# Social inclusion among high-ability children

*Measuring the social benefits of cooperative learning in heterogeneous groups*

# UNIVERSITY OF TWENTE.

BSc thesis Psychology

L. Hogenkamp (S1850911)

Faculty of Behavioural, Management and Social sciences

First supervisor: Dr. A.M. van Dijk

Second supervisor: Dr. A.H. Gijlers

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**Abstract**

During the past decades, more attention has been paid towards education for high-ability children. Although an increasing amount of research has been carried out on this topic, research is still inconclusive about the social benefits of cooperative learning for high-ability children who engage in heterogeneous groups. In the current study, it was therefore investigated whether a supported jigsaw assignment has beneficial effects on social inclusion for high-ability children. Fifth and sixth graders ($n_{total} = 55$; $n_{high-ability} = 21$) participated in a cooperative assignment accompanied with a worksheet that supports the cooperative dialogue and equal participation of group members. Results showed that after engaging in the lesson, children tend to nominate children they worked with in the jigsaw assignment more often than children they did not work with. On top of that, high-ability children tend to be chosen by their groupmates more often in a peer-nomination list when a more positive cooperative process is experienced by the group. However, this research indicated that high-ability children are not more or less socially included in their classroom than other-ability children. To conclude, this research gives the first indications for social inclusion among high-ability children who work together in heterogeneous groups.

*Keywords:* Cooperative learning, jigsaw-method, heterogeneous groups, high-ability children, social inclusion.

**Introduction**

During the past few decades, cooperative learning became a widely accepted and popular form of learning in elementary schools (Johnson & Johnson, 2009; Slavin, 2015). While engaging in cooperative learning, children work together in small groups and actively discuss the course content (Förrer, Kenter, & Veenman, 2000). In this way, children learn with and from each other. Furthermore, explaining difficult concepts and talking about the subject matter results in giving it a personal touch. Accordingly, the subject matter gets more meaningful to the student. This enhances the likelihood that students will apply what they have learnt at school outside the classroom as well. However, whether the cooperative process leads to an active discussion which contributes to the learning process of the group members depends, among other things, on the group composition (Lou et al., 1996).

In cooperative learning, children can be grouped both homogeneously and heterogeneously (Baer, 2003). While in homogeneous groups children only work together with their same-ability peers, in heterogeneous groups children also work together with their other-ability classmates. Overall, heterogeneous groups are favoured as in this group composition children can learn from each other's differences (Förrer et al., 2000; Johnson & Johnson, 1994; Slavin, 1995). High-ability children can model for low-ability children and high-ability children can learn from explaining concepts to low-ability children. However, a problem with heterogeneous learning is that research is inconclusive about the further benefits of cooperative learning, especially for high-ability children. Regarding cognitive benefits, opponents of cooperative learning in heterogeneous groups favour homogeneous pull out classes which are focussed on enrichment in combination with acceleration of learning where high-ability children can work together with the other high-ability children (De Boer, Minnaert, & Kamphof, 2013; Gillies & Ashman, 2003; Plucker & Callahan, 2014). However, a problem with homogeneous grouping is that in this way high-ability children are socially excluded from the other children.

To continue with the social aspect of cooperative learning, it can be stated that even more is unclear about the possible social benefits for high-ability children who engage in cooperative learning in heterogeneous groups and whether or not this setting does promote social inclusion. Research by Adams-Byers, Whitsell and Moon (2004) state that it is uncertain which setting best fits to the social needs of high-ability children. Some studies state that high-ability children benefit from learning in a cooperative environment in heterogeneous groups (e.g. Adams & Rotondi, 1990; Förrer et al., 2000). These studies agree on the fact the children improve their social skills while working together with their other-ability peers; they

learn to accept each other and their differences. In this way, children get to know each other better which might have a positive effect on social inclusion. Furthermore, cooperative learning promotes the child's socio-emotional development; children will improve in their communication skills, have a more positive attitude towards learning and towards themselves, and will engage in better peer relationships when they engage in cooperative learning (Förrer et al., 2000).

On the other hand, research by Ramsay and Richards (1997) and Gillies and Ashman (2003) name some reasons why high-ability children do not socially benefit from learning together in heterogeneous groups. It has been found that high-ability children get bored from explaining the subject matter to their peers and they feel frustrated when the group mark suffers because of the low-ability children. On top of that, high-ability children are afraid that they will be labelled as 'pushy' or 'the teacher's favourite student' when they try motivate others to do their best for the group work or that they are considered as 'too smart'.

All in all, research is inconclusive about the social benefits of cooperative learning for high-ability children (Adams & Rotondi, 1990; Adams-Byers et al., 2004; Förrer et al., 2000; Gillies & Ashman, 2003; Ramsay & Richards, 1997). However, assumptions can be made that cooperative learning in heterogeneous groups might promote social inclusion among high-ability children. As social inclusion has positive effects on learning (Baker, 1995), it might be wise to search for a setting that enhances social inclusion and to test whether this indeed promotes social inclusion.

**The jigsaw method**

In this study, an ideal cooperative setting will be created in which social inclusion should be promoted. During the past few decades, extensive research has evaluated the effectivity and utility of several cooperative learning methods (Moskowitz, Malvin, Schaeffer, & Schaps, 1985). A method that seems to have promising social benefits is the jigsaw method (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978). While engaging in the jigsaw method, students get split up in small groups and meet in expert groups in which they gather information about one of the few distributed subjects of an overarching topic. Subsequently, the students meet in another group in which each member shares information about the by them investigated topic. The information will be combined and tested in class. Accordingly social interdependence is promoted (Slavin, 2015). The initial idea was that if students see the importance of their groupmates and are dependent on each other, this would result in showing more encouragement and help-giving behaviours.

