Universiteit Leiden
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Sit in to fit in

The effects of furniture arrangement on self-other integration and self-disclosure

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Abstract

In this thesis, the effects of furniture arrangement on self-other integration and self-disclosure, both important aspects for group performance, are studied. 58 participants took part in this study. They were tested in groups of six, in one of the two furniture arrangement conditions. Whereas in the first condition participants were seated in a circle facing towards each other, in the second condition they faced away from each other. In both conditions, participants completed the joint Simon task as index of self-other integration and the Revised Self Disclosure Scale as index of self-disclosure. It was hypothesised to find a larger joint Simon effect in the first condition, because intimate settings cause people to feel closer to each other (Coker & Burgoon, 1987). On the other hand, self-disclosure tendency seems to be facilitated by a spacious setting (Jourard & Friedman, 1970; Okken, 2013), therefore it was expected that self-disclosure tendency would be higher in the second condition. No significant differences between the groups were found. However, RT means and self-disclosure scores were in line with the hypotheses and no contradictions were found. This might suggest that the proposed effects were present in the data, but the effect sizes were too small to lead to conclusive results.

Keywords: Group performance, group cohesion, furniture arrangement, joint Simon task, self-other integration, self-disclosure

Introduction

Picture yourself a group working on a challenging and important task with an oncoming deadline. The necessary information and intelligence is present in the group, however, a good result is not guaranteed. Since group performance is complex and difficult to achieve, many companies struggle to generate positive group outcomes. The complexity of group performance originates from the number of factors that are involved. Among other things, group performance depends on skills, cooperation, the complexity of the task and the diversity of the group (Harvey, Pettigrew & Ferlie, 2002). Another factor that is very important, but difficult to achieve, is group cohesion. Cohesion is an often used, broad term with multiple definitions. In this thesis, group cohesion will be defined as the presence of positive interpersonal relationships and a feeling of integration with the group (Chang & Bordia, 2001).

The relationship between group cohesion and group performance has been the subject of several studies (e.g. Chang & Bordia, 2001; Casey-Campbell & Martens, 2009; Evans & Dion, 2012). It can be stated that there is a solid positive correlation between these two factors. This correlation occurs in both directions, implicating that the improvement of group cohesion correlates positively with group performance, and a better group performance correlates positively with group cohesion (Casey-Campbell & Martens, 2009; Evans & Dion, 2012). Multiple correlational studies have been conducted on this subject but not much (experimental) research has investigated methods to facilitate group cohesion.

Another aspect that is of importance for group performance is self-disclosure. Self-disclosure can be defined as the sharing of personal feelings and thoughts with others (Cozby, 1973, as cited by Okken, 2013). Self-disclosure is necessary to avoid group think, a state where the wish for group consensus is stronger than the obligation to make the best decision (Irving, 1982). Group think can lead to catastrophic events, such as the Challenger Incident in 1986 where a space shuttle exploded shortly after take-off (Esser & Lindoerfer, 1989). The pressure to launch the space shuttle had been higher than the ethical motive of expressing doubts about safety issues (Esser & Lindoerfer, 1989). A high level of self-disclosure would have increased the chance that critics expressed their suspicion of a safety problem. In addition, facilitating a high level of self-disclosure in a group does not only prevent group think, it is also beneficial for group cohesion (Kirshner, Dies & Brown, 1978).

The focus of this thesis is the facilitation of group cohesion and self-disclosure. The current research is conducted at the LEF future center, a section of Rijkswaterstaat. The LEF future center facilitates high levels of creativity and group performance. To achieve this, a variety of methods are used. The facilitators from the LEF future center make smart use of the lighting, priming, team building exercises and even well-considered catering in order to

increase group performance (Doornbos & Sijpkens, 2014). Another instrument that is used by the facilitators to guide the group are a variety of furniture arrangements. The LEF future center uses specially designed furniture that serves to guide the group. Furniture is used in every LEF meeting and its arrangement might largely affect the group. Several studies have been conducted at the LEF future center (Doornbos & Sijpkens, 2014), but the effect of furniture arrangements on groups has not been researched before.

Some literature concerning the effects of furniture arrangement on groups can be found. Research has shown that people seated in an arrangement facing towards each other show more affiliative behaviour than when facing away from each other (Mehrabian & Diamond, 1971). These findings are supported by research showing that a more directly facing orientation increases involvement and decreases discomfort in a group conversation (Patterson, Kelly, Kondracki & Wulf, 1979). Other research found that people are more involved and are feeling closer to each other when their bodies face directly (Coker & Burgoon, 1987). In addition, research suggests that patients are more satisfied with their doctors, when they spend more time directly faced towards each other (Larsen & Smith, 1981). Neuropsychological research using Near-infrared spectroscopy even indicated that neural synchronization takes place between two participants when they engage in a face-to-face conversation, but not when in they engage in a back-to-back conversation (Jiang et al., 2012). These studies could suggest that interpersonal relationships and group cohesion benefit from a furniture arrangement facing towards each other.

The effect of furniture arrangement has also been tested with self-disclosure as dependent variable. Jourard and Friedman (1970) found that participants placed in an intimate setting, close to each other, showed lower levels of self-disclosure in comparison with a more spacious setting. Other research suggests that an increase in proximity between people leads to an increase in negative feelings (Albert & Dabbs, 1970; Yildirim & Akalin-Baskaya, 2007), which could cause a decrease in self-disclosure tendency (Okken, 2013). Joinson (2001) found that it is easier to self-disclose when visually anonymous than in a face-to-face conversation. McKenna, Green & Gleason (2002) replicated and extended these results by finding that participants like each other more when talking on-line, while being visually anonymous, compared to talking face-to-face. Other research found that when people meet in a completely dark room, they self-disclose more and like the other person more, compared to a meeting in a brightly lit room (Gergen, Gergen & Barton, 1973). These findings suggest that self-disclosure is higher in a spacious setting, more negative feelings are experienced in high proximity and personal relationships might benefit from a spacious setting. This contradicts the earlier mentioned results that sitting face to face improves interpersonal relationships (e.g. Mehrabian & Diamond, 1971; Larsen & Smith, 1981; Coker & Burgoon, 1987). In sum, the literature is not conclusive and still a lot is unknown concerning the effects of furniture arrangements.

The LEF future center often uses furniture arrangements as a facilitation method, but the scientific literature does not provide clear guidelines about the specific effects of these arrangements. In this study, two different furniture arrangement conditions will be used, to test their effects on group cohesion and self-disclosure. In both arrangements, the chairs will be placed in a circle. In the first arrangement, participants will face towards each other, while in the second arrangement, they will face away from each other. Both these arrangements are currently often used by facilitators in the LEF future center. The chairs that will be used are L-shaped chairs with a large backrest. In the first arrangement the backrest serves as a barrier from the outside world, intending to enhance focus on the group. In the second arrangement, the backrest serves as a barrier from the group, intending to increase the feeling of privacy.

Joint Simon task

One definition of group cohesion is the feeling of integration and the presence of positive interpersonal relationships with the group (Chang & Bordia, 2001). These constructs are difficult to measure implicitly or objectively. In this study, we have chosen to measure these constructs with the joint Simon task. In this section, the task will be explained.

