of stress and the synthesis of corticoids, that inhibit the hippocampus, and thereby memory (Lupien & Lupage, 2001). Besides stress, anxiety was found to be related to choking (Otten, 2009; Vickers & Williams, 2007; Wang, Marchant, Morris & Gibbs, 2004).

What was missing in present choking research is the differentiation between various pressure sources. In choking research, pressure manipulations (e.g. time constraints, incentives, punishment, audience, self-awareness, and important others) are frequently used additively. Therefore, the influence of the idiosyncratic manipulation is unknown. This research uses the influence of important others as a social environmental pressure source.

Generally, it is known that the social environment can lay pressure upon the individual. Zajonc's (1965) research on the influence of audiences on performance is a classic example. Zajonc (1965) found that the sheer presence of an audience can inflict failure. However, this failure mainly depends on the difficulty of the task, and how well-learned the skill is for completing the task (Zajonc, 1965). Moreover, a study by Wright, Jackson, Christie & McGuire (1991) found evidence for the choke inducing influence of audiences. Results indicated that athletes who perform in front of supportive audiences perform less successfully than visiting players when they have to chance to capture a championship (Wright et al., 1991). This home-court disadvantage effect was replicated in another study by Wright & Voyer (1995). Audience support magnifies performance pressure by inducing performers to adopt a prevention focus (i.e. avoid failure) rather than a promotion focus (i.e. seek success, Wallace, Baumeister, & Vohs, 2005). In addition, experimental research found that choking and facilitation occur when promotion and prevention foci are induced (Markman, Maddox & Worthy, 2006; Worthy, Markman & Maddox, 2009). Moreover, avoiding failure is more choke inducing than trying to attain success (Wallace et al., 2005). Audiences may lead performers towards self-focus and over cautiousness. This heightened self-focus disrupts the automatic execution of the skill (Wallace et al., 2005). Thus, the presence of an audience has a negative effect on performance, even when audiences are generally supportive.

However, according to Shah (2003a), audiences in the form of close important others, always have an enhancing influence on performance. Theoretically, close important others are thought to be tied to one's self-concept and make associated goals more salient (Fitzsimons & Bargh, 2003). The activation of these goals interferes with the ongoing goals, and hinders

performance (Shah, 2003a). Moreover, these goals interfere with the conscious goal pursuit when one strongly associates this significant other with the pursuit of an unrelated goal (Shah, 2003). In the same study, close important others facilitate performance when one believes that performance on a first task (i.e. functional creativity) facilitates performance on a unrelated second task (i.e. analytic reasoning). Furthermore, a previous study by Fitzsimons et al. (2003) found that goal-directed behaviour is activated, even in the physical absence of important others. Another factor that moderates performance is relational closeness of close important others. Commitment, accessibility and the pursuit of goals was greater when relational distance was reported as being high versus low (Shah, 2003a). Summarizing, present findings seem contradictory. On the one hand, audiences can induce choking. On the others, audiences in the form of close important others have a facilitating effect. The main question that needs to be answered is: are close others beneficial or harmful to performance? This study is new in that is investigates the influence of important others on performance. To date no such experimental research exists. Recent research on reward processing found that the conscious processing of rewards can hinder performance (Zedelius, Veling & Aarts, 2011). It may be that the same happens when important others are used instead of rewards. Crucial factors that determine the effect of important others are timing and activation. The main dimension that differentiates choking from facilitation is timing. First, when working memory is in high demand, and social information is activated during the skill execution, it will lead to distraction and results in suboptimal performance. Second, when social information is activated before skill execution, it will lead to a motivational boost and result in optimal performance. In this research motivation and pressure were increased through a mild and simple cover story.

In the present study anxiety and self-regulatory efficiency are admitted as possible moderators of choking and facilitation. Previous research indicates that somatic trait anxiety is a significant predictor of choking under pressure (Wang et al., 2004). In addition, anxiety was found to reduce attentional control in a sports related task (Wilson, 2008). Besides, previous research found that in high pressure situations, inefficient self-regulators showed

choking (Ferrari, 2001). Moreover, another possible moderator is skill acquisition. Lam, Maxwell and Masters (2009) found that people who learned the basketball skill in an explicit manner (i.e. step-by-step), were more susceptible to choking than people who learned the skill in an implicit manner (i.e. intuitively), when pressure was manipulated as being high. This study will investigate both choking and facilitation, and try to fill the knowledge gap about the influence of important others on performance. Because of the contradictory predictions that result from choking and facilitation literature, this study will research two main hypotheses. The first hypothesis, when people are exposed to names of important others during skill execution, performance will be suboptimal in comparison to the exposure to names of irrelevant others (i.e. choking). The second hypothesis, when people are exposed to names of important others before skill execution, performance will be better in comparison to the exposure of names of irrelevant others (i.e. facilitation). The first experiment will test the two hypotheses with a mental arithmetic problem solving task (i.e. a task that uses working memory capacity), and the second experiment will test this in a basketball shooting task (i.e. a task that uses gross motor-skills). Instructions by Bargh & Chartrand (2000) were used to develop the research paradigm, and before both experiments are performed a pilot experiment was done. This pilot experiment was performed to calibrate the arithmetic problem solving task that was used.

Experiment 1

Method

Participants and design

Fifty-eight participants took part in the experiment (gender and age of the participants was not recorded in this experiment). Participants were recruited on campus, and a fee of four euro's was given in exchange for participation. A 3 (condition: relevant names during vs. relevant names before vs. control) within-subjects design was adopted.

Materials and procedure

Participants worked on arithmetic problem tasks that were presented on a computer screen. At the start of the experiment, participants had to come up with four names of

important others and had to define the relationship to these people (e.g. mother, best friend). People were told to come up with names of important others that: took a central part in their social life, one cares about and who find it important to perform well. These four names functioned as the relevant names in the experiment. Further on, participants had to identify eight names of people with whom they were not related. These eight names came from a pool of fifty-six first names (twenty-eight male and twenty-eight female names, e.g. 'Maarten' or 'Esther'). The criteria to be included in this pool were; the names had to be common (ranging in incidence between 0,9% and 0,1% of the Dutch population in 2006 (Meertens Instituut, 2010). Another criterion was; the number of people born in 1990 must exceed 100 incidences. This was done to avoid the use of names that became recently unpopular. The eight selected names functioned as the irrelevant names. Randomly sequenced non-words (six consonant letters, starting with a capped letter) were used as filler stimuli.

Besides the factors that functioned in the main design, additional factors were admitted in this experiment to control for individual differences. These factors were: anxiety, math grade, type of math, subjective pressure, credibility, effort, and importance to perform well on intelligence related tasks. Trait anxiety was assessed using a Dutch version of the State-Trait Anxiety Inventory (STAI, Spielberger, Gorsuch & Lushene, 1970), consisting of twenty items. For example, "I feel worried" had to be rated on a four point scale ranging from almost never to always. To control for the level of mental arithmetic problem-solving skill, subjects had to indicate the final math-grade they received in secondary school and which kind of mathematics they had studied ('type A' or 'type B'). Type A being statistics oriented math and type B being abstract reasoning math. In addition, subjective pressure, credibility, effort, and importance to perform well were all rated on seven-point Likert scales ranging from not at all to a lot.

A cover story was set up to increase motivation to perform well. The experiment was framed as being diagnostic of ones general intelligence and was formulated as follows: "*The arithmetic problem task you are going to perform is a validated part of an intelligence test. People who perform well on this task are said to be more intelligent than people who perform*

less well on this task. The results of this task are indicative of school performance and future career success”. Participants had to indicate on a scale ranging from 1-7 how credible this cover story was. This was done after all trials were completed. Mean credibility was 4.02 ($SD = 1.8$).

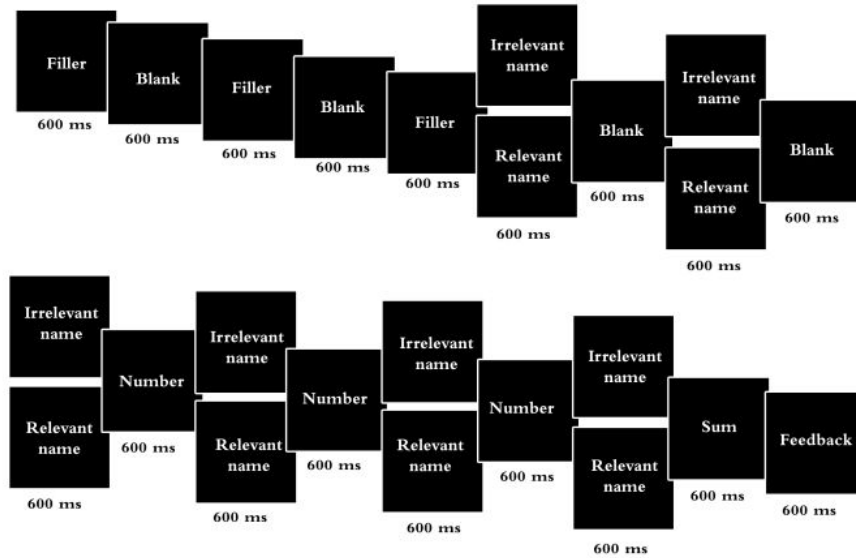


Figure 1: The course of an experimental trial (from left to right, top to bottom)

Trials

The experiment consisted of five practice and sixty experimental trials. Trials were randomly ordered and counterbalanced between conditions. Sixty experimental trials were used to compute reaction times, accuracy, and accuracy within a restrained response window. The course of a single trial is portrayed in Figure 1. Arithmetic problems consisted of three idiosyncratic numbers, which were displayed one at a time. Each arithmetic problem included one carry over operation (the sum of all three last digits must be equal to or larger than 11 and be equal to or smaller than 19). Numbers and primes were presented supraliminal for 600 milliseconds, and interchanged with blank screens for 600 milliseconds, see Figure 1. At the end of a trial, participants had to fill in the sum of the three numbers. A time constrain was set to six seconds, because results from a pilot session indicated that participants focused on

accuracy instead of speed. Feedback was given on correctness and adequateness of the response time. When people responded beyond six seconds, it was announced that one was too slow. The main goal that was asked of participants was to count the three numbers that were primed, and calculate the aggregate

Results

Reaction times

Only reaction times for accurate responses were analyzed. Values greater than three standard deviations from the participant's mean were seen as outliers and were discarded from the analysis. In addition, participant's who deviated three standard deviations from the mean reaction time were considered as outliers and omitted from analysis. This was the case for one participant. A repeated measures ANOVA was performed to test for the main effect of condition on reaction times. Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2(2) = 11.1, p = .004$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.85$). A marginal significant main effect of condition on reaction times was found, $F(1.69, 94.7) = 2.51, p = .10$. When looked at the planned comparisons two out of three approached marginal significance. Reaction times were marginally higher when important others were primed during versus before arithmetic problem solving ($p = .06$, see Figure 2), and reaction times were marginally higher when names of important others were primed during versus control, $p = .15$, see Figure 2. Thus, overall reaction times were slower when names of important others were primed during arithmetic problem solving. Therefore it is said that choking did occur.