Additionally, the jigsaw method was designed in order to replace a competitive learning environment for a cooperative one (Roseth, Lee, Saltarelli, 2019). Accordingly, students are dependent on each other while working with the learning material. Also, the jigsaw method is created in order to optimize peer relationships and to diminish prejudices among students (Aronson et al., 1978). Prejudices and stereotyping are quite prevalent among high-ability children and are even more common when these children participate in segregated educational programs (Eriksson-Sluti, 2001). As the jigsaw method focusses on diminishing prejudices, social inclusion of high-ability children might be optimized.

**Social interdependence theory**

A problem that arises regarding primary school children who engage in cooperative learning, is that they do not know by themselves how to structure a cooperative process. Therefore, it is important to support cooperative learning (van Dijk, 2017). Research by van Dijk (2017) created a worksheet which supported the cooperative process for children who engage in a jigsaw task in heterogeneous groups. As this worksheet will be used in this study and because it is based on the social dependence theory by Johnson, Johnson & Smith, (2007) this theory will be further explained in context of the worksheet.

The social interdependence theory proposes that the accomplishment of goals is influenced by the act of others. Five elements, of which the first three can also be linked to social inclusion and the first two to the jigsaw method, are necessary to create an effective cooperative learning environment.

The first one is *positive interdependence,* meaning that one's success is dependent on the success of the others in the group. This leads to cooperation and contributory actions like helping, offering social support and information sharing (Roseth et al., 2019). The worksheet instructs children to divide resources which are needed to complete the task. In this way, everybody is dependent on each other and everyone's contribution is necessary in order to reach the goal. Additionally in this way every student is socially included in the group work.*,*

Secondly, *individual accountability* means that during the task execution, each student feels responsible for their contribution to the group process and for the group outcome (Johnson et al., 2007). When individual accountability is a fundamental element in cooperative learning, the possibility of social loafing and freeriding will be reduced (Laal, Geranpaye,& Daemi, 2013). In this way every student participates in the assignment and social inclusion is promoted. The worksheet takes individual accountability into account by applying the jigsaw method in the classroom. To specify, resources are distributed among the

children and explained one after another. In this way, each child actively works with the learning material.

Thirdly, *face-to-face promotive interaction* insists that students should discuss the exercise together in order to gather better ideas and solutions. (Johnson et al., 2007). This was stimulated in the worksheet by clear instructions on the worksheet and in the assignment form awarded to the students. As a result of this interaction, students create interpersonal relationships with each other.

Finally, the last principle for cooperative learning is *group processing*. For students it is crucial to get feedback on the learning process in order to function more effectively in the future (Johnson et al. 2007). This element was addressed in the worksheet by letting the children sign the worksheet when agreement was made about the completed worksheet.

The fourth principle *interpersonal and small group skills* was not addressed as training the students in cooperative learning skills before engaging in the exercise is beyond the time span of this research.

**This study**

The aim of this research was to investigate social inclusion of high-ability children after participating in a lesson based on the jigsaw method supported by the worksheet created by van Dijk (2017) in which the children engage in heterogeneous groups. Therefore, the research question that lies at heart of this research is *"To what extend is cooperative learning in heterogeneous groups beneficial for the social inclusion among high-ability children?"* This study will also focus on the effects of cooperative learning in heterogeneous groups in general, but special attention will be given to the effects for high-ability children.

Because the jigsaw method focuses on improving peer-relationships and diminishes prejudices among high-ability children, and because the worksheet leads to a more equal contribution to the cooperative process (Aronson et al., 1978; van Dijk, 2017), it will be expected that high-ability children will, after the assignment, be liked more by their groupmates than by the rest of their classmates. Next, as stated by Förrer at al., (2000), a good cooperative process leads to better peer relationships, it will be expected that children who experienced a more positive cooperative process will like their groupmates better than their other classmates. Overall, it will thus be expected that cooperative learning in heterogeneous group has beneficial effects on social inclusion among high-ability children.

**Method**

**Context of the study**

Children worked on an assignment about the human senses according the jigsaw method, in which each child was subdivided in two different groups. First, children met in the randomly assigned expert groups, in which they prepared individually by reading a text about one of the five senses. Subsequently they cooperated in order to combine knowledge together. When the children were subdivided for the second time, they met in heterogeneous groups in which they shared information about what they have learnt whilst the worksheet served as support. In order to measure social inclusion after participating in the lesson, a peer-nomination list was administered. To assess how the children experienced the cooperative process, a questionnaire was used.

**Participants**

For this study, a sample of 55 fifth and sixth grade students from three classes of two primary schools in a middle-sized village in the east of the Netherlands were selected (24 boys, 31 girls; $M_{age}$ = 11.02 years, SD = 0.91, ranging from 9 to 13 years). This research was approved by the Ethics Committee of the faculty Behavioural, Management and Social sciences (BMS) of the University of Twente.

In the first group, children were randomly assigned to groups of four or five. For the second group heterogeneous groups of five were created by the teacher. In this group, children with each a different expertise worked together. They were classified either as low-ability ($n = 15$; 27,3%), average-ability ($n = 19$; 34,5,%), or high-ability ($n = 21$; 38,2 %). This grouping process was based on general performance during the current schoolyear. Criteria for the grouping were that each group consisted out of at least one high-ability child and at least one low-ability child.

During the data analysis, it became clear that six children did not fill in the questionnaire completely. These data were reported as missing data, and therefore these children were excluded from the analysis in which the data of the questionnaire was used.

The children's parents were informed about the aim of this study and gave active consent for their child to participate. Prior to this study, the children were orally informed about the aim of this study. Children older than eleven years old were asked to sign the questionnaire if they agreed on participating in this study.

**Materials**

*Jigsaw task*

Children worked together according the jigsaw method. The accompanying task was divided into three sections: individual preparation, cooperation, and a knowledge test.

*Individual preparation*

During the first phase (i.e., individual preparation), the children worked on the topic the human senses. In order to prepare for the cooperation phase, each child first individually focussed on their expertise, being either *vision, taste, smell, touch or hearing.* Each assignment included a source list with five texts about the to them assigned topic (for an example, see Appendix A and B). This list was compiled by selecting information on child-friendly websites e.g. Wikikids, Het Klokhuis, and Schooltv and, when possible, texts were selected when they fell into the age range between nine and twelve years. Texts were simplified when not found on child-friendly websites. The children were instructed to divide the texts among the five of them and to read them thoroughly. In this way, individual accountability was promoted. Each source had to be read in order to draw a complete picture of their topic.