During a regular Simon task, participants respond to coloured stimuli that appear either left or right of a reference point on the screen. Participants respond to these stimuli by a left- or right button press. For example, when a blue stimulus appears, participants press left and when a green stimulus appears, participants press right. The location of the stimuli is irrelevant for the task, but research shows that when the stimulus and response location are congruent, reaction times are shorter than when they are incongruent. This difference in reaction times is called the Simon Effect (SE) (Simon & Rudell, 1967). The SE can be explained by referential coding, which is based on the Theory of Event Coding (TEC) (Hommel, Müsseler, Aschersleben, & Prinz, 2001). The TEC states that all perceived stimuli and planned actions are represented in the brain through stimulus and response codes (Hommel et al., 2001). Referential coding refers to the fact that stimuli are coded relative to other stimuli or events that have our attention (Treccani et al., 2006, as cited in Dolk, Hommel, Prinz, & Liepelt, 2013). Referential coding can appear on several dimensions, for example spatial location or colour. When a stimulus appears on the left side of the screen, perceiving this stimulus primes an event code that automatically prepares the brain for a left sided response (Hommel et al., 2001). To give an example on the colour-dimension, when participants are primed with the colour green, event codes for green stimuli are activated that cause participants to respond faster to green stimuli. The SE occurs because of a mismatch between stimulus and response codes. When stimulus and response codes are incongruent, participants show a longer reaction time.

Research has shown that when participants perform on a one sided Simon task, which means they only have to respond to one kind of stimulus, the SE does not occur (Sebanz, Knoblich, & Prinz, 2003). During a one sided Simon task, participants have one response action, which makes the chance of a mismatch between stimulus and response codes unlikely. However, Sebanz and colleagues (2003) also conducted the Simon task in pairs of participants. Participants were instructed to respond to one stimulus each, so no SE was expected. Surprisingly, a significant SE did show. Sebanz and colleagues (2003) hypothesised that this effect is related to the amount of self-other integration between the two participants. This effect was called the Joint Simon Effect (JSE). Research confirmed that the JSE is related to self-other integration, with a higher JSE indicating a higher level of self-other integration. For example, the JSE is sensitive to similarities between the two co-actors, since it is influenced by racial similarity (Croker, Jordan, Schloesser, & Cialdella, 2015), group membership and social status (Aquino et al., 2015; Müller et al., 2011). When performing the joint Simon task with a friendly confederate, the JSE is higher than when performing it with an intimidating confederate (Hommel, Colzato, & Van den Wildenberg, 2009). In addition, when the co-actor of the joint Simon task is a friend, the JSE is positively correlated with empathy (Ford & Aberdein, 2015). The size of the JSE can also be influenced by cognitive states that cause a more integrative or exclusive view (Colzato, De Bruijn, & Hommel, 2012; Colzato et al., 2012; Colzato, Van den Wildenberg & Hommel, 2013).

The JSE is reliable in many social settings. For example, the JSE has occurred in a study where participants worked individually on a computer, but were told that they were performing the task with another person. The JSE did not occur when the participants were informed that they were doing the task with a computer simulated co-actor (Tsai, Kuo, Hung, & Tzeng, 2008). Wen and Hsieh (2015) conducted this set-up in an MRI-scanner and found the same significant results. In addition, MRI data indicated that the medial prefrontal cortex showed increased activity, a finding that fits with previous evidence that this area is related to the intentions and beliefs of other people (Wen & Hsieh, 2015). Other research however, found no significant JSE when participants did not know the location of the co-actor (Sellaro, Treccani, Rubichi & Cubelli, 2013).

The abovementioned research suggests that the joint Simon task could be used as a cognitive measure of a social construct; self-other integration. However, falsification is always important. Several studies tried to de-socialize the JSE and found that it is also solid in non-social situations. For example, a significant JSE showed when a participant conducts the task with a Japanese waving cat or a ticking metronome as co-actor (Dolk, et al., 2013). This could be explained by the fact that the TEC does not differentiate between self-performed actions and other-perceived actions (Hommel et al., 2001). People code their responses in reference to a co-actor when this co-actor is merely present and salient (Dolk

et al., 2013). This is a non-social explanation for the JSE and would make this task of no use for social research. However, the earlier mentioned research does suggest that the JSE also depends on social factors. There should be an explanation for these findings. Dolk and colleagues (2014) were able to find an explanation for the social aspect in the joint Simon task. As mentioned before, the TEC does not differentiate between self and other, therefore actions of others can be coded as our own actions. This effect is larger however, when the co-actor is similar to us (Dolk et al., 2014). In addition, research has shown that group membership (Avenanti, Sirigu & Aglioti, 2010) and positive interpersonal relationships (Mikulincer, Orbach & Iavnieli, 1998) cause a more positive evaluation of another person (Brewer, 1979) and increase the feeling of self-other overlap (Davis, Conklin, Smith & Luce, 1996). Logically, it can be reasoned that this also works the other way around and that a positive relationship induces a larger perceived similarity (Heider, 1958, as cited in Dolk et al., 2014). This would explain the link between positive relationships, a feeling of similarity and integration, a larger referential coding and therefore a larger size of the JSE (Dolk et al., 2014). Conclusively, this would suggest that the joint Simon task is valid to measure self-other integration objectively, and can be used in this study.

The joint Simon task is often conducted by two participants working together on one computer. In this study however, participants are seated in a circle and are working individually on a laptop. It is important to consider the design of the joint Simon task thoroughly. Spatial factors and distance between the participants need to be forethought. Research by Guagnano, Rusconi and Umilta (2010) found a significant JSE when participants were working together within arm-reach, but not when they were working on a larger distance. This tells us that a co-actor needs to be within peripersonal space to act as a reference point. Other research showed that spatial location is very important in the design of a joint Simon task (Dittrich, Dolk, Rothe-Wulf, Klauer & Prinz, 2013). When participants are sitting vertically relative to each other, they code their actions vertically and a Simon task where stimulus- and response location are vertically arranged is needed to induce a JSE. In this study, participants are sitting in a circle. Since they are not directly horizontally or vertically next to each other, a joint Simon task with spatial dimensions will not serve the purpose of the research. Therefore, in this study, a modified version with a colour dimension will be used, a task previously and successfully used by Sellaro, Dolk, Colzato, Liepelt and Hommel (2015). In this task, participants receive the instruction to respond to either squares or triangles, presented at the centre of the screen, by pressing a designated key. Participants are told that they are coupled with a co-actor, responding to the alternative shape. The squares or triangles appear in red or green, but participants are told that the colour of the stimuli is irrelevant. Since the participants are wearing a red or green pair of gloves, they are primed to respond faster to colour-congruent stimuli. The

difference between reaction times on colour-congruent and colour-incongruent stimuli represents the JSE.

Hypotheses

In sum, positive interpersonal relationships, the feeling of self-other integration and self-disclosure are important factors for group performance. Literature suggests that furniture arrangements affect these constructs. Sitting face to face increases positive affiliation (Mehrabian & Diamond, 1971), positive interpersonal relationships and self-other overlap (Davis et al., 1996). Self-disclosure however, might be facilitated by a less intimate furniture arrangement (Jourard & Friedman, 1970). In this study, these theories will be tested in the LEF future center. The main goal of this study is to provide the facilitators of the LEF future center with lines of approach to enhance group cohesion and avoid group think. Also, it might give the LEF future center scientific support for their way of working. The central question of this study is: How does furniture arrangement influence self-other integration and self-disclosure?

In this study, two different furniture arrangements that are often used at the LEF future center will be tested. Participants will be tested in groups of six, seated in one of the two furniture arrangement conditions. In the first condition, participants will sit in a circle facing towards each other, in the second condition they will face away from each other. The dependent variables are self-other integration and self-disclosure. To measure self-other integration, the joint Simon task will be used. Participants will perform this task individually, but they will be informed that they are coupled with a random member of the group. We have chosen this setting because we want to measure the feeling of integration with the group instead of the integration with the co-actor alone. In addition to this task, participants will be asked to rate on a 7-point Likert scale how integrated they feel with the co-actor and the group. Self-disclosure will be measured with the Revised Self Disclosure Scale (RSDS), in which participants will score statements about self-perceived self-disclosure on a 7-point Likert scale (Wheeless, 1978; Wheeless & Grotz, 1977).

The first hypothesis is that an arrangement facing towards each other will increase self-other integration, compared to an arrangement facing away from each other. This will be tested with the joint Simon task, where reaction times will be measured and a higher JSE is expected in the first condition than in the second condition. We also expected the self-reported feeling of self-other integration to be higher in the first condition than in the second condition. The second hypothesis is that an arrangement facing away from each other will increase the self-disclosure scores as measured by the RSDS, compared to an arrangement facing towards each other.