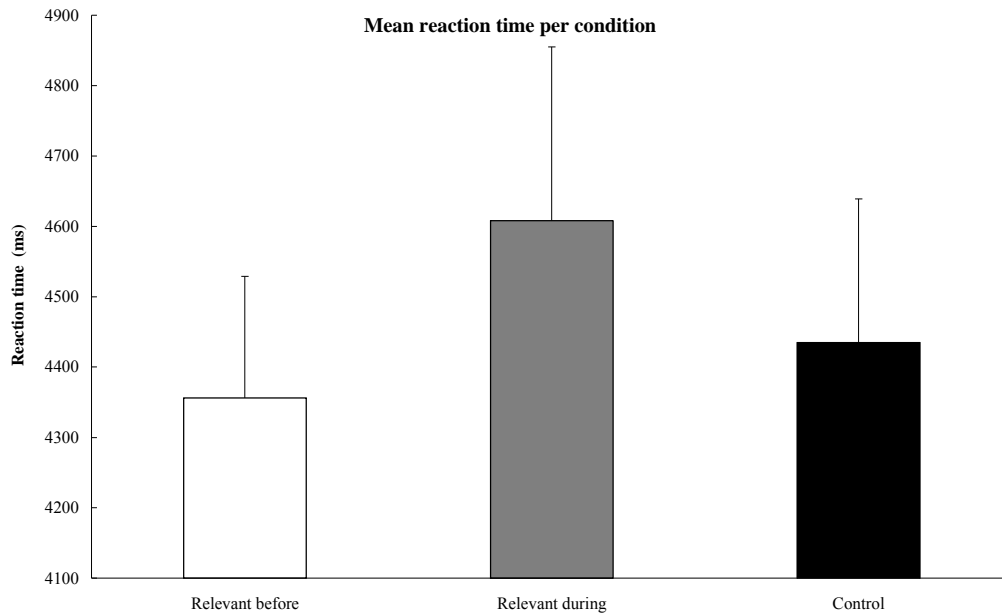


Figure 2: Mean reaction time per condition

Accuracy

Accuracy on trials from which the reaction time deviated than three standard deviations from mean reaction per participant, were considered as outliers and therefore discarded from the next set of analysis. No significant main effect of condition was found on accuracy, $F(2, 112) = .23, p = .80$. All planned comparisons were non-significant, $p > .55$.

Accuracy within restrained time window

Accuracy scores within a time window of 6000 ms were used as the dependent measure. Accuracy scores on trials from which the reaction time was greater than three standard deviations of the participant, were regarded as outliers and were discarded from the next set of analysis. No significant main effect of condition on the accuracy within the restrained time window was found, $F(2, 112) .53, p = .59$. All planned comparisons were non-significant, $p's > .40$.

Speed \times accuracy

Overall, accuracy was found to be significantly negative correlated with reaction times, $r(57) = -.31, p = .02$. The relation was as follows: the higher the accuracy, the shorter reaction time.

The role of individual differences

The next sets of analyses were performed to test whether individual differences interacted with the main design. All factors were individually interacted with the main design, using repeated measures ANOVA. All moderator variables were transformed into standardized scores. In all analysis above average standardized scores of the moderator variable (i.e. plus one standard deviation above the mean) were compared to below average standardized scores (i.e. minus one standard deviation from the mean). Planned comparisons and figures are only given, when the interaction effects proved to be significantly interacted with the main design or approached significance. Mauchly's tests indicated that the assumption of sphericity had been violated when reaction times was the dependent variable. Therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity. Adjusted degrees of freedom and adjusted p -values are given where the assumption of sphericity had been violated.

Anxiety

First, no significant main effects of anxiety were found on reaction times, $F(1, 55) = .34, p = .56$, accuracy, $F(1, 55) = .29, p = .59$, and accuracy within a restrained time window, $F(1, 55) = .46, p = .50$. Secondly, the main effects were qualified by non-significant interactions between anxiety and condition on reaction times, $F(1.69, 92.7) = .18, p = .80$, accuracy, $F(2, 110) = .30, p = .74$, and accuracy within a restrained time window $F(2, 110) = .18, p = .84$. Thus, no effects of anxiety were found on reaction times, accuracy and accuracy within a restrained time window.

Subjective pressure

First, main effects of subjective pressure on reaction times were partially significant. Subjective pressure on reaction times, $F(1, 55) = 3.57, p = .06$, accuracy, $F(1, 55) = .30, p = .59$, and accuracy within a restrained time window, $F(1, 55) = 1.72, p = .20$. The group that experienced above mean pressure ($M = 4928$ ms, $SD = 1642$ ms) were much slower than the group that experience below media pressure ($M = 3954$ ms, $SD = 1176$ ms), $t(55) = 2.55, p = .01$. Second, the main effects were qualified by non-significant interactions between condition

and subjective pressure on reaction times, $F(1.68, 92.5) = .66, p = .50$, accuracy, $F(2, 110) = 1.28, p = .28$, and accuracy within a restrained time window, $F(2, 110) = 1.21, p = .30$. Thus, overall subjects who experienced high pressure were much slower, and thus show more choking than subjects who experiences low pressure.

Math grade

First, main effects of math grade were non-significant. Math grade on reaction times, $F(1, 55) = .21, p = .65$, accuracy, $F(1, 55) = 2.99, p = .09$, and accuracy within a restrained time window, $F(1, 55) = 2.25, p = .14$. Second, the main effects were qualified by a non-significant interaction between math grade and condition on reaction times, $F(1.69, 93.0) = .05, p = .93$, marginally significant interaction between math grade and condition on accuracy, $F(2, 112) = 2.21, p = .15$, see Figure 3. The interaction showed significant differences only when math grade was above average. When names of important others were primed before arithmetic means ($M = 64.6\%$) accuracy was higher in comparison to when names of important others were primed during arithmetic means ($M = 59.8\%$, $p = .09$, see Figure 3). No significant differences were found between the other conditions (relevant during with control: $p = .45$, and relevant before with control: $p = .33$). In the group which reported below average math grade no differences between conditions emerged, $p > .31$. Lastly, no interaction between math grade and condition on accuracy within the restrained time window was found, $F(1.80, 99.0) = 1.67, p = .20$. Thus, those that achieved above average math grades showed a slight facilitating effect of close important others.

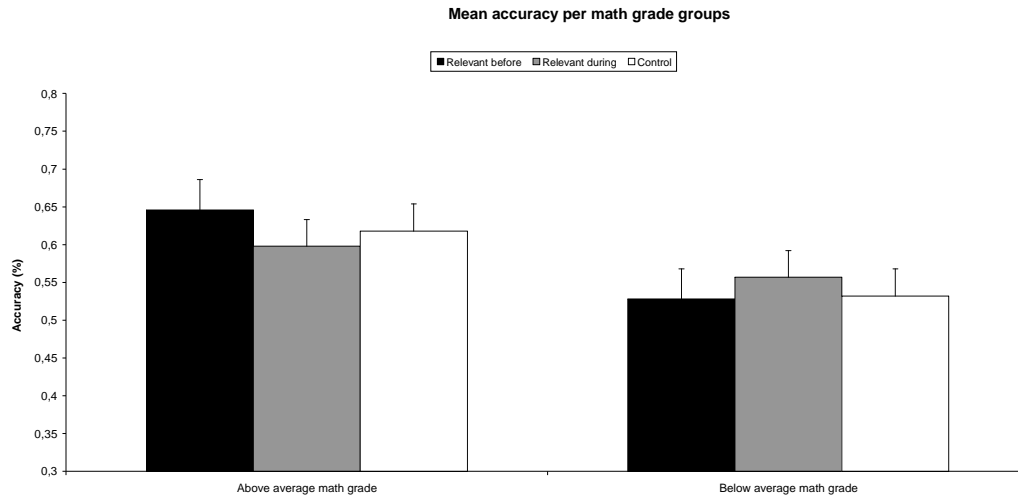


Figure 3: Mean accuracy per math grade groups (above versus below average math grade)

Type of math

First, all main effects of math type were non-significant. Type of math on reaction times, $F(1, 55) = 1.01, p = .32$, accuracy, $F(2, 110) = .48, p = .49$, and accuracy within a restrained time window, $F(1, 55) = .08, p = .78$. Secondly, the main effects of math type were qualified by non-significant interactions between math type and condition on reaction times, $F(1.70, 93.5) = 1.83, p = .17$, accuracy, $F(2, 110) = 1.32, p = .27$, and accuracy within a restrained time window, $F(1.80, 99.0) = 1.56, p = .22$. However, when both groups were analyzed separately a different pattern emerged (see Figure 4). In the group that studied statistics oriented math (i.e. type A) no main effect of condition on reaction times was found, $F(2, 56) = .55, p = .58$. However, in the group that studied abstract oriented math a marginal significant main effect of condition on reaction times emerged, $F(1.58, 42.5) = 2.76, p = .09$, see Figure 4. All planned comparisons in the group that studied statistics oriented math yielded non-significant results, p 's $> .30$, see Figure 4. In the group that studied abstract oriented math, people were marginally slower when names of important others were presented during arithmetic problem solving in comparison to before, $p = .08$, see Figure 4, and the control condition, $p = .07$, see Figure 4. It can be concluded that people who studied abstract oriented math suffer more from choking than people who study statistics oriented math.