*Cooperation*

In the second phase (i.e., cooperation), the children were instructed by the assignment (Appendix A) to explain to each other what they have read and to listen to each other carefully. The aim of this was to create positive interdependence as the information collected by each of the children was used in order to create the concept map together.

In order to support group discussion about the content, the children met during the second assignment in heterogeneous groups of five and filled in an adjusted version of a worksheet created by van Dijk et al., (2017), (Figure 1). In the first step of the assignment, children were instructed to share with their group members what they have learnt in the expert groups. This contributes to individual accountability, as each student provides information necessary to fill in the worksheet. On top of that, the students were instructed to listen carefully to each other because they had to recall what their groupmates told about their topic in the second step.

In the second step, each child wrote down an important concept or fact about each topic of their peers. This supports positive interdependence, as the children were made aware

of the benefits from learning together. Each child had to share information in order to complete the worksheet.

The third step of the original worksheet was excluded from this assignment, as this step intended to instruct the children construct a list of elements that could be used for a design process. This was not part of this research and for that reason not used in the worksheet. Therefore, the last step in the adjusted worksheet was signing the worksheet. The aim of this was to make the child's role in the group process explicit.

**De 5 zintuigen**

Dit werkblad is van

**1**

**Rapporteren**

Informeer om de beurt je groepsgenoten over wat je hebt geleerd in je expertgroep.

**Belangrijk:** Voor stap 2 moet je onthouden wat je groepsgenoten hebben uitgelegd. Luister dus goed naar elkaar!

Gebruik de informatie uit jouw woord web! Wat is de belangrijkste informatie over jouw onderwerp?

**2**

**Goed geluisterd?**

Schrijf nu minstens één ding op over elke expertise van je groepsgenoten.
*Wat is er verteld?*
*Wat is belangrijk?*

Zijn jullie het er mee eens? Schrijf het in de vakken, naast je eigen icoontje.

**3**

**Handtekening**

Ben je het eens wat er is genoteerd op het werkblad? Zet dan jouw handtekening in jouw vak.

*Figure 1.* Worksheet to support information-sharing

*Knowledge test*

In order to create a setting in which the children could apply what they have learnt by themselves and from their group members, a test was executed. Two questions were asked about each of the five topics to emphasize equal contribution. One point was awarded for each correct answer. A group total score was computed after the test by multiplying all individual scores in the group. This was done in order to create positive interdependence and individual accountability.

**Cooperative learning questionnaire**

In order to evaluate the cooperative process, a questionnaire based on the work of Janssen (2008) was administered (Appendix C). The questionnaire intended to measure four collaborative activities during the collaborative process. All four aspects are important for a successful learning process (Janssen, 2008). The questionnaire consisted out of sixteen items which could be answered with 'not agree' 'somewhat agree' and 'agree' for which, respectively, one, two or three points could be rewarded. The maximum score that could be achieved was 48, the minimum score was 16.

First, *performing task-related activities* is being measured. It was checked to what extend the children shared and discussed information in order to combine their information necessary to complete the assignment. Also, verbalization of ideas is measured. On top of that, it was checked whether the children asked each other questions in order to gather information. All this should indicate the children's problem-solving skills, individual learning and group functioning (Janssen, 2008).

Secondly, the *performance of social activities* was investigated. The questionnaire measured to what extend children praised each other's ideas and gave each other compliments. (Janssen, 2008). These positive social interactions should enhance the group's cohesiveness.

Thirdly, *coordination or regulation of task-related activities* was measured. For a group process to run smoothly, it is important that children coordinate their task (Janssen, 2008). In this questionnaire, therefore, the child's metacognitive activities are being measured like planning and checking the task progress.

Finally, *coordination or regulation of social activities* was evaluated. In cooperative learning, students are dependent on each other and therefore evaluating the social aspect of the collaboration process is important (Janssen, 2008). This evaluation form intended to let

the children identify collaboration strategies, collaboration process, and evaluate the collaboration process (Janssen, 2008).

To examine the reliability of the questionnaire, Cronbach's alpha has been computed. Analysis showed that the questionnaire reached acceptable reliability, $\alpha = .76$.

### *Peer-nomination list*

In order to assess social inclusion among the students, a peer-nomination questionnaire was administered. This questionnaire consisted out of two items which could both be posed positively and negatively (Leung & Silberling, 2006). To get a clear view of the peer relationships, four questions were asked about relationships in and outside the classroom; *Name three students you would like to work with on an assignment; Name three students you do not want to work with on an assignment* (Leung & Silberling, 2006)*; Name three students you would like to play with after school;* and *Name three students you do not want to play with after school* (Zindler, 2009).

### Procedure

The children in this study took part in ninety-minute lesson. Prior to the lesson, the assignments were explained and comprehension was checked. In the first part, which took thirty minutes, children were randomly assigned one topic by their teacher, being either vision, hearing, smell, taste or feeling. In this way, ideally, five groups which each studied one of these topics were created. Subsequently, each child individually read one of the five sources provided by the source list. Next, the children were instructed to explain one after another what they have read in their source. Herewith, the children were asked to listen to each other carefully because they needed all information for the second assignment. Finally, the groups created a concept map together in which they combined their knowledge about the to them assigned topic.

In the second part, the children were assigned to heterogeneous groups of five by their teacher. Each group received one worksheet which should be filled in together. First, children were instructed to share the information they gathered about their topic in the first assignment in order to give each group member a complete picture of the human senses. The children were asked to listen to each other carefully, because they had to recall information of their group members in the second step. In this step, each child was instructed to write down one thing about each topic of their peers. In this way, a complete picture of the human senses was

created. When agreement was made on what was written down, children were asked to sign the worksheet. They were given thirty minutes to finish the assignment.