Method

Participants

58 participants took part in this study, 32 women and 26 men. The sample size was decided based on an a-priori sample size calculation conducted with the program GPower (Faul, Erdfelder, Lang & Buchner, 2007). For both tasks the calculation was two-tailed, an alpha of 0.05 was adopted and a power of 0.8 was considered acceptable. For the joint Simon task, the expected effect size was d = 0.45 (e.g. Sellaro et al., 2015) and for the Revised Self Disclosure Scale (RSDS) an effect size of d = 0.6 (e.g. Leung, 2002) was expected. The power analyses indicated that 48 participants would give sufficient power to detect the effects of the joint Simon task using a mixed ANOVA. A sample size of 60 would be needed to detect effects of the RSDS using an ANOVA.

Every participant signed the informed consent and completed all the tasks. The participants were recruited by a recruitment agency and received a compensation of 17,5 euro for 45 minutes of participation. They were pseudorandomly assigned to one of the two furniture arrangement conditions. The recruitment agency was asked to recruit physically and mentally healthy participants between the ages of 18 and 40 that preferably received higher education. The mean age of the participants was M = 29.2 years, SD = 6.35, with a minimum age of 19 and a maximum age of 40. All participants received higher education, 33 were university-educated and 25 were HBO-educated (university of applied sciences).

Material

For the furniture arrangements, L-shaped chairs were used. The chairs were placed in circles of six, either facing towards each other or facing away from each other as presented in Figure 1. In order to induce a JSE in the joint Simon task, participants were primed with either the colour red or green. For this cause, three red and three green chairs were used and participants were wearing red or green coloured gloves. To bring about the feeling of self-other overlap, it was important that participants were sitting in, or close to, each other's peripersonal space (Guagnano et al., 2010), therefore the distance between the chairs was relatively small. In the second condition participants did not sit in each other’s peripersonal space, this was not possible because of the large backrest of the chairs. Participants performed the tasks on Fujitsu Laptops, the data were collected using E-Prime 2.0 software. Participants worked with the laptop on their lap. The keyboard was used to perform the tasks. No mouse or mousepad was needed.

Figure 1. The two furniture arrangement conditions

Tasks

The joint Simon task was used to measure self-other integration. Participants received the instruction to respond to either squares or triangles, presented at the centre of the screen, by pressing a designated key. The squares or triangles could appear in red or green. Participants were instructed to ignore the colour of the stimuli and react as fast and accurate as possible. Since the participants were all sitting on a red or green chair and were wearing a red or green glove, they were primed to respond faster to colour-congruent stimuli. The six participants were informed that their laptops were connected so they would be working in pairs where one of the pair responds to the squares and the other one responds to the triangles. In fact, the participants all worked individually.

Each trial started with the presentation of a white fixation cross on a black screen for a random period between 1450 and 1950 ms. The target stimulus was shown until the participants responded, but not longer than 800 ms. Participants performed a practice block of 40 trials with feedback on their response. Feedback for the co-actor's responses was simulated, 10% of the co-actor's responses were marked as incorrect in order to enhance the belief of cooperation. After this practice block, three experimental blocks of 60 trials each were conducted, with 20 second breaks in between the blocks.

The Revised Self-Disclosure Scale (RSDS) is a questionnaire with 31 statements about self-perceived self-disclosure. For this study, the questionnaire was translated into Dutch. The participants marked the statements reflecting on the relationship with the co-actor from the joint Simon task. The statements were rated on a 7-point Likert scale. This questionnaire focuses on five aspects of self-disclosure: intended disclosure, positiveness, honesty, amount of disclosure and depth of disclosure. In this study, this instrument is chosen, because of the high reliability, which is between .85 and .91 for all of the five aspects (Wheeless, 1978). In addition, this scale is often used, also in recent research (e.g. Leung, 2002; Myers & Johnson, 2004; Shirley, Powers & Sawyer, 2007; Thon & Jucks, 2014).

Design

This study has a two factor design. The first factor is furniture arrangement with two conditions: facing towards each other and facing away from each other. The dependent variables are self-other integration and self-disclosure. The second factor is colour-congruence, with reaction time as dependent variable. Participants completed the study in one furniture arrangement condition only.

Procedure

This study has been approved by the Psychology Research Ethics Committee of Leiden University. When the participants arrived, in groups of six, they first received information about the procedure. After the informed consent was signed, the test phase began. The participants were seated one of the two furniture arrangement conditions. They received a laptop and a pair of gloves. After this, they read the instructions on the screen concerning the first task, which was the joint Simon task. It was important that the participants started the task simultaneously, therefore they started after a sign from the experimenter. The joint Simon task took approximately 20 minutes.

When the joint Simon task was finished, participants completed the RSDS (Wheeless, 1978; Wheeless & Grotz, 1977) in approximately 10 minutes. When the questionnaire was completed, two questions about the joint Simon task were to be answered: Participants had to rate on a 7-point Likert scale how integrated they felt with their co-actor and the group. Afterwards, the participants received a debriefing letter and the opportunity to ask questions about the study. In total, the duration of the study was not longer than 45 minutes.

Analysis

The reaction times measured by the joint Simon task were analysed by means of analysis of variance (ANOVA), with colour congruency (congruent vs. incongruent) as a within-participants factor, and orientation (facing towards vs. facing away) as a between-participants factor. In case of a significant congruence*orientation interaction, the Bonferroni post hoc test would be used to analyse differences between the two groups. Accuracy was analysed by means of ANOVA with error rates for congruent and incongruent stimuli as dependent variables and orientation as independent factor.

The participants were asked to rate on a 7-point Likert scale to what extent they felt integrated with the co-actor and the group. This ordinal data could only be tested with parametric tests when the necessary assumptions were met. The ratings would be analysed by means of ANOVA. In case of violations of the assumptions, a Mann Whitney U test would be conducted, with the ratings as dependent factors and orientation as independent factor.

The RSDS measures self-disclosure on 5 aspects; intended disclosure, positiveness, honesty, amount of disclosure and depth of disclosure. Total scores of self-disclosure were analysed, as well as the 5 aspects separately. When assumptions were met, an ANOVA would be conducted with furniture arrangement as independent variable and self-disclosure scores as dependent variables. When assumptions were violated, a Mann Whitney U test would be used to analyse the data from the RSDS. Lastly, possible correlations between congruence and self-disclosure were explored. For these correlations, the difference in reaction time means between congruent and incongruent stimuli (congruence) and the scores on self-disclosure were taken into account. A significance level of 0.05 was used for all tests, the analyses were performed in SPSS 20.

Results

Descriptive statistics

58 participants were tested, divided in two conditions. A marginally significant difference in gender of the participants in the two conditions was found, X^2 (1, N = 58) = 3.32, p = .068, with a higher percentage of men (57%) tested in the first condition than in the second condition (33%). The age of the participants did not differ significantly, X^2 (19, N = 58) = 14.48, p = .75. On the aspect of education, a significant difference was found, X^2 (1, N = 58) = 5.78, p = .02, with a higher frequency WO-educated participants in the first condition (71%) than in the second condition (40%). The descriptive statistics of the participants in the two conditions are presented in Table 2.

Table 2*. Descriptive statistics of the participants*

	First condition	Second condition
N	28	30
Men	16	10
Women	12	20
Age [SD]	29.37 [1.30]	28.97 [1.12]
HBO-educated	8	18
WO-educated	20	12

Joint Simon task

The joint Simon task measured reaction times (RT) for congruent and incongruent stimuli. The RT means were analysed using a mixed ANOVA, with colour congruency (congruent RT vs. incongruent RT) as a within-participants factor, and orientation (facing towards vs. facing away) as a between-participants factor. The assumptions to conduct a mixed ANOVA had been met. One participant was removed from the data because of a low response rate on incongruent trials and RT means being significant outliers, $N = 57$. The data for the dependent measures were normally distributed in both conditions. Levene's test indicated homogeneity of the variances: Congruent, $F(1,55) = .613$, $p = .437$; Incongruent, $F(1,55) = 1.25$, $p = .276$.