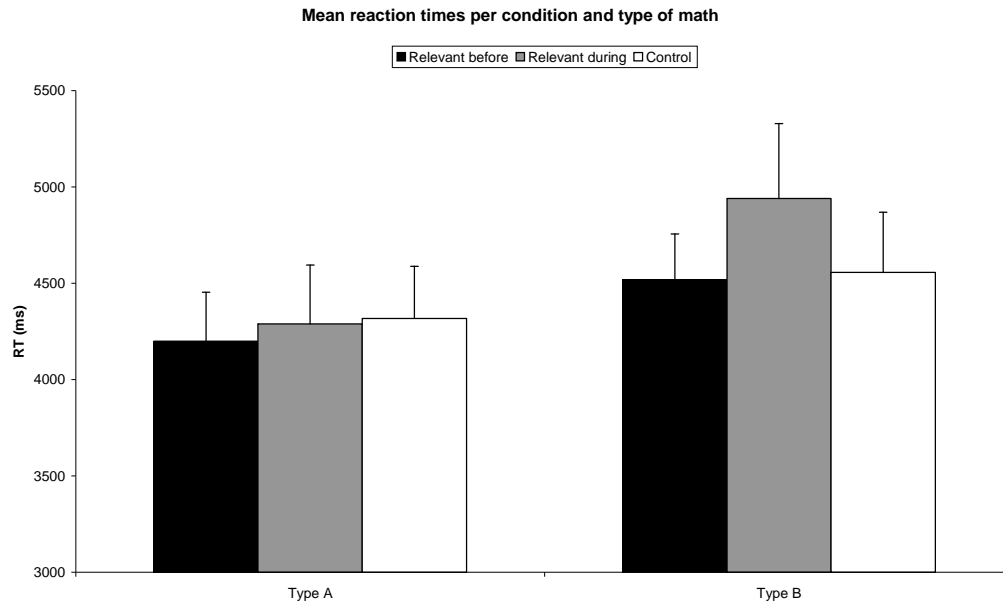


Figure 4: Mean reaction times per condition and math type

Credibility

Two additional participants, who deviated three standard deviations from mean credibility, were considered as outliers and discarded from the next set of analysis.

First, main effects of credibility proved to be non-significant. Credibility on reaction times, $F(1, 53) = .79, p = .38$, accuracy, $F(1, 53) = .56, p = .46$, and accuracy within a restrained time window, $F(1, 53) = 1.14, p = .29$. Second, the main effect of credibility was qualified by partially significant interactions. Between credibility and condition on reaction times, $F(1.75, 92.6) = .95, p = .38$, accuracy, $F(2, 106) = 3.69, p = .03$, and accuracy within a restrained time window, $F(2, 106) = 1.20, p = .31$. The pattern that emerged from the significant interaction between credibility and condition is as follows. In the group that highly believed that the arithmetic problem solving task was indicative of general intelligence, accuracy was significantly higher when names of important others were primed before arithmetic means in comparison to the control condition, $p = .03$, see Figure 5. The other planned comparisons were non significant, p 's $> .19$. However, when people did not believe that the task was indicative of intelligence, no differences emerged, p 's $> .16$, see Figure 5. Thus, facilitation (i.e. relative improvement in accuracy) only occurred when one believes that the arithmetic problem solving task is indicative of intelligence.

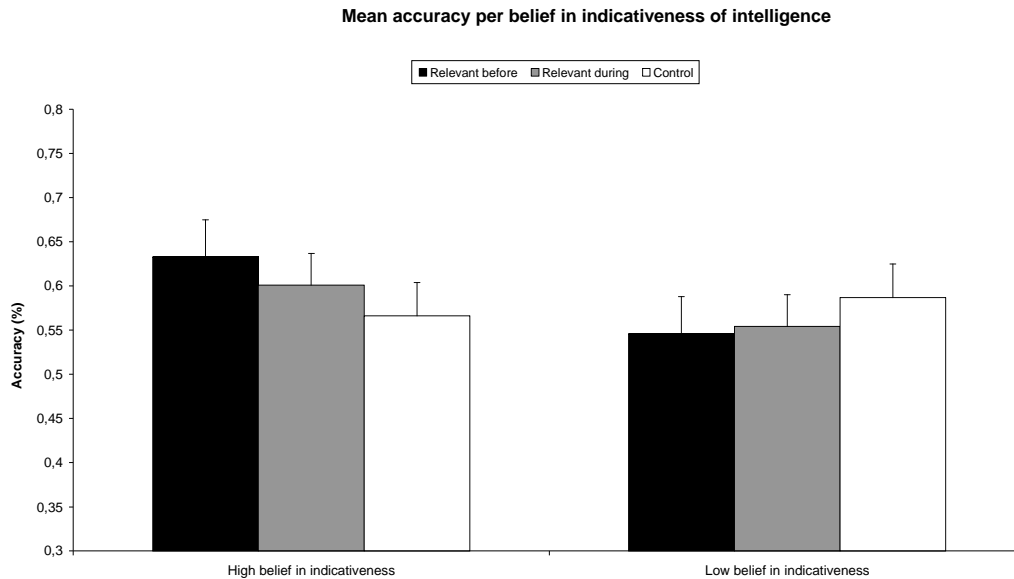


Figure 5: Mean accuracy per belief in indicativeness of intelligence

Effort

Two additional participants who deviated three standard deviations from the group mean were considered as outliers and removed from the next set of analyses. First, the main effects of effort on reaction times, $F(1, 53) = .22, p = .64$, accuracy, $F(1, 53) = 4.63, p = .04$, and accuracy within a restrained time window, $F(1, 53) = 3.29, p = .08$. Mean split was used to form two groups on the basis of effort scores, people who put a lot of effort ($N = 38$) and people who did no effort to perform well ($N = 17$). People who put a lot of effort into performing well ($M = 61.4\%, SD = 17.7\%$), were more accurate than participants who put no effort into performing well ($M = 50.3\%, SD = 17.6\%$), $t(53) = 2.16, p = .04$. This was also found when accuracy within a restrained time window was the dependent variable, a lot of effort ($M = 52.8\%, SD = 19.1\%$) versus no effort ($M = 41.7\%, SD = 20.4\%$), $t(53) = 1.96, p = .06$. Second, the main effects of effort were qualified by non-significant interactions between effort and condition on reaction times, $F(1.78, 94.1) = .14, p = .85$, accuracy, $F(2, 106) = .77, p = .47$, and accuracy within a restrained time window, $F(1.80, 95.4) = .77, p = .46$. Thus, those that put more effort into performing well were more accurate than those that put little effort into performing well. No effects of effort and condition were found on any of the dependent variables.

Importance to perform well on intelligence related tasks

First, all main effects of importance were non-significant. Importance on reaction times, $F(1, 55) = .005, p = .95$, accuracy, $F(1, 55) = 1.77, p = .19$, and accuracy within a restrained time window, $F(1, 55) = .90, p = .35$. Second, the interaction effects between importance and condition showed partial significant results. Importance and condition on reaction times, $F(1.69, 92.7) = .29, p = .71$, accuracy, $F(2, 110) = 1.35, p = .26$, and accuracy within a restrained time window, $F(2, 110) = 2.45, p = .09$. In the group that found it important to perform well on tasks that are related to intelligence, accuracy within a restrained time window was marginally better when names of important others were primed before arithmetic problem solving in comparison to before ($p = .10$) and the control condition ($p = .05$, see Figure 6). However this pattern was not found in the group of participants who found it unimportant to perform well on tasks that are related to intelligence (all planned comparisons: $p's > .40$). Thus, only when one finds it important to perform well, a facilitating effect occurred.

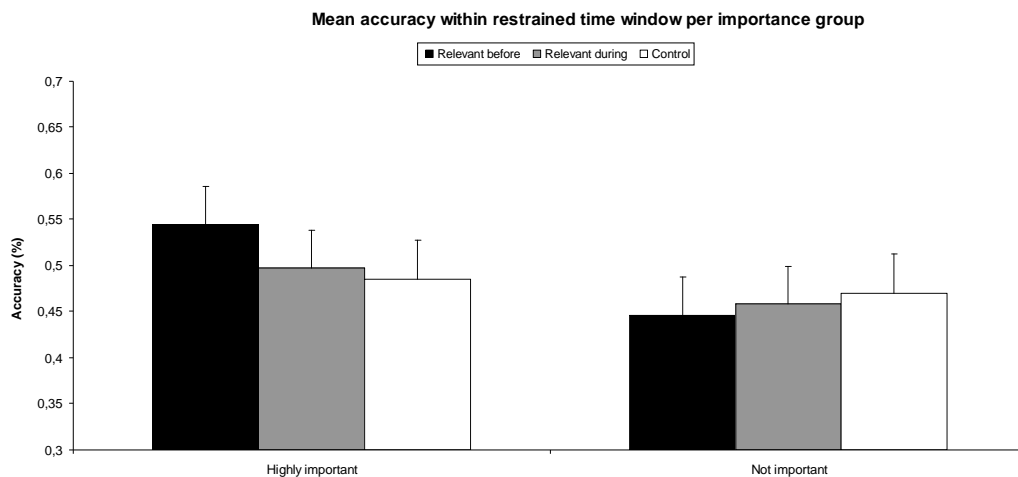


Figure 6: Mean accuracy within restrained time window per importance group

Discussion

The present data yielded evidence that the priming of names of important others can induce choking and have a facilitating effect, but that the effects are in part due to individual differences. Overall, as expected participants took marginally more time to come to a correct

answer when names of important others were primed during arithmetic problem solving in comparison to the control condition. Slower means worse, and therefore it is said that choking did occur. The reason behind this effect is: in high demanding and stressful situations (i.e. high working memory demand), one needs more time and processing power to come to a correct answer. An accurate response is the main goal, and to compensate for highly taxed working memory (i.e. through distracting stimuli), one is to trade speed for accuracy. On the other hand, neither choking nor facilitating effects of close important others were found on accuracy measures. However, evidence for choking was found in subjects who experienced high levels of pressure and those that studied abstract oriented math. Subjects who experienced high levels of pressure were much slower than subjects who experienced low pressure levels. In addition, people who study abstract math suffer more from choking than people who study statistics oriented math. These results are in line with choking literature. It is proposed that people who study abstract oriented math have better reasoning abilities, and thus have better working memory capacity than people who study statistics oriented math. Kyllonen and Christal (1990) found that reasoning ability is highly correlated with working memory capacity. On tasks where working memory is in high demand, individuals who are most likely to fail under pressure are those high in working memory capacity (Gimmig, Huguet, Caverni & Cury, 2006). In addition, it was also found that people who are most motivated to excel, showed relatively more choking than people who were not motivated to excel (Masters et al., 1992).

Evidence was also found for the facilitating effect of close important others when one attained above average math grade in secondary school, one believes that arithmetic problem solving is indicative of intelligence, and one finds it important to perform well. Although marginal significant, people who attained high math grades were more accurate than people with low math grades. The idea behind this is that people who attain high math grades have better working memory capacity than people who attain low math grades. Facilitating effects of important others only showed when math grade were above average. When one attains high math grades and one finds it important to perform well, it is thought that the additional

facilitating effect of important others, results in better performance. When one attains low math grades, and one finds it is not important to perform well, overall motivation already low, and the additional facilitating effect of important other is not seen. This explanation is backed by the finding that those who indicated above average effort to perform well, were more accurate than those that put little effort into performing well.