Subsequently, the children participated in the third section which tested the heterogeneous group's collective knowledge. The children individually answered ten questions about the human senses. One point was awarded for each correct answer. The correct answers of each group member were added up. The group with the most points won a small reward. Children had ten minutes to complete the quiz.

Finally, social inclusion was measured by means of a peer nomination list, for which the children had ten minutes. Next, the cooperative process was measured by a questionnaire, for which the children had five minutes to fill it in. The children were asked to fill in the questionnaire and the peer nomination list individually and were told that the results would not be shared with anyone. Because of the sensitivity of the questions in the peer nomination list, the children were instructed to separate their table from their group-members, so that they could fill in the questionnaires privately.

**Data analysis**

*Peer-nomination list*

In order to examine the social inclusion of the children, the peer nomination lists have been analysed. First a positive preference score for each child was computed by adding up how many times the child was mentioned in the top three of *Name three students you would like to work with on an assignment* and *Name three students you would like to play with after school*. Each time the child is mentioned in the positive question, one point was added to the positive preference score. A negative preference score was computed the similarly; each time the child was mentioned in the top three of the statement *Name three students you do not want to work with on an assignment* or *Name three students you do not want to play with after school* one point was added to the negative preference score. Subsequently, the negative preference score was subtracted from the positive preference score and in this way a total preference score was computed (Leung & Silberling, 2006). The minimum and maximum score a child could get, depended on the class the child was in. Namely, a child could be mentioned positively by each child two times per peer-nomination list. For example, in class one which contained 21 children, each child could be mentioned positively by each of the 20 children two times (as two positive questions were asked). Logically, each child could also be mentioned negatively by each child twice. Therefore the maximum total preference score in class one was 40, the minimum total preference score was -40. In class two, the maximum total preference score

was 28, and the minimum total preference score was -28. In class three the maximum total preference score was 36 and the minimum preference score was -36. In order to take into consideration that some classes consisted of more children, and that therefore higher preference scores could be obtained in these classes, ratio scores were computed for each child by dividing the total preference score by the number of children in the classroom. The ratio scores that were computed ranged between -1 and +1. To get a general view of the social inclusion of the children with different ability levels, an one-way ANCOVA has been conducted to compare the mean scores of these groups.

Next, the aim was to find out whether after the assignment children are liked more by their group members than by the rest of the classroom. First, total preference scores were computed within the jigsaw groups. To explain, it was computed how many times a child is mentioned in the peer-nomination lists of their groupmates. The maximum total preference score within the groups was 10, as the biggest group consisted out of six children. Therefore the minimum total preference score was -10. The same has been done when computing the total preference score outside the jigsaw group. Also for these scores ratio scores were computed. An one-way MANCOVA was conducted to compute the mean scores of the variables total preference score within the jigsaw group and total preference score outside the jigsaw group and to examine whether a statistically significant difference was present between groups. Also, it was determined whether there existed a statistically difference between the total scores on the variables total preference score within the jigsaw group and total preference score outside the jigsaw group. As it was expected that the variable percentage of friends within the jigsaw group would influence the results, this variable was used as control variable.

*Cooperative learning questionnaire*
Thirdly, it was measured whether an overall positive score on the questionnaire correlated to mentioning each other's groupmates more often in the peer-nomination questionnaire. By adding up the scores for each item per child, the total score for the questionnaire was computed for each child. Questions that were asked negatively were rotated. A hierarchical multiple regression was carried out in order to examine the correlation between the total score on the questionnaire and the total preference score within the jigsaw group. Next, the variable percentage of friends within the jigsaw group was added to the analysis as this variable was expected to influence the total preference score within the jigsaw group. To examine the

results for high-ability children, the same analysis was conducted whilst only including high-ability children.

**Results**

  To get a general view of social inclusion between the different ability levels, an one-way ANCOVA has been carried out with the total preference score of the peer-nomination list as dependent variable and student's ability level as independent variable. Furthermore, it was assumed that the total preference score of the peer-nomination list might be influenced by how many friends a child already has within the classroom. Therefore, the percentage of friends within the classroom was selected as a covariate. The analysis showed that no significant differences were found between the total preference scores of the children with different ability levels ($F(2,51) = .743, p = .481$).

  Next, it was examined whether the children are liked more by their groupmates than by other children after participating in the lesson. A one-way MANCOVA has been conducted with the dependent variables total preference score on the peer-nomination list received from children within the jigsaw group and total preference score on the peer-nomination list received from children outside the jigsaw group. The independent variable students' ability level and the covariate percentage of friends within the jigsaw group were also added to the analysis. A significant difference was found between the dependent variables within the jigsaw group and the total preference score within the jigsaw group and total preference score outside the jigsaw group when controlled for percentage of friends within the jigsaw group ($F(2, 52) = 9.857, p < .001, \Lambda = .717, \eta_p^2 = .283$). However, there was a no statistically significant difference between the ability groups ($F(2, 51) = 2.453, p = .051, \Lambda = .829, \eta_p^2 = .089$). Table 1 shows the means scores for the different ability levels on preference scores within and outside the jigsaw group.

Table 1

*Mean scores for abilities on preference scores received inside and outside the jigsaw group*

|  | Within jigsaw group | | Outside jigsaw group | |
| --- | --- | --- | --- | --- |
|  | *M* | *SD* | *M* | *SD* |
| Low-ability | .040 | .293 | -.012 | .248 |
| Average-ability | -0,044 | .261 | -.033 | .240 |
| High-ability | .210 | .296 | .039 | .253 |
| Total | .076 | .300 | -.001 | .245 |

Additionally, it was investigated whether children who experienced the cooperation more positively mentioned their jigsaw group-members more often in the peer nomination list. As six children did not fill in the questionnaire completely, their data was excluded from the analysis. A hierarchical multiple regression with the dependent variable total preference score within the jigsaw group and the independent variables evaluation of the cooperative process and percentage of friends within the jigsaw group has been conducted. To investigate the relationships between these variables, correlations were used. Analysis showed that significantly weak positive correlations can be observed between the evaluation of the cooperative process and total preference score within the jigsaw group ($r = .319$, $p = .003$) and percentage of friends within the jigsaw group and total preference score within the jigsaw group ($r = .493$, $p = .001$). Furthermore, the hierarchical multiple regression analysis reveals that the evaluation of the cooperative process contributed significantly to the regression model ($F (1,47) = 8.463$, $p = .006$) and accounted for 15.3% of the variation in total preference score within the jigsaw group. Adding the variable percentage of friends within the jigsaw group explained an additional 15.4% of variation in the total preference score within the jigsaw group and this change in $R^2$ was significant ($F (1, 46) = 10.237$, $p = .002$). Table 1.2 shows the predictors on the total preference score within the jigsaw group.