Congruence

The results showed that the congruency effect, the difference in RT between congruent and incongruent stimuli, was marginally significant, $F(1,55) = 3.79$, $p = .057$, partial $\eta^2 = 0.065$. RT were shorter for congruent stimuli, $M = 365$, $SD = 34.08$, than for incongruent stimuli, $M = 369$, $SD = 37.09$. These results suggested that participants respond faster to stimuli with the same colour as the prime.

*Congruence*orientation*

The congruence*orientation interaction effect was not significant, $F(1,55) = .575$, $p = .452$, partial $\eta^2 = 0.010$. Congruent, Facing towards, $M = 359$, $SD = 37.14$; Incongruent, Facing towards, $M = 365$, $SD = 42.06$; Congruent, Facing away, $M = 370$, $SD = 30.42$; Incongruent, Facing away, $M = 373$, $SD = 31.83$. No significant effect of orientation on the size of the congruency effect was found. RT means and standard deviations in the two orientations are presented in Figure 3.

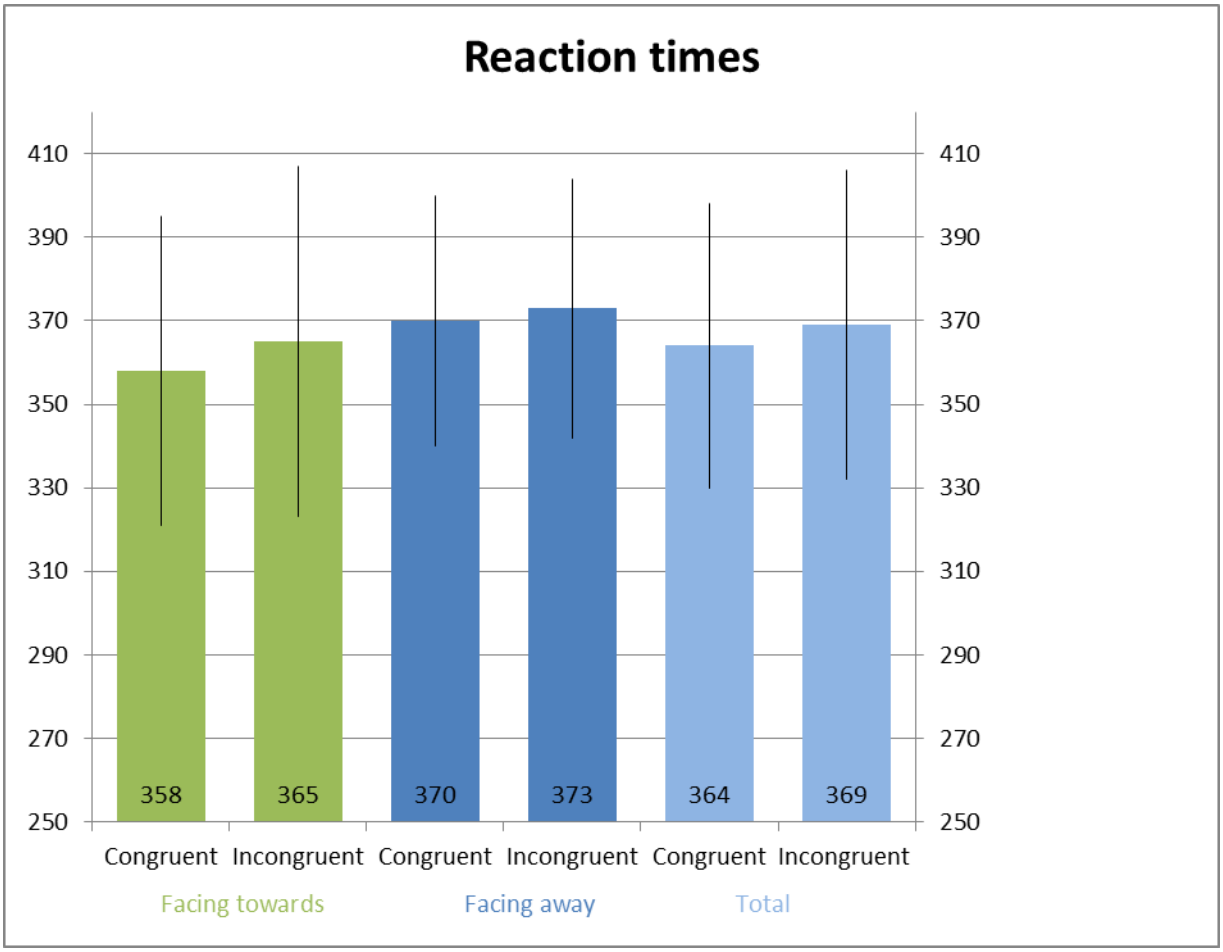

Figure 3. Reaction time means (ms) and standard deviations for congruent and incongruent stimuli in the two furniture orientations

*Congruence*colour of prime*

When observing the data, a difference in the size of the congruency effect between participants primed with red and green seemed to be present. To explore whether this difference was significant, an ANOVA was conducted with congruence as within-participants factor and colour of prime as between-participant factor. The interaction effect of congruence*colour of prime was marginally significant, $F(1,55) = 3.413$, $p = .07$, partial $\eta^2 = .058$. A close to significant effect of colour of prime on the size of the congruency effect was found. The means and standard deviations of the two groups are presented in Figure 4ab and Table 4c.

When analysing the congruency effect without the participants with a red prime, a highly significant congruency effect was found, $F(1,27) = 13.206$, $p = .01$, partial $\eta^2 = .328$. However, no significant congruence*orientation interaction effect was found, $F(1,27) = 0$, $p = .984$, partial $\eta^2 = 0$.

When solely analysing the participants with a red prime, no congruency effect was found, $F(1, 26) = .04$, $p = .953$, partial $\eta^2 = 0$. The congruence*orientation interaction effect was also not significant, $F(1,26) = .92$, $p = .346$, partial $\eta^2 = .034$.