The next experiment will try to replicate and extend the findings in experiment 1. Besides, we will try to find evidence for choking and facilitation on a gross motor-skill. It is interesting to see if findings by Zedelius et al. (2011), that conscious processing of rewards interfere with performance, can be extended to a more real-life setting (i.e. basketball shooting task). Close important others instead of rewards were used to activate goal-directed behaviour (i.e. optimal performance and high accuracy). It was hypothesized that close important others can induce choking and have a facilitating effect. We propose that accuracy will be better when names of important others are presented before shooting compared to during shooting and control. In addition, we propose that accuracy will be worse when names of important others are presented during compared to before shooting and control. In experiment 2 a task was sought that also uses executive attention and has a motor-skill component. Therefore, a basketball shooting task was used. Basketball shooting uses fine and gross-motor skills, and one needs moderately high levels of executive attention (Wang, Marchant, Morris & Gibbs, 2004). Research by Engle (2002) found that on dual-tasks the main resource that is used is executive attention (i.e. working memory capacity).

Experiment 2

Experiment 2 utilized a large part of the design used in the first experiment. However, adaptations were made to compensate for practical matters. The main differences between experiment 1 and 2 are twofold. First, to increase difficulty of the task, two positions were chosen to shoot from. It is known that taking shots from the same position produces a learning effect, especially with many (i.e. 40 trials) consecutive trials (Lam et al., 2009). Second, the manner in which, and the number of presented primes were adapted to fit the experiment. In experiment 1 primes were presented visually, in experiment 2 stimuli were presented orally.

In experiment 2, two primes per trial were presented in contrast to six primes per trial in experiment 1. Besides differences, an additional hypothesis was submitted to the second experiment. It was expected that accuracy on the difficult second position (i.e. 45° angle) is lower than on the easier first position (i.e. straight). Secondly, people who shot from the difficult position when names of important others were presented would perform worse than when they were presented with names of irrelevant others. It is assumed that shooting from a difficult position is more demanding on working memory capacity than shooting from an easy position.

Method

Participants and design

Fifteen participants (nine female) with a mean age of 23.3 years ($SD = 1.8$) took part in the experiment. Participants were recruited through the following media: internet advertising, social media, posters, and direct contact. Participation was voluntarily as no fees were available for this part of the research. The main criterion to participate in the research was adequate basketball experience. First stated as at least five years of experience, but later adjusted to include more participants. Mean years of basketball experience was 6.9 years ($SD = 4.7$). A 3 (condition: relevant names before, relevant names during, and control) \times 2 (court position: easy (straight) versus difficult (45° angle, see appendix B)) within-subjects design was used.

Task and procedure

Basketball free throw shooting was the task. Free throw shooting is a skill that uses hand-eye coordination, gross, and fine motor skills. It requires moderately high executive attention, and moderate arousal levels (Wang et al., 2004). The first part of the research consisted of filling in a questionnaire composing of questions about basketball experience, the social environment, and demographics (e.g. the Dutch translation of 'how long do you already play basketball?'). Participants had to indicate which four people were most important to them. It was stated that participants had to choose names on the following criteria: people who are a central part of your social life, you care about and who find it important to perform

well and get good results (see appendix A). Subsequently, participants had to indicate how close they felt to these four important people. The aggregate score of the closeness was used as an indicator of relational distance. In addition, eight names of people participants were not familiar with had to be chosen. These names came from the same pool of names that were used in experiment 1. Both the names of important others and irrelevant names were used as the priming stimuli for this behavioural experiment. Names were recorded using a real life voice.. The second part of the study consisted of testing on location. Three different locations were used; the main difference between these locations was that two were outside, and one indoor basketball court. A personal laptop computer was used to run the experiment, and a wireless headphone was used to present the auditory stimuli. Testing sessions included six practice trials and thirty-six experimental trials.

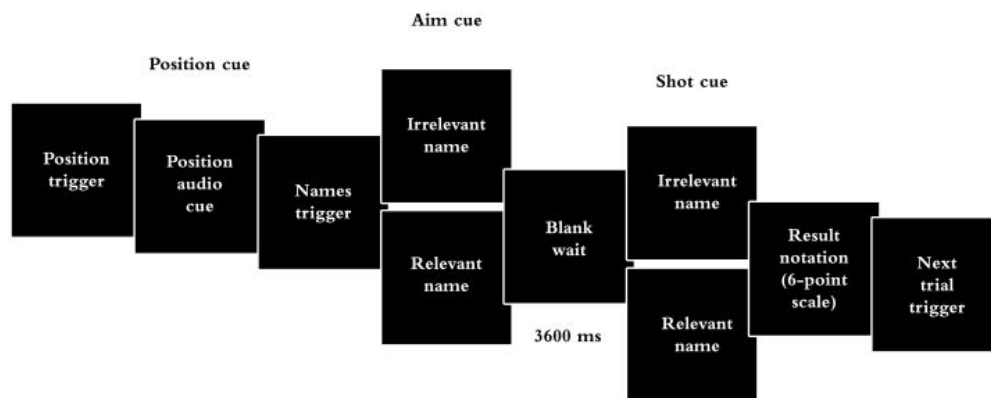


Figure 7: The course of an experimental trial (chronologically from left to right)

Trial

The beginning of a trial was triggered by the experimenter (see Figure 7). The first audio fragment always conveyed the position from which the participant had to shoot (i.e. a spoken ‘one’ for the straight ahead position and a ‘two’ for the 45° angle position). After both feet of the participant were stationed on position, the experimenter triggered the next set of audio fragments. It was said that participants had to prepare for shooting when they heard the first name, and immediately shoot when they heard the second name. The gap between

priming of the first and second name was held constant across all trials at 3600 milliseconds. The trial ended when the experimenter rated the result on a six point scale. This six point scale rates the result of a shot on scale ranging from complete miss (1) to all net (6) (Hardy & Parfitt, 1991). When a clean basket was made, it was coded as 5, 4 = rim and in, 3 = backboard and in, 2 = rim and out, 1 = backboard and out, and 0 = complete miss. After the experiment participants had to fill in the Dutch translation of the Action State Orientation Scale (see Appendix C, ACS-90, Kuhl, 1991), and some additional questions to check for: expected hypotheses, research purpose, awareness, credibility, effort, and subjective pressure. Participants were debriefed about the nature of this experiment, and were thanked for participation.

Materials

A standard size seven basketball was used during all testing sessions. Two equidistant spots (i.e. at 5.50 metres from the basket) were used to shoot from. The free-throw line was a predetermined first spot. But participants could indicate which spot from a 45° angle, left or right they preferred as a second spot (see Appendix B).

The Action Control Scale (ACS-90, Kuhl, 1994) was used to assess individual differences in self-regulatory efficiency. The scale consists of twenty-four forced-choice items. The scale differentiates between people who are action versus state oriented. Action oriented people are characterized as being able to regulate their affective state under high demanding and stressful conditions, this efficient self-regulation can result in mood improvements. Whereas, people who are state oriented are inefficient in regulating their emotions under high demanding and stressful conditions. These people experience uncontrollable negative moods and rumination (Kuhl, 1994; Koole & Jostmann, 2004; Jostmann & Koole, 2006). A cumulative score on the ACS-90 was calculated using the score on the AOF scale and reversed score on the AOD scale. This was done, because theoretically it is assumed that both scales measure the same self-regulatory dimension.

Participants were also questioned about how they acquired their basketball skills. Research by Masters et al. (1992) indicates that skill acquisition is an important moderator of

choking under pressure. Two seven-point Likert scales were used to assess implicit and explicit learning (e.g. Dutch translation of ‘to what extent did you learn the skill of basketball in an implicit manner, i.e. in an intuitive manner without thinking). The aggregate of both scales was used as a measure of skill acquisition (i.e. high scores indicate implicit, and low scores indicate explicit acquisition). Additional seven-point Likert scales were used to assess subjective pressure, and years of basketball experience.

Results

Accuracy was measured using the aforementioned six-point scale. A 3 (condition: relevant before, relevant during, and control) x 2 (position: easy versus difficult) within subjects design was analyzed using repeated measures ANOVA. First, the two main effects of condition and position, and secondly the interaction between condition and position were analyzed. No significant main effect of condition on accuracy was found, $F(2, 28) = .40, p = .68$. Planned comparisons indicated that accuracy was equal across conditions. When names of important others were presented before shooting ($M = 3.60, SD = .36$) in comparison with the control condition ($M = 3.71, SD = .38, p = .53$, see Figure 8). When names of important others were presented during shooting ($M = 3.71, SD = .41$) versus when relevant names were presented before shooting ($M = 3.60, SD = .36, p = .45$, see Figure 8). Lastly, when relevant names were presented during shooting ($M = 3.71$) in comparison to control ($M = 3.71, p = .96$, see Figure 8). A marginal significant main effect of position on accuracy was found, $F(1, 14) = 3.25, p = .09$. Mean accuracy on the easy first position (i.e. straight ahead) was marginally higher ($M = 3.77, SD = .31$) than mean accuracy on the difficult second position (i.e. 45° angle towards the basket, $M = 3.58, SD = .29, p = .09$, see Figure 8). Lastly, no significant interaction effect was found between condition and court position on accuracy, $F(2, 28) = 0.12, p = .89$. Thus, differences in accuracy only differed due to effects of position, but not due to the presentation of close important others.