To examine this effect for high-ability children, only the data of the high-ability children were used for the same analysis. The hierarchical multiple regression shows a significantly weak positive correlation between the evaluation of the cooperative process and the total preference score within the jigsaw group ($r = .476$, $p = .017$) and a significantly moderate positive correlation between the percentage of friends within the jigsaw group and total preference score within the jigsaw group ($r = .588$, $p = .003$). Furthermore, the analysis shows that the total score on the questionnaire contributed significantly to the regression model ($F (1, 18) = 5.279$, $p = .034$) and accounted for 22,7 % of the variation in the total preference score within the jigsaw group. Adding the variable percentage of friends within the jigsaw group explained an additional 22 % of the variation in the total preference score within the jigsaw group and this change in $R^2$ was significant ($F (1, 17) = 6.756$, $p = .019$). Table 2.2 shows the predictors on the total preference score within the jigsaw group for high-ability children.

Table 2.1.

*Hierarchical multiple regression of predictors on total preference score within the jigsaw group*

| Variable | β | t | R | $R^2$ | $\Delta R^2$ |
|---|---|---|---|---|---|
| Step 1 | | | .391 | .153 | .135 |
| Evaluation of the cooperative process | .024 | 2.909** | | | |
| Step 2 | | | .554 | .307 | .277 |
| Evaluation of the cooperative process | .016 | 2.065* | | | |
| Percentage of friends within the jigsaw group | .007 | 3.199** | | | |

*Note. *p < .05, **p < .01, ***p <.001*

Table 2.2.

*Hierarchical multiple regression of predictors on total preference score within the jigsaw group for high-ability children*

| Variable | β | t | R | $R^2$ | $\Delta R^2$ |
|---|---|---|---|---|---|
| Step 1 | | | .476 | .227 | .184 |
| Evaluation of the cooperative process | .026 | 2.298* | | | |
| Step 2 | | | .668 | .447 | .382 |
| Evaluation of the cooperative process | .018 | 1.760** | | | |
| Percentage of friends within the jigsaw group | .007 | 2.599* | | | |

*Note. N = 20; *p < .05, **p <.01, ***p <.001.*

**Discussion**

Cooperative learning is a popular and widely used method in primary school education (Johnson & Johnson, 2009; Slavin, 2015). Yet, research was still inconclusive about whether cooperative learning has social benefits for high-ability children (Adams & Rotondi, 1990; Adams-Byers et al., 2004; Förrer et al., 2000; Gillies & Ashman, 2003; Ramsay & Richards, 1997). On the one hand, it was stated that high-ability children get bored from explaining the subject matter to the lower-ability children (Gillies & Ashman, 2003; Ramsay & Richards, 1997). Therefore, this group of researchers favours homogenous learning. However, in this way children are socially excluded from the rest of the classroom. Other research is fairly positive about cooperative learning in heterogeneous settings and state that this setting leads to improved social skills and better peer relationships (Förrer et al., 2000). In order to investigate the social benefits of cooperative learning in a heterogeneous setting, this study aimed to create a cooperative setting in which social inclusion should be promoted and it has been measured to what extend this setting was beneficial for high-ability children when it comes to social inclusion.

First, this research found that there was no difference between ability levels related to social inclusion within the classroom. So, high-ability children were not more or less socially included than children with other ability levels. This disproves the assumption that has been made by Aronson et al., (1978), and Eriksson-Sluti (2001) who state that high-ability children have to deal with a lot of prejudices and therefore might be socially excluded from the classroom. As the current study aimed to create a cooperative setting in which social inclusion should be promoted, this effect might not be observed in this study. However, as no pre-test was conducted, it cannot be stated whether this effect was already present before the study. Yet, it is still remarkable to observe that high-ability children are not necessarily less socially included in the classroom.

Next, the current study indicated that children are chosen more often by the children they worked with than by the children they did not work with. Choosing the children one worked with more often is in line with research by Förrer et al., (2000), who state that children get to know each other better when engaging in cooperative learning which might lead to social inclusion. During the lesson in this study, children might have worked with children who they normally do not work with, and realised that it is pleasant to work with these children. Also, possible stereotypes or prejudices the children held against others in the classroom might be diminished by creating an assignment in which children had to cooperate in order to achieve a common group goal.

Finally, it has been found that generally children who experience a positive cooperative process tend to choose the children whom they worked with more often in their peer-nomination list. When the analysis was carried out for high-ability children specifically, it was also observed that when high-ability children experienced a more positive cooperative process, group members were chosen more often. These findings are supported by Förrer et al., (2000), who state that a good cooperative process leads to better peer relationships. In practice, this means that a positive experience might be needed in order to support social inclusion. Possibly, this also means that a structured cooperative process is needed. The fact that children who experienced the cooperative process positively tend to like their group members more gives more insight in how to promote social inclusion.

However, some limitations should be taken into consideration. This study only used a post-test and not a pre-test to measure social inclusion. For that reason, it is unknown how social inclusion manifested itself before the intervention. Additionally, it cannot be stated whether the prejudices against high-ability children, which were not observed in this study, were also absent before this study. Therefore, it cannot be stated whether this intervention leads to social inclusion among high-ability children and whether or not prejudices against high-ability children are diminished. When a pre-test will be conducted, primary school teachers can receive more valuable information about the social effects of a supported jigsaw assignment. When these effects are positive, it can be advised that they should give high-ability children the opportunity to learn with other-ability children more often in order to promote social inclusion. So, future research can determine the effectivity of the lesson on social inclusion by means of a pre-post-test design.