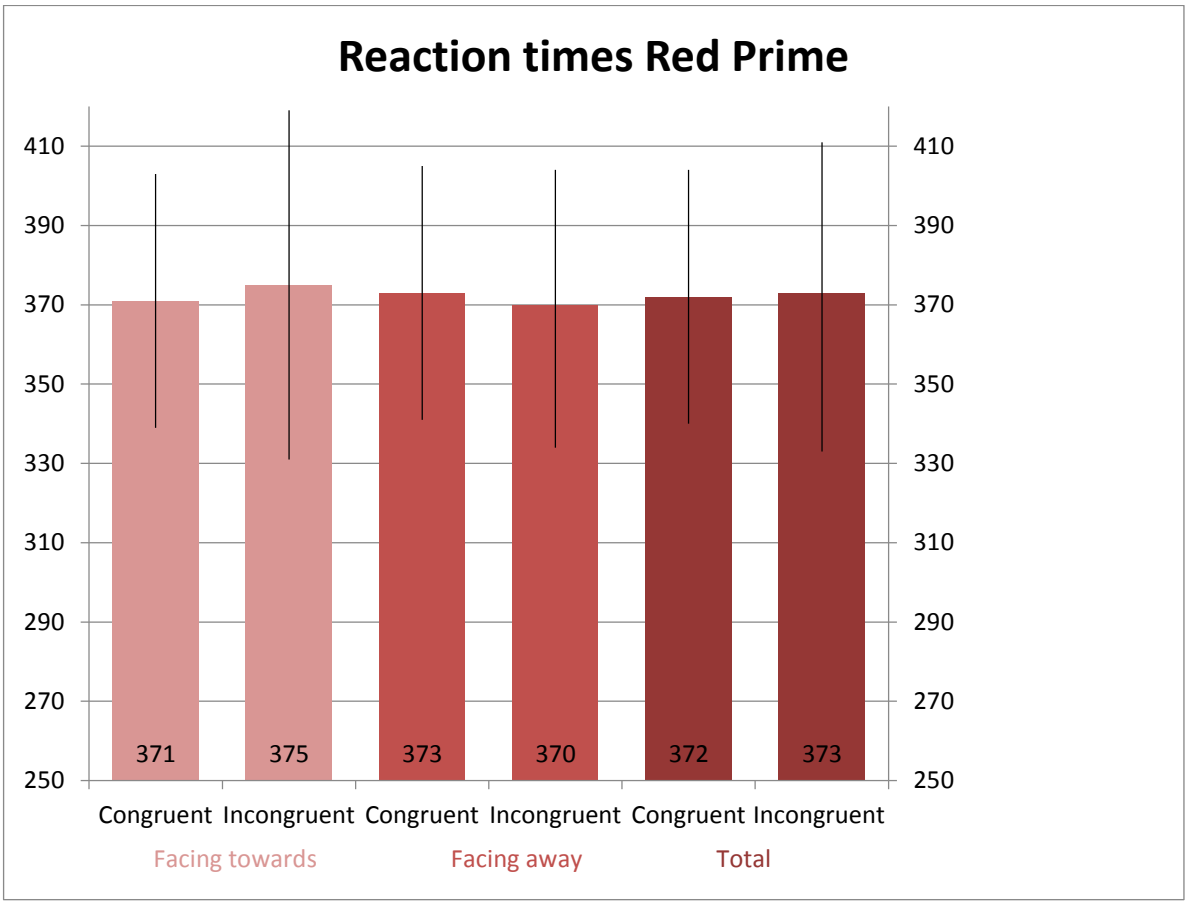

Figure 4a. Reaction time means (ms) and standard deviations for congruent and incongruent stimuli in participants primed with red

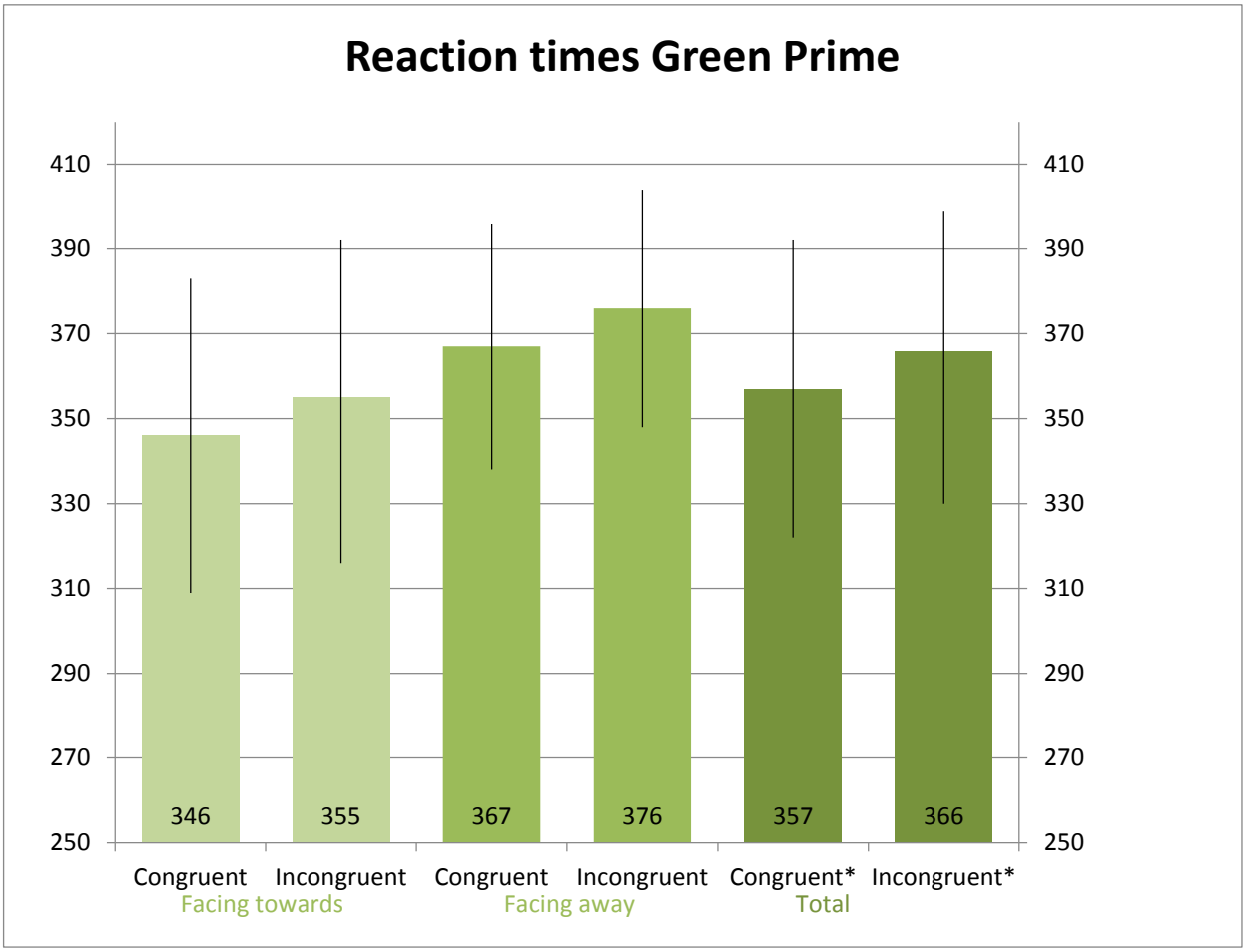

Figure 4b. Reaction time means (ms) and standard deviations for congruent and incongruent stimuli in participants primed with green,* indicates a significant difference

Table 4c. *Reaction time means (ms) and [SD] for participants primed with red and green*

	Green Prime	Red Prime
Congruent total	357 [35.00]	372 [31.83]
Incongruent total	366 [34.17]	373 [39.74]
Congruent, Facing towards	346 [37.98]	371 [32.82]
Incongruent, Facing towards	355 [38.21]	375 [44.55]
Congruent, Facing away	367 [29.64]	373 [32.01]
Incongruent, Facing away	376 [28.63]	370 [35.74]

Self-reported self-other integration

Participants were asked to rate on a 7- point Likert scale to what extent they felt integrated with the co-actor in the joint Simon task and the group. For these ratings to be analysed by means of ANOVA, some assumptions needed to be met. The data complied to these assumptions in some aspects, the data were normally distributed in each group and no significant outliers were detected, $N = 58$. However, Levene's test indicated a difference in homogeneity of variances between the groups, integration with group, $F(1,56) = 7.34$, $p = .009$; integration with co-actor, $F(1,56) = 1.38$, $p = .244$. As a consequence of this violation, we needed to conduct a non-parametric test, the Mann Whitney U test. The results indicated no difference in the reported feeling of integration with the co-actor in the two orientations, U = 398.5, $p = .733$; Facing towards, $M = 3.11$, $SD = 1.72$; Facing away, $M = 3.17$, $SD = 1.48$. However, a significant difference in the reported feeling of integration with the group was present between the two orientations, U = 264.5, $p = .012$; Facing towards, $M = 3.04$, $SD = 1.71$; Facing away, $M = 1.91$, $SD = 1.17$. The results indicate that orientation does not influence the feeling of integration with the co-actor, but it does seem to affect the feeling of integration with the group. The means and standard deviations are presented in Figure 5.