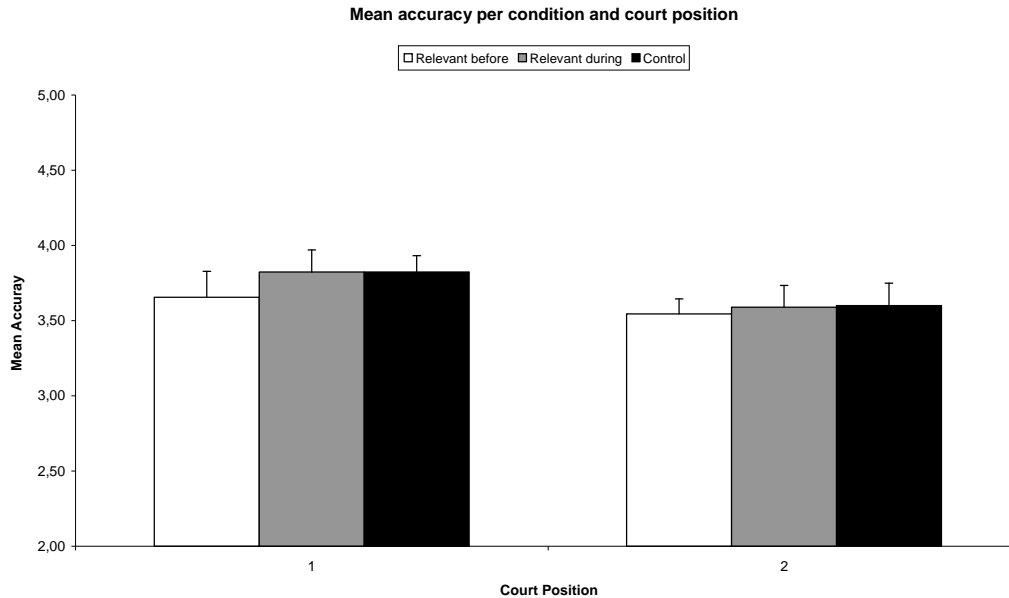


Figure 8: Mean accuracy per condition and court position

The role of individual differences

The next sets of analyses were performed to investigate the role of individual differences on the main design. All factors were individually interacted, using repeated measures ANOVA. All continuous moderator variables were transformed into standardized scores. In all analysis, an above average group (i.e. plus one standard deviation) was compared to a below average group (i.e. minus one standard deviation). Planned comparisons and figures are reported where the interaction with the main design approached significance or was significant.

Pre-test test gap

Post hoc it appeared that the between subject factor of pre-test test gap interfered with the main design. Participants were assigned to two groups on the basis of pre-test test gap. Those that came to the testing session more than a day after they filled in the pre-test questionnaire ($N=11$) were compared to participants who tested within a day after filling in the pre-test questionnaire ($N=4$). First, the main effect of pre-test test gap on accuracy was non-significant, $F(1, 13) = 1.32, p = .27$. Secondly, two-way interactions were highly significant. Between pre-test test gap and condition on accuracy, $F(2, 26) = 6.56, p = .005$, and between pre-test test gap and position on accuracy, $F(1, 13) = 13.45, p = .003$. In the

group who tested more than one day after pre-testing, planned comparisons yielded the following: when names of important others were presented before shooting, accuracy was significantly worse in comparison to the presentation of names of important others during shooting, $p = .03$, and the control, $p = .05$, see Figure 9. In the group who tested within a day from pre-testing this pattern was reversed: when names of important others were presented before shooting, accuracy was significantly better compared to the presentation of names of important other during shooting, $p = .06$, and the control, $p = .07$, see Figure 9. Thus, it can be concluded that choking did occur when tested more than a day after pre-testing, and a facilitating effect was found when tested within a day after pre-testing.

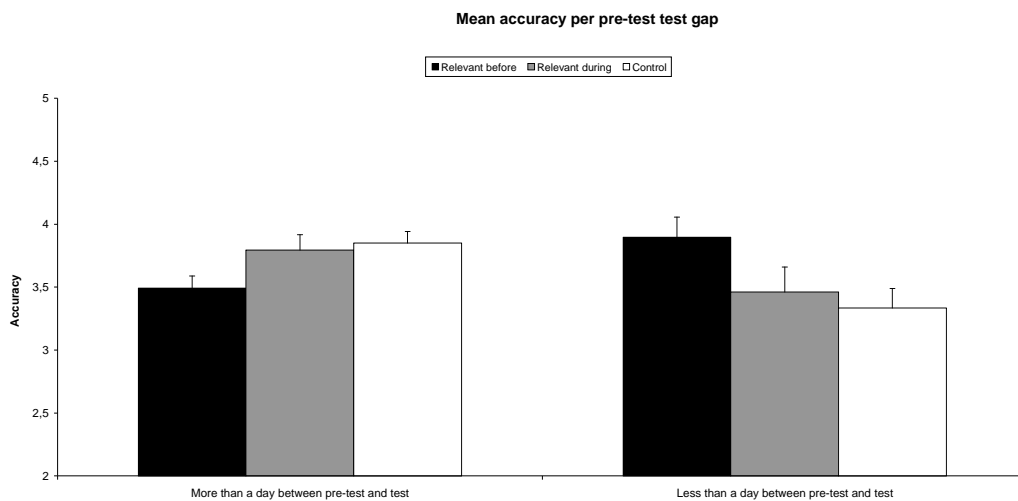


Figure 9: Mean accuracy per pre-test test gap groups

In the group who tested more than a day after pre-testing: no difference was found between accuracy on positions, $p = .83$, see Figure 10. However, in the group that tested within a day after pre-testing, accuracy when shot from the easy position was significantly higher than accuracy when shot from the second position, $p = .001$, see Figure 10. Last, the three-way interaction between condition, position and pre-test test-gap was non-significant, $F(2, 26) = .28, p = .76$. Thus, accuracy differences on position were found only for those who tested within a day of pre-testing.

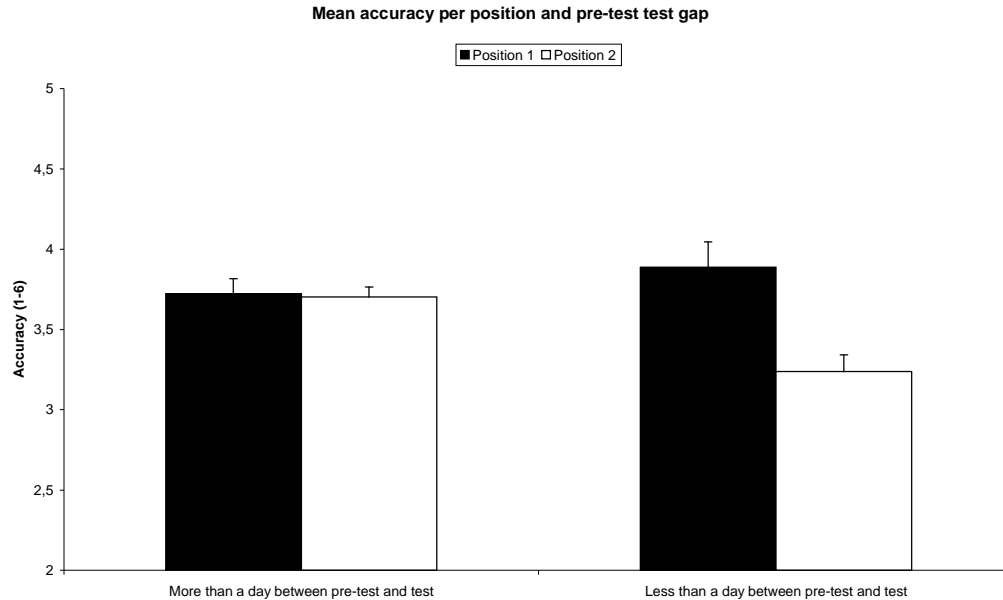


Figure 10: Mean accuracy per position and pre-test test gap

Relational closeness

First, the main effect of relational closeness on accuracy was non-significant, $F(1, 13) = .76, p = .40$. Second, both two-way interactions were non-significant. Between relational closeness and condition on accuracy, $F(2, 26) = .12, p = .89$, and between relational closeness and position on accuracy, $F(1, 13) = .85, p = .37$. Last, no three-way interaction existed between condition, position and relational distance on accuracy, $F(2, 26) = .87, p = .43$. Thus, unlike existing literature suggests, no moderating effect of relational closeness was found.

Self regulatory efficiency

First, the main effect of self-regulatory efficiency on accuracy was non-significant, $F(1, 13) = .90, p = .36$. Second, this effect was qualified by significant two-way interactions: between self-regulatory efficiency and condition on accuracy, $F(2, 26) = 5.57, p = .01$, and between self-regulatory efficiency and position on accuracy, $F(1, 13) = 9.56, p = .01$. Effective self-regulators showed the following: accuracy was worse when names of important others were presented before, $p = .02$, and during shooting, $p = .06$, compared to the control condition, see Figure 11. The pattern was different for inefficient self-regulators: accuracy was better when names of important others were presented before compared to the control

condition, $p = .07$, see Figure 11. The other planned comparisons were non-significant, $p > .15$. The interaction between self-regulatory efficiency and position showed that accuracy differed only when one is ineffective in self-regulating one's emotions. Accuracy was worse when shot from a difficult position compared to an easy position, $p = .002$, see Figure 12. This was not the case for people who are efficient in self-regulation, $p = .54$. Last, the three-way interaction between condition, position and self-regulatory efficiency on accuracy was non-significant, $F(2, 26) = .06, p = .94$. Thus, choking emerged when one can efficiently self-regulates ones affective state, and a slight facilitating effect was found when one is inefficient in self-regulating one's emotional state. In addition, people who are inefficient self-regulators performed worse when shot from a high demanding (i.e. difficult position) versus a low demanding position (i.e. easy position).