Next to that, this study only implemented one lesson in order to obtain results. However, still positive results can be observed; After the intervention, children tend to like their groupmates more than the other children and children who experienced the cooperative process more positively tend to like their groupmates more. Yet, research suggests that multiple lessons while using the jigsaw method leads to a more positive overall evaluation of the cooperative process (Casteleyn, 2012). This can be explained by research by Gillies & Ashman (1996), who state that children acquire more cooperative skills when engaging in cooperative learning more often. Additionally, research by Clarke (1994) describes that the jigsaw method is a difficult method to understand when using it for the first time. Multiple lessons, therefore, might be able to improve comprehension. When a multiple lesson series will be implemented, it will be expected that children would evaluate the cooperative process more positively (Casteleyn, 2012), and therefore it will be expected that children receive a

higher score from children within their jigsaw group and thus social inclusion should be promoted in this way. Additionally, when a multiple lesson series will be implemented children have the opportunity to work with the other children in the classroom as well. This will lead not only to appreciation of the high-ability children in their jigsaw group, but in the classroom as a whole. As already several positive results have been found in this research, it can be expected that by means of a longer intervention stronger effects can be found. Future research should therefore test the effect of a multiple lesson series.

In the introduction, it could be observed that when talking about cooperative learning, two camps were contradicting each other when talking about possible social benefits of cooperative learning in heterogeneous groups. The current study seems to choose the side of research that is fairly positive about the social benefits of cooperative learning for high-ability children. Also, this study suggests to have an additional value to research by van Dijk (2017) in which a worksheet was created in the context of the jigsaw method that supported equal participation and the group dialogue about the topic. Apart from cognitive benefits that were observed in that study, this worksheet also seems to have social benefits. To conclude, the current study is an addition to the current literature on the social benefits of cooperative learning among high-ability children who work in heterogeneous groups. Based on this research, it can be concluded that the supported jigsaw method suggest to have beneficial effects on social inclusion among high-ability children.

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**Appendix A**

Assignment expert groups

# Opdracht 1
Onderwerp: *Kijken*

Het onderwerp waar jij je met je groepje mee bezig gaat houden is 'kijken'.

> **Tijd**: 30 minuten
>
> **Materialen**: Deze opdracht, een vel A4 papier, een pen of potlood, de bronnenlijst

**Wat ga je doen?**
Samen met jouw groepje ga je één woord web maken over 'kijken'. In de bronnenlijst die je hebt gekregen staan stukjes tekst over het onderwerp. Deze teksten kan je gebruiken bij het maken van het woord web. Ieder van jullie kiest één van de bronnen en bestudeert deze. Als je hier mee klaar bent leg je elkaar uit wat je hebt gelezen. Samen bepaal je wat er in het woord web komt.

Het is belangrijk dat je goed naar elkaar luistert bij het maken van het woord web. In de tweede ronde moet je namelijk aan de anderen kunnen vertellen hoe kijken werkt.
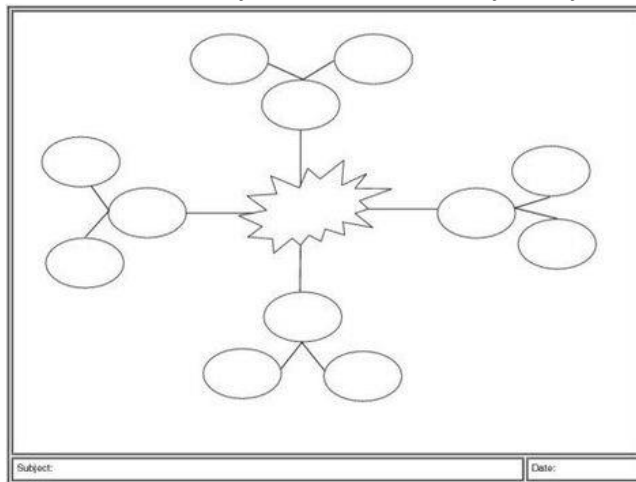
**Appendix B**
Example source list for assignment expert group

# Bronnenlijst kijken

## Tekst 1

**Oog**

Een menselijk oog is een bol met ongeveer een diameter van 2,4 cm. Het oog wordt volledig omgeven door vliezen waarbij ieder vlies zijn eigen functie heeft. Op de oogbol kan je de iris zien, het gekleurde deel. De opening van de iris heet de pupil. De hoeveelheid licht die op het oog valt bepaalt hoe groot deze pupil is. Bij veel licht is de pupil klein en bij weinig licht groot.

Gelukkig kan de oogbol er niet uitvallen, hij wordt namelijk bijeen gehouden door 6 oogspieren. De voorzijde van het oog is altijd nat door het traanvocht. Iedere keer als we met onze ogen knipperen worden deze bevochtigd. Als we worden geprikkeld door sterke of koude wind of door een emotie wenen we en treedt de traanklier in werking. Die bevindt zich in de oogkas. De tranen doden bacteriën en zorgen ook dat het oog vochtig blijft. Buiten het traanvocht zorgen ook de oogleden, wimpers en wenkbrauwen tegen bescherming.

*Bron:* https://mens-en-gezondheid.infonu.nl

## Tekst 2

**Een bril**

Als je <u>ogen</u> het niet zo goed doen, kun je veel profijt hebben van een **bril**. Dat betekent dat je hier veel hulp van hebt. De glazen van een bril zorgen ervoor dat je de dingen scherper kunt zien. Ook worden brillen gebruikt als oogbescherming. Denk maar aan de <u>zonnebril</u> of een veiligheidsbril.