A significant correlation has been found between the scores of self-reported feeling of integration with the group and integration with the co-actor, $r(55) = .386$, $p = .003$. No significant correlation has been found between congruence (difference incongruent and congruent RT means) and self-reported feeling of integration with the co-actor, $r(55) = .157$, $p = .245$, or the group, $r(55) = .084$, $p = .535$. Since the participants primed with red showed no congruency effect, the chance of finding a correlation was small. However, when the participants primed with red were excluded from the data, the correlation remained insignificant for both the integration with the co-actor, $r(29) = .307$, $p = .107$, and the group, $r(29) = -.072$, $p = .7$

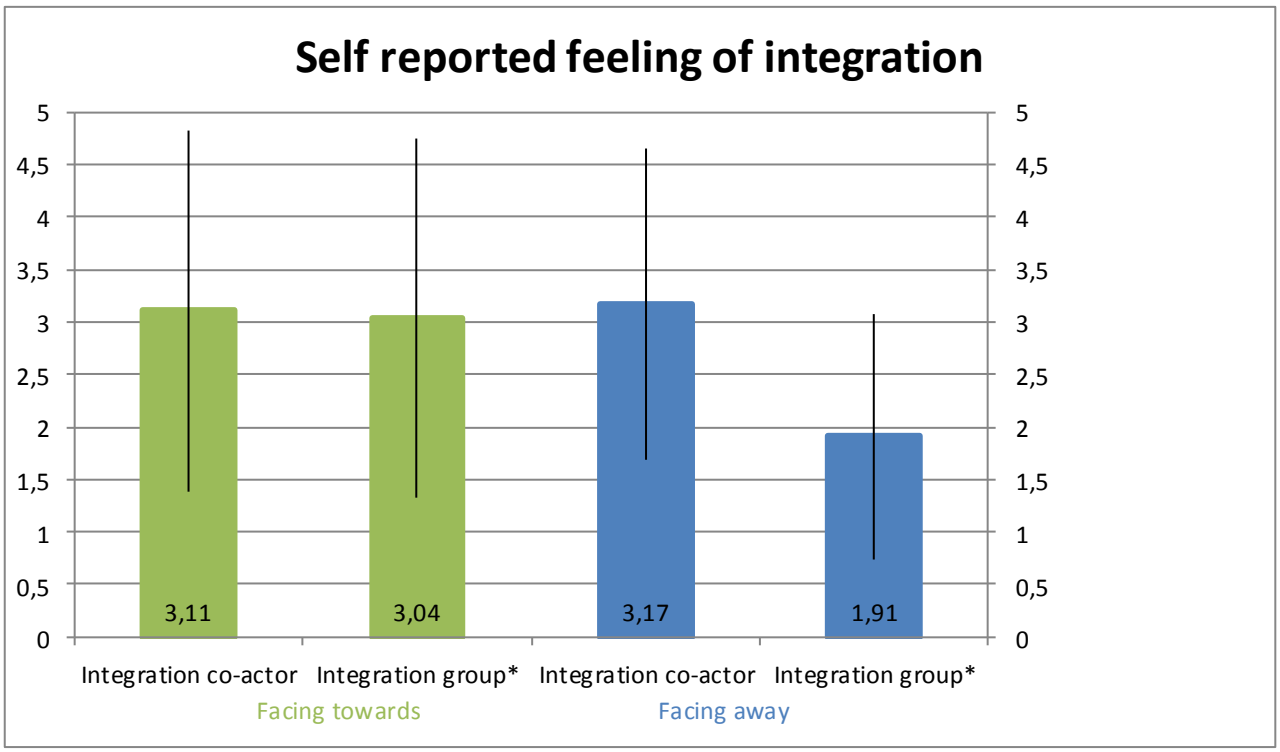

Figure 5. Self-reported feeling of integration, * indicates a significant difference

Accuracy

Accuracy was analysed by means of ANOVA, with congruence as within-participant factor and orientation as between-participant factor. The data met the assumptions for ANOVA. One participant was excluded from the analysis because of a low response rate on incongruent trials and accuracy scores being significant outliers, N = 57. Levene's test showed no differences in homogeneity of variances, Accuracy congruent, $F(1,55) = .982$, $p = .362$; Accuracy incongruent, $F(1,55) = 3.82$, $p = .056$. Accuracy overall was very high, $M = .98$, $SD = .23$. No difference was found in accuracy between congruent and incongruent stimuli, $F(1,55) = 2.06$, $p = .652$. The results also showed no difference in accuracy between the two orientations, $F(1,55) = 6.62$, $p = .491$. Accuracy scores are presented in Table 6.

No significant correlation between accuracy and RT means was found for congruent stimuli, $r(57) = -.181$, $p = .177$. For incongruent stimuli a significant negative correlation was found, $r(57) = -.386$, $p = .05$. These findings suggested there is no speed-accuracy trade off (Salthouse & Hedden, 2002).

Table 6. *Accuracy scores and [SD]*

	Congruent	Incongruent
Accuracy	.984 [.019]	.981 [.037]
Accuracy facing towards	.983 [.024]	.977 [.051]
Accuracy facing away	.985 [.014]	.987 [.012]

Self-disclosure

To measure the effect of orientation on self-disclosure, participants completed the Revised Self Disclosure Scale (RSDS). This questionnaire with 31 items was rated on a 7-point Likert scale. The RSDS measures self-disclosure on several aspects; intended disclosure, honesty, positiveness, amount of disclosure and depth of disclosure. To parallel the scores, several items were recoded so that higher scores indicate higher levels of self-disclosure. The internal consistency of the RSDS in this study was sufficient, a = .832. For the separate scales within the RSDS, Cronbach's alpha coefficients were as follows: intended disclosure = .612, positiveness = .816, honesty = .782, amount of disclosure =.789, depth of disclosure = .798. According to the general guidelines, an internal consistency of .70 is considered sufficient (Nunnally, 1978). However, other research stated that the reliability of a construct is acceptable when above .60, especially when the number of items is low (Hair, Black, Babin, Anderson & Tatham, 2006). This indicated that even the internal reliability for the aspect 'intended disclosure' was adequate.

Since the RSDS conveys ordinal data, several assumptions needed to be met in order to be analysed by means of ANOVA. The data was normally distributed and clear of significant outliers, N = 58. Levene's test had shown homogeneity of the variances, $F(1,56) = .00$, $p = .994$. These findings indicated the data was fit to be interpreted by means of ANOVA.

The results showed no significant effect of orientation on self-disclosure scores, $F(1,56) = 1.51$, $p = .699$. On the different aspects of self-disclosure, again no significant differences between the groups were found. The means and standard deviations of the RSDS scores on different aspects of self-disclosure are presented in Table 7.

The previous results indicated a difference between participants primed with red and green, this difference was absent in the self-disclosure scores, $F(1,56) = .630$, $p = .431$.

Table 7*. RSDS means and [SD]*

	Facing towards	Facing away
Intended discosure	21.89 [3.09]	22.43 [2.87]
Positiveness	29.50 [5.75]	29.43 [5.06]
Honesty	39.14 [6.75]	39.50 [6.15]
Amount	29.32 [6.92]	29.20 [8.44]
Depth	16.32 [5.91]	17.33 [5.20]
Self-disclosure total	136.17 [15.92]	137.90 [17.63]

Correlation congruence and self-disclosure

We analysed whether congruence and self-disclosure scores correlated. No significant correlations between these measures could be found, $r(57) = -.009$, $p = .949$. When the participants with a red prime were excluded from the data, because they show no congruency effect, the correlation remained insignificant, $r(29) = -.016$, $p = .935$.