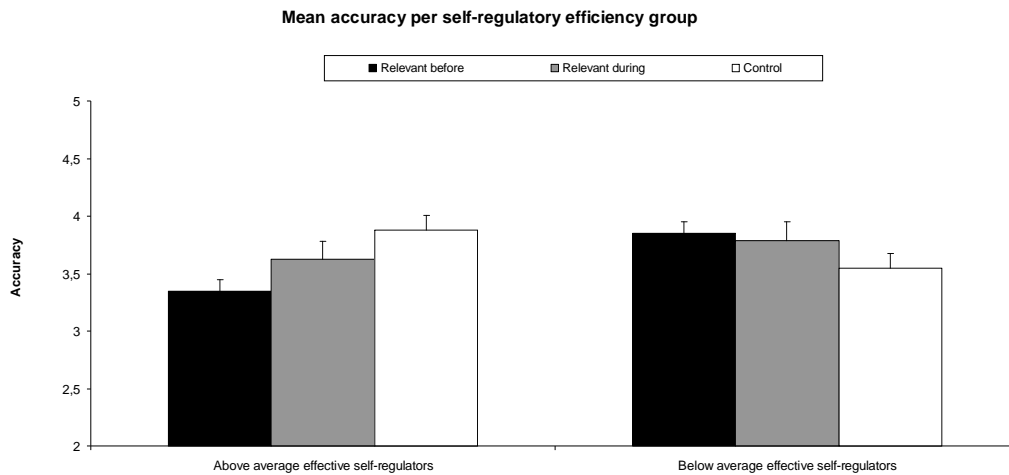


Figure 11: Mean accuracy per self-regulatory efficiency group

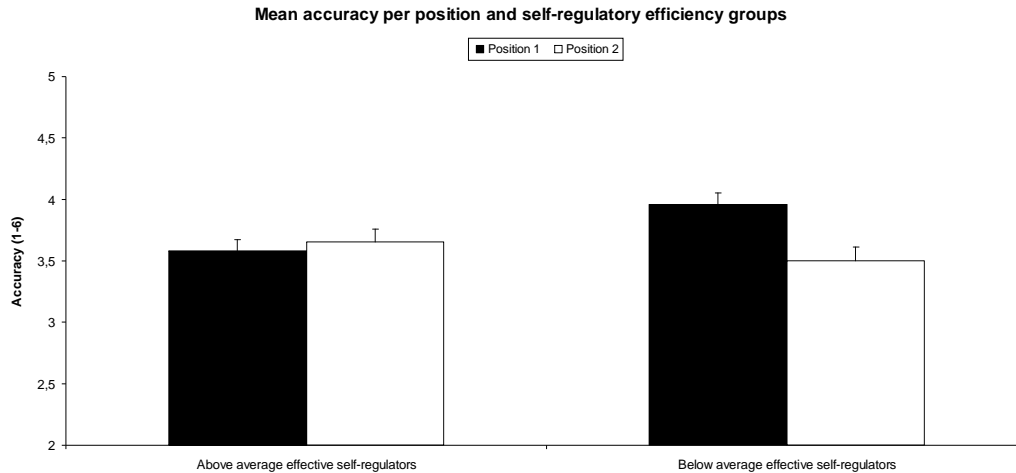


Figure 12: Mean accuracy per position and self-regulatory efficiency groups

Skill acquisition

First, the main effect of skill acquisition on accuracy was not significant, $F(1, 13) = .001, p = .99$. Second, the main effect was qualified by non-significant two-way interactions between skill acquisition and condition on accuracy, $F(2, 26) = 2.37, p = .11$, and between skill acquisition and position on accuracy, $F(1, 13) = .72, p = .41$. Last, the three-way interaction between condition, position and skill acquisition on accuracy was not significant, $F(1, 13) = 2.30, p = .12$.

Subjective pressure

First, the main effect of subjective pressure on accuracy was not significant, $F(1, 13) = .03, p = .86$. Second, the main effect was qualified by non-significant two-way interactions between subjective pressure and condition on accuracy, $F(2, 26) = .70, p = .50$, and between subjective pressure and position on accuracy, $F(1, 13) = .04, p = .85$. Last, the three-way interaction between subjective pressure, condition and position on accuracy proved to be non-significant, $F(2, 26) = .83, p = .45$.

Basketball experience

First, the main effect of basketball experience on accuracy was not significant, $F(1, 13) = .63, p = .44$. Second, the main effect was qualified by non-significant two-way interactions between basketball experience and condition on accuracy, $F(2, 26) = .13, p = .88$,

and between basketball experience and position on accuracy, $F(2, 26) = .19, p = .67$. Last, the three-way interaction between condition, position and basketball experience on accuracy was not significant, $F(2, 26) = 2.35, p = .12$.

Discussion

The findings of experiment 2 partially extend those of experiment 1 by demonstrating that choking and facilitation did occur, but only when factors like pre-test test gap and self-regulatory efficiency are taken into account. Overall, neither choking nor facilitation effects of close important others on performance were found. However, subjects who tested more than a day after pre-testing did show a choking effect due to close important others. Opposite to what was expected, accuracy was worse when names of important others were presented before shooting compared to the control condition. The reversed pattern emerged in subjects who tested within a day after pre-testing. They showed a facilitating effect due to close important others. These subjects were more accurate when names of important others were presented before shooting compared to the control condition. The reason for this reversed pattern is thought to be dependent on one's memory of filling in the pre-test questionnaire. It is believed that subjects are shocked to hear names of close important others when memory of filling in the pre-test questionnaire is lost. Subjects, who did remember the names they wrote down on the pre-test questionnaire, are thought to be expectant about the priming of the names.

The results of experiment 2 also demonstrated that choking emerged when one can efficiently self-regulate one's affective state, and a slight facilitating effect was found when one is inefficient in self-regulating one's emotional state. In addition, people who are inefficient self-regulators performed worse when shot from a high demanding (i.e. difficult position) versus a low demanding position (i.e. easy position). As expected, shooting accuracy was higher when shot from an easy position compared to a difficult position. However, this effect did not emerge in the interaction between condition and position. Unlike previous research suggests, no moderating effects of relational closeness (Shah, 2003a), skill

acquisition (Lam et al., 2009), subjective pressure and basketball experience on performance were found.

General Discussion

This research found evidence for choking and facilitating affects due to important others. These findings came across in an experimental setting and a behavioural experiment. In experiment 1 it was established that, overall participants showed a choking effect due to the priming of close important others. Specifically, choking was found for people who studied abstract reasoning math. Besides, facilitating effects were found when one believes that the task at hand is indicative of intelligence and one finds it important to perform well on intelligence related tasks. These findings are in line with previous research by Shah (2003a). Experiment 2 partially expanded the findings in a real-life setting. Although, overall neither a choking nor a facilitating effect of close important others was found. When looked in more detail, choking occurred in people who tested more than a day after pre-testing, and who were efficient self-regulators (i.e. action oriented people). The latter finding is in line with existing research by Jostmann and Koole (2006). They found that action oriented people perform worse when primed with an accepting person, whereas state-oriented people performed better when primed with an accepting person. It must be noted that in present study close important others were not classified on a demanding-accepting dimension. Nevertheless, it is assumed that close important others are accepting persons.

While important others were previously thought to facilitate performance, the present research suggests that they can also distract, and thereby harm performance. It is assumed that close important others activate behavioural-goals that are different from the task-goals (i.e. performing well), and that this simultaneous activation of goals is distracting, and eventually leads to choking. The effects were established in the experimental setting and a behavioural experiment, and across tasks that use working memory capacity, executive attention and gross-motor skills. Current findings add to the existing literature in the following way. In the physical absence, close important others still have an effect on performance. This finding is in line with Fitzsimons et al. (2003). They found that close important others guide behavioural

goals. However, current findings also extend and oppose previous findings. In contrast with facilitating effects found by Shah (2003a), this research found that close important others can have a choking effect on performance. Moreover, current findings fill this knowledge gap in choking literature. In addition, findings are in line with choking literature (Beilock, et al., 2004; Gimmig et al., 2006).

The current research used a solid design and findings came from both a lab and real-world setting. The present research is also novel in investigating and establishing the influence of important others on performance. However, in a way the current research falls short. The current design was not able to test the underlying mechanism of choking. In this study it was assumed that choking occurred through working memory capacity. But no data of participant's working memory capacity was collected. Another shortcoming has to do with the unexpected finding of choking when primed before shooting, whereas choking was expected to occur during shooting. We argue that instructions may have caused this finding. It was instructed to directly shoot when one hears a second name. Possibly, because the time gap between the second prime and shooting is small, the priming of the second name had no effect on shooting. But no data exists on this time gap between primes and shooting. Furthermore, during the recruitment and testing of participants a methodological error arose. The pre-test test gap was not held constant across participants due to difficulties with recruitment. Therefore the effect of residual memory possibly interfered with the main design. Last, statistical power of the second experiment was low, because low amounts of collected data. Therefore the implications which followed from the second experiment are not as powerful as anticipated.

The present research has implications for athletics and performance in general. It is better not to invite your parents or close important others to the most crucial challenges. Instead, ask your parents to support you in preparation to performance, because this will aid in motivating oneself. Current findings replicate those of previous findings in sports related tasks, such as basketball shooting (Otten, 2009). Furthermore, present findings indicate that the interfering role of one's parents can be harmful to performance. This is another reason for

trainers, coaches and sport-psychologists to shield their pupils from outside influences, even when well intended. Besides, athletes should be trained to focus only on the execution of a skill, and be guarded against distractions (e.g. one's parent or winning a prize).

In future research one should measure the effect of residual memory on performance, or keep this factor constant as proposed by Shah (2003a). Further on, underlying mechanisms of choking must be investigated using neuropsychological and biochemical insights. This will aid in unravelling the underlying mechanisms of choking and facilitation. Subsequently, future research should further investigate the moderating role of skill acquisition and relational closeness, and try to replicate current findings of choking and facilitation in a real-world setting.

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Appendices

Appendix A: Pre-test questionnaire

Beste deelnemer,

In dit onderzoek zijn wij geïnteresseerd in gedrag in een sociale context. We willen voor iedere deelnemer hierbij zijn of haar eigen sociale context betrekken. We denken dat de eigen sociale context namelijk belangrijk is voor allerlei aspecten van ons denken en handelen.

We willen je daarom nu vragen om een aantal namen te noemen van mensen die in jouw eigen, persoonlijke sociale omgeving een grote rol spelen. Het gaat hier om namen van mensen die centraal staan in jouw sociale omgeving, om wie jij geeft en die het belangrijk vinden dat je goed presteert en goede resultaten behaalt. Je zou dus bijvoorbeeld kunnen denken aan je vriend of vriendin, één of beiden van je ouders, één van je beste vrienden, coach/trainer of een beste team-/studiegenoot.

Bedenk nu welke vier mensen het meest belangrijk voor jou zijn en om wiens mening je geeft, en die het belangrijk vinden dat je goede resultaten behaalt. Geef eerst de naam van die belangrijke ander aan, en voer daarna in hoe deze persoon in relatie tot jou staat, bijvoorbeeld dat het je vriend, je moeder, of je beste vriendin is.

1. Schrijf de naam op van de persoon die het meest belangrijk is voor jou.	<i>Naam:</i>		<i>/Relatie tot:</i>						
2. Hoe ervaar jij de band tussen jou en deze persoon?	<i>Helemaal niet sterk</i>	1	2	3	4	5	6	7	<i>Heel erg sterk</i>
3. Schrijf de naam op van de persoon die het op één na meest belangrijk is voor jou.	<i>Naam:</i>		<i>/Relatie tot:</i>						
4. Hoe ervaar jij de band tussen jou en deze persoon?	<i>Helemaal niet sterk</i>	1	2	3	4	5	6	7	<i>Heel erg sterk</i>
5. Schrijf de naam op van de persoon die het op twee na meest belangrijk is voor jou.	<i>Naam:</i>		<i>/Relatie tot:</i>						
6. Hoe ervaar jij de band tussen jou en deze persoon?	<i>Helemaal niet sterk</i>	1	2	3	4	5	6	7	<i>Heel erg sterk</i>
7. Schrijf de naam op van de persoon die het op drie na meest belangrijk is voor jou.	<i>Naam:</i>		<i>/Relatie tot:</i>						
8. Hoe ervaar jij de band tussen jou en deze persoon?	<i>Helemaal niet sterk</i>	1	2	3	4	5	6	7	<i>Heel erg sterk</i>

U kunt nu doorgaan naar de vragen op de volgende pagina.