Een bril bestaat uit een montuur (dit houdt de glazen bij elkaar en zorgt ervoor dat je hem op je hoofd kunt zetten) en glazen. De glazen zijn van glas of van kunststof. Als je goed dichtbij kunt kijken, maar minder goed in de verte, ben je bijziend. Je glazen zijn dan hol. Als je wel goed in de verte kan kijken en niet zo goed dichtbij, ben je verziend. Je glazen zijn dan bol. De vorm en dikte van je glazen zorgen voor de sterkte. De glazen van je bril zorgt ervoor dat het licht op een goede manier op je <u>netvlies</u> komt, waardoor je weer scherp kunt zien. Soms is de vorm van je oogbol niet mooi rond, en is het lastig scherp te zien. Een bril kan hierbij ook helpen om toch scherp te kunnen zien.

*Bron:* https://wikikids.nl

## Tekst 3
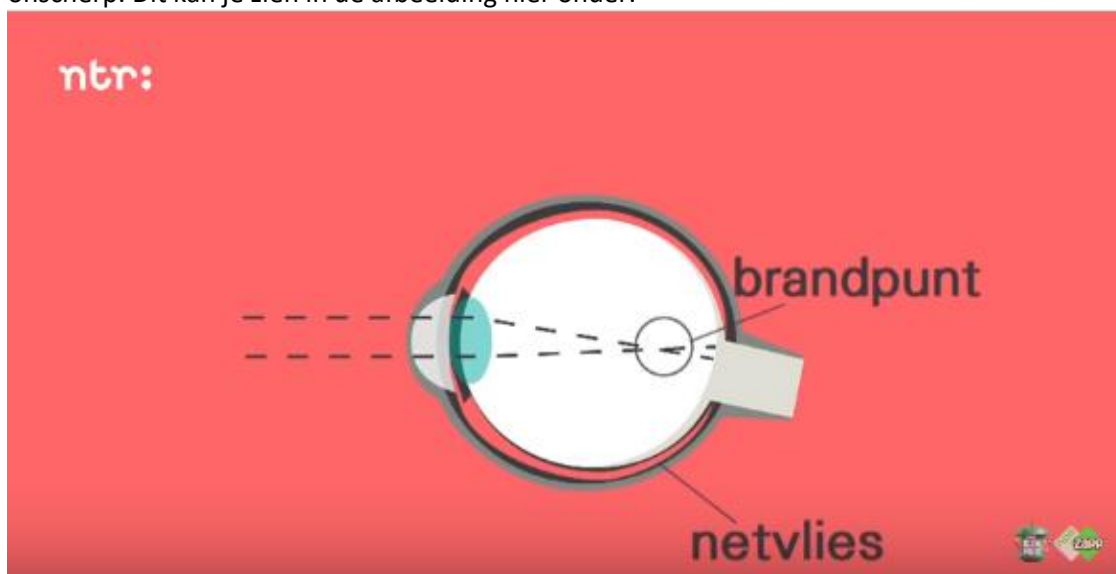
**Wat is bijziendheid?**

Super leuk natuurlijk, een spelletje spelen op je smartphone of op je laptop. Of natuurlijk instagrammen, snapchatten, of binnen een boek lezen. Dit doen we massaal en vaak uren per dag. Ook jonge kinderen kijken steeds langer en vaker naar een beeldscherm. Heb je je wel eens afgevraagd wat dat ge-game en getuur doet met je ogen?
Caroline Klaver is oogarts en legt uit of het erg is om heel lang dichtbij te kijken, bijvoorbeeld naar een beeldscherm of naar een boek. Caroline zegt dat dit slecht is voor je ogen, en dat je hier bijziend van kan worden.
Wat heeft dat nou te maken met dichtbij kijken? Caroline legt uit dat in de normale situatie het brandpunt van het licht dat binnen komt in je ogen, precies op je netvlies valt. Daardoor zie je scherp. Dit kan je zien in de afbeelding hier onder.
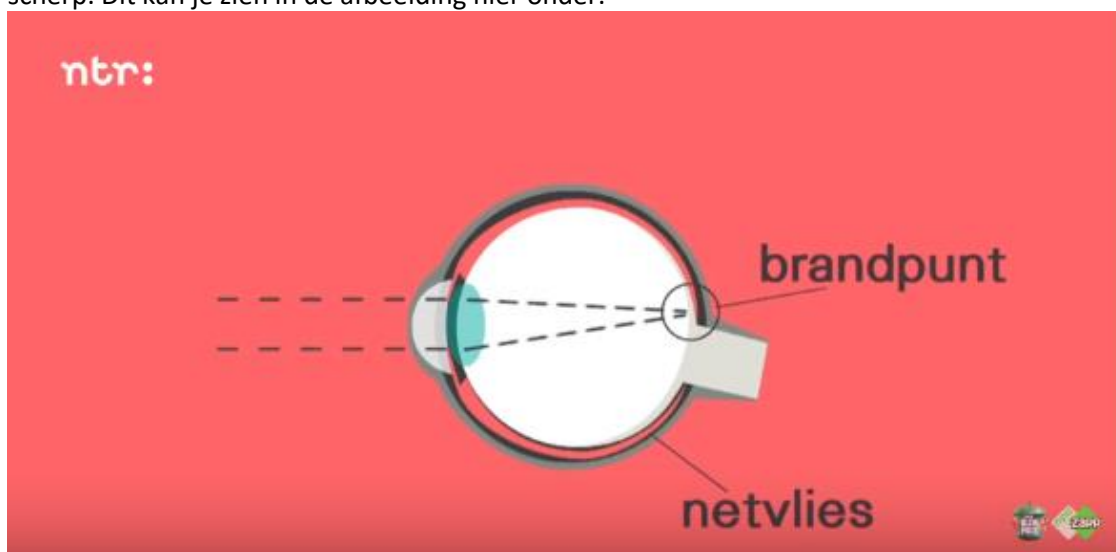


Als je bijziend bent, komt het licht samen in een punt dat voor het netvlies valt. Daardoor zie je onscherp. Dit kan je zien in de afbeelding hier onder.