Discussion

Self-other integration

In this study, we investigated whether furniture arrangements affect self-other integration. In this section, the results on self-other integration will be discussed, as well as factors that may have influenced these results. Two furniture arrangements that are often used in the LEF future center were compared. Whereas in the first condition participants were facing towards each other, in the second condition they faced away from each other. Previous research in this area found that people feel closer to each other, show more affiliation and describe relationships as more positive when they face each other directly (Mehrabian & Diamond, 1971; Larsen & Smith, 1981; Coker & Burgoon, 1987). Our hypothesis was in line with this research, we expected that the furniture arrangement in the first condition would induce better interpersonal relationships and therefore a higher feeling of self-other integration (Dolk et al., 2014), than the furniture arrangement in the second condition. The joint Simon task was used to test this hypothesis. We expected to find a difference between the reaction times on congruent and incongruent stimuli, a joint Simon effect (JSE). This effect occurs when participants feel similar to their co-actor and when a positive interpersonal relationship is experienced that causes a feeling of self-other overlap (Dolk et al., 2014). A larger JSE indicates a higher level of self-other integration (Dolk et al., 2014), therefore we expected that the size of the JSE would be larger in the first condition than in the second condition. In addition to the joint Simon task, participants were asked to rate on a 7-point Likert scale to what extent they felt integrated with the co-actor and the group, we expected this self-reported feeling of integration to be in accordance with the results of the JSE.

The results cannot completely confirm the hypothesis. The congruency effect approached near significance, indicating that participants felt integrated with the co-actor. The congruence*orientation interaction effect was not significant, implying that there was no effect of furniture arrangement on self-other integration. Even though the findings failed to be significant, the reaction time means as presented in Figure 3 are in line with the hypothesis, a larger JSE seems to be present in the first condition than in the second condition.

An unexpected finding manifested itself: a close to significant difference in the size of the congruency effect between participants with the red and green prime was found. When analysing these groups of participants separately, a highly significant congruency effect was found in the group with the green prime. This is in contrast with the group primed with red, where the congruency effect is insignificant. This observation suggests that half of the participants was not successfully primed during the study. It is not clear why the red glove and chair did not prime the participants to respond faster to red stimuli. No errors in the programming of the task or the encoding of the data could be found. In another joint Simon study by Sellaro and colleagues (2015) with a comparable task using red and green stimuli, this priming fallacy did not occur. An explanation for the priming error might be that a black background was used in the current task, where a grey background was used in Sellaro and colleagues' (2015) version of the task. In the current study, the green stimuli were bright and therefore might have had a higher saliency on the black background than the red stimuli. Research does show that people respond faster to salient stimuli than to less salient stimuli (Kerzel & Schönhammer, 2013). Perhaps the saliency of the green stimuli reduced the effect of the red prime, therefore no difference in reaction time means was found. This unfortunate and unforeseen effect has decreased power to find conclusive results.

Even when excluding the participants primed with red, no significant interaction effect was found, indicating that furniture arrangement does not affect the feeling of self-other integration. The joint Simon task has not been studied before with furniture arrangement as independent factor. Distance, however, has been the subject of a previous study. This research stated that a significant JSE solely occurs when co-actors are placed in each other's peripersonal space (Guagnano et al., 2010). In the current study, this was the case in the first condition but not in the second condition. A difference between the two groups could have been expected based on this research, but our results do not support these findings. Also the previously discussed research on which the hypothesis was based (Mehrabian & Diamond, 1971; Larsen & Smith, 1981; Coker & Burgoon, 1987, Dolk et al., 2014), is not in agreement with the current findings.

Several factors may have influenced the JSE and decreased power to find significant results. First of all, participants did not perform a 'standard' joint Simon task where they work together side by side. In this study, participants did not know who their co-actor was which could have decreased the feeling of self-other integration. This setting was chosen, because the aim was to measure the feeling of integration with the group instead of with one co-actor alone. The JSE is sensitive for similarities between co-actors (Dolk et al., 2014). Since groups are in general more diverse than one person, the feeling of similarity with the group could have been lower than the feeling of similarity with just one designated co-actor. In addition, a considerable amount of scientific research is conducted with

university students as participants, often aged between 19 and 25. This is also the case for many joint Simon studies (e.g. Hommel et al., 2009; Aquino et al., 2015; Sellaro et al., 2015). In this study however, the participants were recruited by a recruitment agency, therefore the range of age was broader; between 19 and 40 years old. When people differ largely in age, the feeling of similarity and self-other overlap might be lower than when they are all young adults.

Another factor that could have reduced the size of the JSE was the programming of the task. During a 'standard' joint Simon task, the responses of the co-actor typically show a congruency effect. In this study, we have decided to include no congruency effect in the programmed responses of the co-actor, in order to rule out the chance that the size of the JSE is influenced by the size of the JSE of the co-actor. However, it is a possibility that in a standard joint Simon task the congruency effect in the co-actor's response enforces the size of the JSE. However, a significant JSE is also found in studies where the computer simulated responses of the co-actor show no congruency effect (Tsai et al., 2008; Wen & Hsieh, 2015), indicating that if this effect occurs, it is probably a small effect. Nonetheless, it is possible that in our study the co-actor showing no congruency effect might have decreased the size of the JSE in the participants.

Even though the joint Simon effect showed no results, significant effects concerning the self-reported feeling of self-other integration are found. Participants were asked to rate on a 7-point Likert scale to what extent they felt integrated with the co-actor and the group. The results showed that furniture arrangement significantly affects how integrated participants felt with the group. In line with the hypothesis, participants felt less integrated with the group in the furniture arrangement facing away from each other than when facing towards each other. This suggests that furniture arrangement does affect groups, but maybe these effects are too small to be detected with the joint Simon task. No correlation between the size of the JSE and self-reported feeling of integration was found, which indicated that in this study the joint Simon task did not represent the reported feeling of self-other integration.

The joint Simon task is a very interesting, cognitive task that might be of good use in social research. However, it might not be suited for measuring self-other overlap in groups since the feeling of integration with a group is often lower than the feeling of integration with one other person. This may have decreased the size of the JSE and therefore also decreased power to find significant results. However, the reaction time means are in line with the hypothesis and no contradicting results are found. The findings showed that people report to feel less integrated with the group when facing away than when facing towards, implying that furniture arrangement may have an effect on groups.

Self-disclosure

The second aspect that was investigated in this study is self-disclosure. In this section, the results on self-disclosure will be discussed. Self-disclosure is an important aspect at the LEF future center and previous research suggests that it is influenced by furniture arrangements. It is found that people show lower levels of self-disclosure in an intimate setting than in a more spacious setting (Jourard & Friedman, 1970). An increase in proximity leads to an increase in negative feelings (Albert & Dabbs, 1970; Yildirim & Akalin-Baskaya, 2007) that could decrease self-disclosure tendency (Okken, 2013). Based on these studies it was hypothesised that a furniture arrangement facing away from each other would increase self-disclosure tendency, compared to an arrangement facing towards each other which would decrease self-disclosure tendency.

The results show no significant differences in self-disclosure scores between the groups. However, the means show that on some aspects of self-disclosure, means are slightly higher when facing away from each other. This finding, even though not significant, is in line with the hypothesis.

A factor that could have decreased the effect on self-disclosure is that participants were performing the tasks in isolation. Participants did not know each other beforehand and they did not talk to each other during the study, in this situation it is difficult to judge to what degree they would self-disclose. Many other studies on furniture arrangement did choose for a setting where participants talked to each other in person (Albert & Dabbs, 1970; Jourard & Friedman, 1970; Mehrabian & Diamond, 1971). We chose not to include communication because in that case additional factors might have influenced the results. In this study, communication could have influenced liking and liking could affect the size of the JSE (Dolk et al., 2014) and self-disclosure scores (Collins & Miller, 1994). This would have been an unwanted confounder in the data.

Overall, with some of the self-disclosure means pointing in the same direction, cautious evidence that self-disclosure tendency is higher when in a spacious setting might have been found. More extensive research with more participants might replicate these findings with more conclusive results.