We willen graag nog meer weten over wie in jouw omgeving een rol speelt en wie je allemaal kent. Daarom volgt nu een lijst met namen. We willen je vragen om van elke naam aan te geven of er iemand in jouw sociale omgeving is die zo heet. Denk hierbij aan je vrienden en familie, huisgenoten, studiegenoten, teamgenoten, of verenigingsgenoten. Omcirkel het antwoord.

1. Maarten	<i>Ja / Nee</i>	19. Daniel	<i>Ja / Nee</i>
2. Esther	<i>Ja / Nee</i>	20. Mirjam	<i>Ja / Nee</i>
3. Martijn	<i>Ja / Nee</i>	21. Robin	<i>Ja / Nee</i>
4. Karin	<i>Ja / Nee</i>	22. Femke	<i>Ja / Nee</i>
5. Michael	<i>Ja / Nee</i>	23. David	<i>Ja / Nee</i>
6. Sanne	<i>Ja / Nee</i>	24. Emma	<i>Ja / Nee</i>
7. Frank	<i>Ja / Nee</i>	25. Bastiaan	<i>Ja / Nee</i>
8. Petra	<i>Ja / Nee</i>	26. Manon	<i>Ja / Nee</i>
9. Sander	<i>Ja / Nee</i>	27. Erwin	<i>Ja / Nee</i>
10. Daniëlle	<i>Ja / Nee</i>	28. Lotte	<i>Ja / Nee</i>
11. Bart	<i>Ja / Nee</i>	29. Danny	<i>Ja / Nee</i>
12. Eva	<i>Ja / Nee</i>	30. Tessa	<i>Ja / Nee</i>
13. Hans	<i>Ja / Nee</i>	31. Bas	<i>Ja / Nee</i>
14. Ellen	<i>Ja / Nee</i>	32. Julia	<i>Ja / Nee</i>
15. Tim	<i>Ja / Nee</i>	33. Ruben	<i>Ja / Nee</i>
16. Lisa	<i>Ja / Nee</i>	34. Fleur	<i>Ja / Nee</i>
17. Gerard	<i>Ja / Nee</i>	35. Daan	<i>Ja / Nee</i>
18. Simone	<i>Ja / Nee</i>	36. Sophie	<i>Ja / Nee</i>

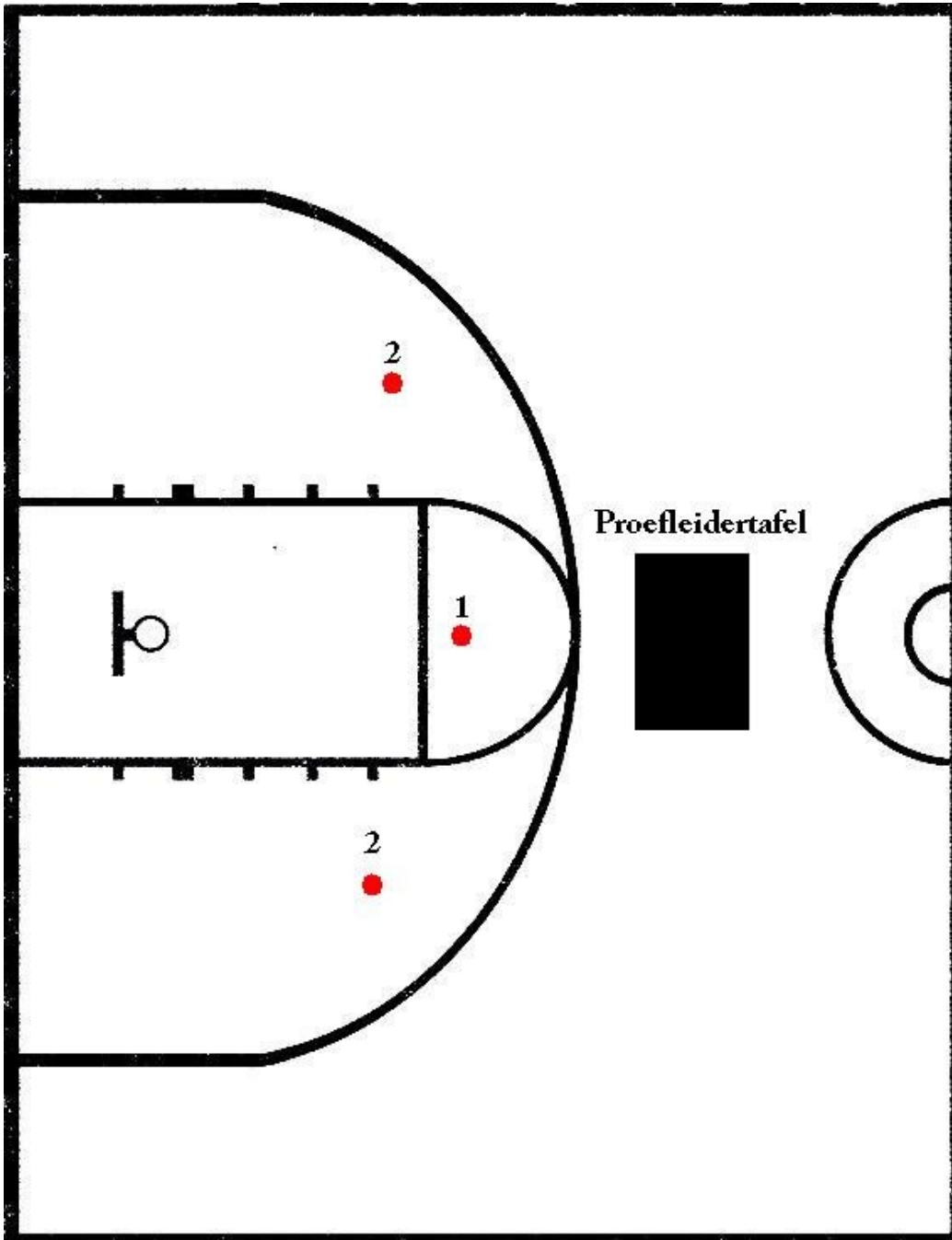
Op de laatste pagina volgen nog een paar vragen over basketbal.

Voordat je mee kan doen aan het daadwerkelijke onderzoek willen we nog een paar dingen van je weten. Omcirkel steeds het voor jou juiste antwoord.

9. Wat vindt je van het spelen in een basketbal team?	<i>Helemaal niet leuk</i>	1	2	3	4	5	6	7	<i>Heel erg leuk</i>
10. Hoe moeilijk vindt je het om in een basketbal team te spelen?	<i>Helemaal niet moeilijk</i>	1	2	3	4	5	6	7	<i>Heel erg moeilijk</i>
11. Hoe heb je basketbal geleerd?	<i>Via school</i>	<i>Via vrienden</i>	<i>Via televisie kijken</i>	<i>Geheel Zelf</i>	<i>Via vereniging/coach</i>				
12. Wat is voor jou het hoogst gespeelde niveau met basketbal?									
13. In hoeverre heb je basketbal impliciet aangeleerd? (Op een intuïtieve manier, zonder erbij na te denken hoe het moet)	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Helemaal wel</i>
14. In hoeverre heb je basketbal expliciet aangeleerd? (Op een bewuste manier, stap voor stap letten op de motorische uitvoering van de verschillende vaardigheden)	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Helemaal wel</i>
15. In hoeverre heb je van je coach/trainer geleerd om stap voor stap schot techniek oefenen?	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Helemaal wel</i>
16. In hoeverre heeft je coach/trainer je aangeleerd om intuïtief schot techniek te oefenen?	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Helemaal wel</i>
17. Hoe lang speel je al ongeveer basketbal?	<i>..... jaar</i>								
18. In welk jaar bent u geboren?	<i>.....</i>								
19. Wat is uw geslacht?	<i>m / v</i>								
20. Mogen wij u nog vragen om uw lengte en gewicht?	<i>lengte: ca. ... cm / gewicht: ca. kg</i>								
21. Ben je links of rechts handig?	<i>Links / Rechts / Beide</i>								

Bedankt voor het invullen van de vragenlijst!

Appendix B: Test setup



Appendix C: Post-test questionnaire

Beste deelnemer,

Bedankt voor het meedoen aan dit onderzoek. Dit was het fysieke gedeelte, nu volgen nog een paar vragenlijsten ter afsluiting. Omcirkel de meerkeuze antwoorden.

1. Waar denk je dat dit onderzoek over ging?										
2. Wat denk je dat wij met dit onderzoek verwachten te vinden?										
3. In hoeverre heb jij je best gedaan om goed te presteren tijdens het basketbal?	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Heel erg</i>	
4. In hoeverre geloof je dat de basketbaltaak die je net hebt gedaan samenhangt met je algemene vaardigheid in basketbal?	<i>Geloof ik zeker niet</i>	1	2	3	4	5	6	7	<i>Geloof ik zeker</i>	
5. In hoeverre vind je het belangrijk om goed te presteren op taken die met sport/basketbal te maken hebben?	<i>Helemaal niet belangrijk</i>	1	2	3	4	5	6	7	<i>Heel erg belangrijk</i>	
6. In hoeverre denk je dat de namen die tijdens het basketbal langskwamen jouw prestatie hebben beïnvloedt?	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Helemaal wel</i>	
7. In hoeverre ervoer je druk om te presteren tijdens het basketbal?	<i>Helemaal niet</i>	1	2	3	4	5	6	7	<i>Helemaal wel</i>	
8. Hoe goed was jij in gymnastiek op de middelbare school?	<i>Heel slecht</i>	1	2	3	4	5	6	7	<i>Heel goed</i>	

Op de volgende pagina volgen nog een paar vragen over hoe jij je voelt.



Deze vragenlijst gaat over de manier waarop mensen reageren op stressvolle situaties. De vragen bestaan telkens uit een korte omschrijving van een situatie met twee mogelijke manieren waarop je op een dergelijke situatie zou kunnen reageren.

Kies het alternatief dat het beste omschrijft wat jouw reactie zou zijn in de situatie die beschreven wordt.

Doe dit door je keuze te omcirkelen (een a of een b).