Hoe word je dan bijziend en is het erfelijk? Caroline legt uit dat bijziendheid erfelijk kan zijn, maar dat het vooral door de leefstijl komt van de kinderen; dat ze veel binnen zitten en dat ze lange tijd achter elkaar dichtbij kijken. Dat kan door het kijken naar een smartphone, maar ook door het lezen van een boek. Dus, door dichtbij kijken, uren achter elkaar, kan je bijziend worden.
*Bron:* Het Klokhuis

## Tekst 4

**Zicht, één van je zintuigen**

Om te kunnen zien is er licht nodig. Licht weerkaatst van een voorwerp richting ons oog. Het licht komt ons oog binnen door het doorzichtige hoornvlies en een opening in ons oog, de pupil. De pupil is door de van de iris omringd. De lichtgevoeligheid van de binnenkant van het oog is zeer kwetsbaar. Om beschadiging te voorkomen kunnen de spiertjes de opening bij stellen. Groter bij weinig licht en kleiner bij veel licht. Achter de pupil ligt de lens. Licht dat weerkaatst is door voorwerpen wordt door het hoornvlies en de lens gebundeld en als een verkleind, scherp maar omgekeerd beeld op het netvlies geprojecteerd. In het netvlies zitten speciale lichtgevoelige cellen, staafjes en kegeltjes. Kegeltjes herkennen de kleuren. Staafjes zorgen ervoor dat wij ook bij weinig licht goed kunnen zien. Het licht activeert de staafjes en de kegeltjes in het netvlies en deze geven een signaal door aan de oogzenuw. Via de oogzenuwen komen de signalen aan in het zichtgebied in je hersenen. Daar wordt het beeld weer recht gezet en herkend, het is een bloem.

*Bron:* https://schooltv.nl

## Tekst 5

**De pupilreflex**

Als je in de zon probeert te kijken, merk je dat dat erg vervelend is. He doet pijn en je blijft een tijdje vlekken voor je ogen zien. Dit is niet goed voor je oog, en als er veel licht in je oog komt, kan zelfs je netvlies beschadigen. In de Iris, zitten allemaal kleine spiertjes die de pupil groter en kleiner kunnen maken.  Zo kan je iris je beschermen tegen te veel licht.
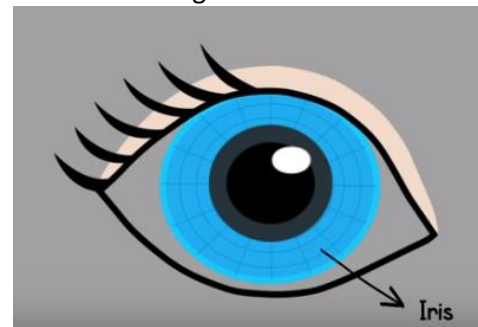


Wanneer het in je omgeving licht wordt, trekken de kringspiertjes in de iris zich samen. Ze maken de pupil heel klein, zodat er maar een beetje licht doorheen kan.
Wordt het vervolgens donkerder, dan ontspannen de kringspiertjes en trekken de lengtespiertjes zich samen. De pupil wordt groter en kan zo zo veel mogelijk licht naar binnen laten. Wordt het weer lichter? Dan ontspannen de lengtespiertjes en trekken de kringspiertjes weer samen. Je kunt deze spieren niet zelf besturen, dat gaat automatisch. We noemen dit ook wel een reflex. Het groter en kleiner worden van de pupil, noemen we daarom de pupilreflex.

*Bron:*
https://www.youtube.com/watch?v=O 9U86XI9134

**Appendix C**

Evaluation form cooperative learning

**Evaluatie Coöperatief leren**

Je hebt vandaag met jouw groepje samengewerkt. Julie hebben samen een werkblad ingevuld en een quiz gedaan. Hieronder zie je weer allemaal stellingen. Deze stellingen gaan over het samenwerken. Geef voor elke stelling aan of jij het er **niet mee eens** bent, een **beetje mee eens** bent, of **mee eens** bent. Zet een kruisje in het juiste vakje.

Deze vragenlijst is ingevuld door:…………………………

Leeftijd:………………

Ik ben een jongen/ meisje (zet een rondje om het goede antwoord)

| | Niet mee eens | Beetje mee eens | Mee eens |
|---|---|---|---|
| Iedereen luisterde naar elkaar. | ☐ | ☐ | ☐ |
| Alle groepsleden deden goed mee. Iedereen heeft bijvoorbeeld meegeschreven of meegedacht. | ☐ | ☐ | ☐ |
| We waren het snel eens over wat we zouden opschrijven. | ☐ | ☐ | ☐ |
| Ik vond het leuk om in een groep aan deze opdracht te werken. | ☐ | ☐ | ☐ |
| Doordat we in een groep werkten, vond ik het moeilijk om te begrijpen wat we moesten doen. | ☐ | ☐ | ☐ |
| Door het werken in een groep heb ik meer geleerd dan wanneer ik deze opdracht alleen zou moeten doen. | ☐ | ☐ | ☐ |
| Ik heb veel ideeën en argumenten ingebracht. | ☐ | ☐ | ☐ |
| We keken elkaar aan tijdens het samenwerken. | ☐ | ☐ | ☐ |
| We lieten elkaar uitspreken. | ☐ | ☐ | ☐ |
| Ik heb veel geleerd van deze opdracht. | ☐ | ☐ | ☐ |
| We hebben elkaar regelmatig complimentjes gegeven. | ☐ | ☐ | ☐ |
| We hebben ideeën van alle groepsleden overwogen. | ☐ | ☐ | ☐ |
| We hebben eerst besproken hoe we de taak zouden aanpakken. | ☐ | ☐ | ☐ |
| Ik vond het eng om in de groep om hulp te vragen. | ☐ | ☐ | ☐ |
| Ik ben tevreden met ons werkblad. | ☐ | ☐ | ☐ |

Ik probeerde te begrijpen wat iemand anders bedoelde. ☐ ☐ ☐