General discussion

The goal of the current study was researching a facilitation method of the LEF future center in order to enhance group cohesion and group performance. The effects of furniture arrangement on self-other integration and self-disclosure were investigated. In this section, the hypotheses and results will be mentioned briefly. In addition, general limitations and positive aspects of the study will be discussed, as well as implications and suggestions for future research. The first hypothesis was that an arrangement facing towards each other will increase the feeling of self-other integration, compared to an arrangement facing away from

each other. The second hypothesis was that an arrangement facing away from each other will increase the tendency to self-disclose, compared to an arrangement facing towards each other. Even though we found little conclusive results, some findings can be named. First, a close to significant congruency effect (and a highly significant congruency effect when excluding participants primed with green) is found. It can be stated that a JSE is present. Even though the joint Simon task indicates no significant results between the conditions, self-reported feeling of integration with the group did show a significant effect in accordance with the hypothesis. On the aspect of self-disclosure, some of the means are in line with the hypothesis. The fact that a large part of our results are in line with the hypotheses and no contradicting results are found, could indicate that the proposed effects are present in the current data, but the effect sizes are too small to indicate significant results.

Limitations related to one of the two dependent variables are previously discussed, some general aspects that may have negatively influenced power will be mentioned in this section. First, the effect sizes were substantially smaller than anticipated and as a result more participants were needed. 58 participants took part in this study, this sample size was calculated to give sufficient power. However, since the effect sizes were very small, more participants will be necessary in future research on this subject.

An aspect that could have influenced the results were the laptops that participants were working on. Research has shown that when sitting behind a large desk, people have a higher tendency to self-disclose, than when small desks are used (Okken, 2013). People feel safer with a barrier in between themselves and their co-actor. Because we wanted to avoid a barrier between the participants and the group, no desks were used and the laptops were placed on participants' laps. However, the laptops could still have functioned as a barrier from the group. The laptops could have increased self-disclosure scores in the first condition, because participants felt sheltered. In addition, the laptops could have decreased the feeling of self-other integration in the first condition, because of the physical barrier between the participant and the group.

The short duration of the study can be considered a drawback. Research shows that frequently being exposed to something or someone increases liking. This effect occurs without any form of communication and is called the mere-exposure effect (Zajonc, 1968). Since liking causes higher scores of self-disclosure (Collins & Miller, 1994) and self-other integration (Dolk et al., 2014), a longer duration could have positively influenced the self-disclosure scores and the JSE in the first condition where participants were able to see each other. The mere-exposure effect even influences feelings of perceived similarity (Moreland & Zajonc, 1982), an important aspect for the joint Simon task. Perhaps if the duration of the study was longer, the feeling of similarity would have developed stronger in the first condition. Consequently, a higher JSE could have been found in the first condition.

Apart from limitations and drawbacks, also positive aspects of this study can be named. First, it can be mentioned that the participants were not recruited by the university, but by a professional recruitment agency. Most of them did not participate in research before, therefore they were relatively naive to research methods. Pretending to cooperate is an often used deception in psychology research. Many university students might have guessed they were working individually, while most of the current participants indicated during the debriefing that they believed to be playing with a real person. As a result of the between-participant design, participants did not suspect furniture arrangement as a factor. Because of this, participants did not respond in a way they thought was common or desirable.

The joint Simon task was optimised for this study. Responses of the co-actor were pre-programmed to enhance the belief of cooperation. In addition, the feedback block was very effective, because error rates were extremely low. Because of the low error rates, reaction time was a more reliable measure (Salthouse & Hedden, 2002).

This study is conducted in order to improve the facilitation methods at the LEF future center. How can the findings contribute to these methods? A high self-disclosure tendency is required in order to avoid group think (Irving, 1982) and positive interpersonal relationships contribute to group cohesion (Chang & Bordia, 2001).The literature is not conclusive about the effects of furniture arrangements on these factors, which increases difficulty to give clear guidelines on this subject. Some studies found that an intimate setting enhances interpersonal relationships (Mehrabian & Diamond, 1971; Larsen & Smith, 1981; Coker & Burgoon, 1987), where other studies stated the opposite (Albert & Dabbs, 1970; Yildirim & Akalin-Baskaya, 2007). Further research even found that a spacious setting improves interpersonal relationships, compared to an intimate setting (Gergen et al., 1973; Mckenna, et al., 2002). The results of our study cannot conclusively resolve these contradictions, but some guidelines can be mentioned. Since interpersonal relationships and self-disclosure are causally related in both directions (Collins & Miller, 1994), it is a possibility that both intimate and spacious furniture arrangements facilitate both interpersonal relationships and self-disclosure, which would be an explanation for the abovementioned contradictions in literature. A face-to-face setting enhances interpersonal relationships, which will consequently increase self-disclosure. In a spacious setting self-disclose tendency is higher which consequently increases interpersonal relationships. The fact that both furniture arrangements facilitate both aspects does not implicate that facilitators should be indifferent to which furniture arrangement to use. As a recommendation it can be said that it is of importance to consider proximity carefully, placing people too close to each other will increase negative feelings, undermining the development of both interpersonal relationships and self-disclosure (Albert & Dabbs, 1970; Yildirim & Akalin-Baskaya, 2007). Therefore, for people who do not know each other, it

might be beneficial to meet in a spacious setting, preferably where they are visually anonymous. People who know each other well can be placed with higher proximity than people who are solely acquainted (Freedman, 1975, as cited by Kiesler & Cummings, 2002). Their group performance can benefit from the advantages of an intimate setting. People report to feel more integrated when facing towards each other, when they sit in they fit in.

In order to emphasize either group cohesion or self-disclosure, the furniture can be rearranged depending on the situational needs. Facilitators have to take furniture arrangements into account in every LEF session, but it is important to know that the effects are small and subtle. Placing people in an intimate setting might not be sufficient to enhance interpersonal relations and group cohesion, but more additional methods are necessary. Furniture arrangements will be more effective when used in combination with other factors, like the photo projections on the wall, well-considered lighting and perhaps even the music or odour in the room. However, since the LEF future center and the field of psychology still need to learn about how people are affected by their environment, for the moment it can be recommended to experiment with one method at the time, to study the isolated effects. For this cause, empirical observations during LEF-sessions are very important, because they can lead to theories which can later be tested with scientific research. When more research has been performed and more knowledge about the methods is available, then combining factors will bring about the highest effectivity in the LEF future center.

In settings outside the LEF future center, this study can also give some cautious guidelines. In every line of work where group performance is of importance furniture arrangements need consideration. Offices of companies, counsellors and psychologists could be adapted to create a cohesive or open ambience. When people need to cooperate intensively, an intimate setting should be created and when group think needs to be avoided, spaciousness is necessary. Since previous research found, and our study cautiously supports, that furniture arrangements affect how people feel and behave, offices should be designed flexibly, so furniture can be re-arranged to the optimal position for the situation.

In order to increase the scientific knowledge in the field of psychology, further research is necessary. A larger study with more participants and more factors taken into account might lead to more concrete conclusions. In a future study, furniture arrangements could be researched with liking, individual/social behaviour, awareness or cooperation as dependent variables. These factors are also very interesting to study in joint Simon research, in order to see how they correlate with the size of the JSE. In this study, self-reported feeling of integration did not correlate with the size of the JSE. In order to get a better understanding of the social aspect of the JSE, it could be suggested to research this again. Previous research (Albert & Dabbs, 1970; Yildirim & Akalin-Baskaya, 2007) suggests that positiveness is influenced by furniture arrangement. This could be the subject for a

more elaborate research since mood is a very important factor for LEF and concrete guidelines on this topic would be of great use. When furniture arrangements in LEF are studied again, increasingly contrasting arrangements may be used that will induce larger effect sizes.

Overall, even though the results of this study were not as desired, it can still contribute to the science of self-other integration and self-disclosure. Cautious guidelines to enhance group performance can be given and this study gives leads for new research. With every new study we are working towards a future where the environment can be efficiently adapted in order to optimise group and individual processes.

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