1. Wanneer ik verplicht ben om iets te doen wat saai en oninteressant is	A. Doe ik het snel zodat ik ervan af ben	B. Duurt het gewoonlijk een tijdje voordat ik er aan toekom
2. Wanneer ik iets kwijtraak dat heel waardevol voor me is en ik het nergens kan vinden	A. Vind ik het moeilijk om aan iets anders te denken	B. Zet ik het na een tijdje uit mijn gedachten
3. Wanneer ik niets in het bijzonder te doen heb en me verveel	A. Vind ik het moeilijk om de energie te vinden om überhaupt nog iets te doen	B. Dan vind ik snel iets om te doen
4. Wanneer ik thuis moet werken	A. Vind ik het vaak moeilijk om het werk af te krijgen	B. Doe ik het meestal ogenblikkelijk
5. Wanneer iets erg belangrijk voor me is, en het me maar niet lijkt te lukken	A. Raak ik langzaam de moed kwijt	B. Laat ik het gewoon zitten en begin ik aan iets anders
6. Wanneer ik veel belangrijke dingen moet doen en al deze dingen haast hebben	A. Weet ik vaak niet waar ik moet beginnen	B. Vind ik het vaak makkelijk om een plan te maken en daar aan vast te houden
7. Wanneer er twee dingen zijn die ik graag wil doen en ze niet tegelijk kunnen worden gedaan	A. Begin ik snel aan één ding en vergeet ik het andere dat ik niet kon doen	B. Is het voor mij niet makkelijk om datgene wat ik niet kon doen uit mijn gedachten te krijgen
8. Wanneer ik een nieuw apparaat heb gekocht (bijvoorbeeld een computer of een mobiele telefoon) dat per ongeluk op de grond valt en niet meer te repareren is	A. Zal ik daar al weer snel over heen zijn	B. Zal het lang duren voordat ik daar overheen zou zijn
9. Wanneer ik voor iets belangrijks moet zorgen dat tevens onaangenaam is om te doen	A. Dan doe ik het en dan ben ik er van af	B. Kan het een poosje duren voordat ik mezelf ertoe kan zetten om het te doen
10. Wanneer ik aan een belangrijk project moet beginnen	A. Denk ik er vaak te lang over na waar ik moet beginnen	B. Heb ik er geen enkel probleem mee om te beginnen
11. Wanneer ik iets belangrijks met iemand moet bespreken die steeds niet te bereiken is	A. Moet ik er onophoudelijk aan denken, zelfs wanneer ik iets anders aan het doen ben	B. Vergeet ik het gemakkelijk totdat ik die persoon weer zie
12. Wanneer ik veel dingen heb gekocht en thuis merk dat ik teveel heb betaald- en ik het geld niet kan terugkrijgen	A. Kan ik me niet op iets anders concentreren	B. Vergeet ik dat weer gemakkelijk
13. Wanneer mij wordt verteld dat mijn werk volledig tekort schiet	A. Trek ik me daar niet erg lang wat van aan	B. Voel ik me verlamd
14. Wanneer ik vastzit in het verkeer en een belangrijke afspraak mis	A. Vind ik het de eerste tijd moeilijk om aan iets anders te beginnen	B. Vergeet ik dat snel en doe ik al gauw iets anders
15. Wanneer ik een moeilijk probleem moet oplossen	A. Is het gewoonlijk geen probleem voor me om eraan te beginnen	B. Is het moeilijk voor me om de dingen in mijn hoofd op een rijtje te krijgen, zodat ik niet gelijk aan het probleem toekom
16. Wanneer ik onverwachts vrij heb en ik moet bedenken wat ik wil gaan doen	A. Duurt het lang voordat ik besloten heb wat ik wil gaan doen	B. Beslis ik wat ik ga doen zonder er veel over na te denken

17. Wanneer iets me echt ontmoedigd heeft	A. Vind ik het moeilijk om ook maar iets uit te voeren	B. Vind ik het makkelijk om mezelf af te leiden met andere dingen
18. Wanneer er meerdere dingen op dezelfde dag misgaan	A. Weet ik gewoonlijk niet hoe ik daar mee om moet gaan	B. Ga ik gewoon door alsof er niets is gebeurd
19. Wanneer ik weet dat ik iets binnenkort moet afmaken	A. Moet ik mezelf ertoe zetten om het af te maken	B. Vind ik het makkelijk om het af te krijgen
20. Wanneer ik wekenlang aan een project heb gewerkt en vervolgens alles aan het project volledig misgaat	A. Dan kost het me veel tijd om mezelf aan te passen	B. Dan heb ik daar even last van, maar daarna denk ik er niet meer aan
21. Wanneer ik een saaie opdracht moet doen	A. Heb ik er gewoonlijk geen probleem mee om het af te maken	B. Dan lukt het af en toe gewoon niet om er doorheen te komen
22. Wanneer ik aan een wedstrijd meedoe en telkens verlies	A. Dan kan ik het verliezen makkelijk uit mijn gedachten zetten	B. Dan blijft de gedachte aan het verliezen door mijn hoofd gaan
23. Wanneer ik me volledig heb ingespannen om heel goed werk te leveren en het desondanks allemaal misgaat	A. Vind ik het niet moeilijk om aan iets anders te beginnen	B. Vind ik het moeilijk om ook nog maar iets te gaan doen
24. Wanneer ik mezelf erop voorbereid om een moeilijk probleem te gaan oplossen	A. Voelt het alsof ik voor een grote berg sta waarvan ik denk dat ik hem niet kan beklimmen	B. Zoek ik naar een manier waarop het probleem op een zo geschikt mogelijke manier kan worden opgelost

Bedankt voor het invullen van de vragenlijst!

Appendix D: Stageverslag

Onderzoeksactiviteiten

Tijdens de interne onderzoeksstage is aandacht besteedt aan de volgende onderzoeksactiviteiten: ontwikkelen van een labexperiment, meehelpen in de werving van proefpersonen, meehelpen in het uitvoeren van een veldstudie, assistentie in het laboratorium en het uitvoeren van twee eigen experimenten (één labexperiment en één gedragsstudie).

In de begin fase van de interne stage en thesis, is aandacht besteedt aan het programmeren van een labexperiment met behulp van 'E-prime'. Het hoofddoel hierbij was het onderzoeksdesign omzetten in een werkend experiment. Het ging om het ontwikkelen van een 'sometjes' taak. Nadat het programmeren was afgerond, is er op drie verschillende momenten data verzameld. Na de eerste week 'draaien' bleek dat het experiment niet moeilijk genoeg was. Met behulp van de interne begeleiders is ervoor gekozen om het experiment aan te passen. Het experiment is moeilijker gemaakt door stimuli random op het beeldscherm aan te bieden. Vervolgens is het aangepaste experiment uitgevoerd. Een probleem hierbij was echter dat er weinig ($N = 21$) proefpersonen zijn geworven. Dit kwam mede doordat het experiment plaats vond in een onderwijsvrije week. Om wel een adequaat aantal proefpersonen te verkrijgen, is ervoor gekozen om bij te draaien. Dit resulteerde in totaal tot 58 proefpersonen. Tussen het uitvoeren van de eigen onderzoeken, is er op verschillende momenten geassisteerd in het laboratorium en bij de werving van proefpersonen. Daarnaast is er ook meegeholpen met het ontwikkelen en uitvoeren van veldonderzoek.

In overleg met de interne begeleiders is ervoor gekozen om het eerste experiment proberen te repliceren in de praktijk. Hiervoor is een basketbal taak ontwikkeld, waar getracht werd om zo dicht mogelijk bij het originele design te blijven. De voornaamste aanpassingen waren: het oraal in plaats van visueel aanbieden van de stimuli en het moeilijker maken van de basketbal taak door twee posities op te nemen waar vanaf geschoten kon worden. De werving van participanten voor het gedragsexperiment was de grootste obstakel in het uitvoeren van het onderzoek. Doordat er specifieke eisen aan participanten werd gesteld (i.e. adequate ervaring in basketbal), was het aantal proefpersonen in de eerste wervingsgolf al

minimaal. Waar in eerste instantie gevraagd werd om 40 proefpersonen, zijn er uiteindelijk maar 15 getest. De volgende obstakels vormde hiervoor de grootste oorzaak. Ten eerste, het onderzoek was afhankelijk van de bereidheid van participanten om vrijwillig en zonder vergoeding mee te doen aan het onderzoek. Ten tweede, vormde het niet beschikken over een eigen basket een groot obstakel. Bij het uitvoeren van het onderzoek kwam het voor dat er maar één participant per avond getest kon worden, omdat de baskets verder in gebruik waren. Uiteindelijk is er op drie verschillende locaties getest. Ten derde, was het design zo opgesteld dat er twee verschillende meetmomenten plaatsvonden. Een pre-test vragenlijst en het daadwerkelijk uitvoeren van het onderzoek. Het inspreken van de namen en het voorbereiden van de op maat gegoten experimenten, kost in de praktijk tijd. Daardoor was het vaak het geval dat meer dan een dag na het invullen van de pre-test vragenlijst het onderzoek kon plaatsvinden. Hiervoor moesten individuele afspraken gemaakt worden, maar voor velen was hierdoor de drempel om mee te doen te hoog. Als laatste, omdat er op buitenlocaties getest werd, speelde het weer een grote rol. Aangezien de apparatuur niet regenbestendig was, hebben er vijf proefpersonen niet kunnen deelnemen aan het onderzoek omdat het regende.

Motivering keuze en leerervaringen

De hoofdreden voor de keuze om een interne onderzoekstage te gaan volgen was om sociaal- en sport- psychologische inzichten te combineren in onderzoek. De doelstelling was om in totaal drie onderzoeken uit te voeren. Twee lab experimenten en een gedragsexperiment. Maar, omdat de verwachte effecten in het eerste experiment niet helemaal uitkwamen, is ervoor gekozen om geen tweede labexperiment uit te voeren. Een andere doelstelling was het behalen van voldoende proefpersonen. Mede door eerder genoemde redenen is dit matig gelukt. De voornaamste leerervaring die getrokken kan worden uit de interne stage is dat er bij de werving van proefpersonen een directe tactiek gehanteerd moet worden (e.g. mensen direct aanspreken of ze nu mee kunnen doen aan het onderzoek). Daarnaast, er heel erg goed moet worden nagedacht om een onderzoek uit te voeren dat gebruikt maakt van twee of meer meetmomenten.

De ontvangen feedback op de voorgestelde methodes heeft ertoe bij gedragen dat er nog beter de omschakeling van theoretische inzichten in een werkend onderzoek gemaakt kan worden. Daarnaast, zijn er ook onderzoeksvaardigheden aangeleerd en verder ontwikkeld. Hierbij moet vooral gedacht worden aan het zelfstandig kunnen omzetten van een design in een werkend labexperiment, verdieping in de huidige sociaal psychologische literatuur en het uitvoeren van de data-analyses met SPSS.