Conforming to coordinate: Children use majority information for peer coordination

Sebastian Grueneisen*, Emily Wyman and Michael Tomasello

Department of Developmental and Comparative Psychology, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

Humans are constantly required to coordinate their behaviour with others. As this often relies on everyone’s convergence on the same strategy (e.g., driving on the left side of the road), a common solution is to conform to majority behaviour. In this study, we presented 5-year-old children with a coordination problem: To retrieve some rewards, they had to choose the same of four options as a peer partner – in reality a stooge – whose decision they were unable to see. Before making a choice, they watched a video showing how other children from their partner’s peer group had behaved; a majority chose the same option and a minority chose a different one. In a control condition, children watched the same video but could then retrieve the reward irrespective of their partner’s choice (i.e., no coordination was necessary). Children followed the majority more often when coordination was required. Moreover, conformers mostly justified their choices by referring to the majority from the video demonstration. This study is the first to show that young children are able to strategically coordinate decisions with peers by conforming to the majority.

Humans need to coordinate with others. When carrying heavy objects together, playing a match of football, navigating through traffic, or using a currency to exchange goods, our personal outcomes depend on coordinated efforts with other people rather than our own actions alone. From early in development, children are remarkably adept at coordinating their behaviour with others. They start coordinating their attention towards objects with adults before their first birthday (Carpenter, Nagell, & Tomasello, 1998) and only a little later – at around 18 months – they are able to coordinate simple actions with adults. For instance, they will wait for adult partners to do their part of a joint action and re-engage them after coordination breakdown (Warneken, Chen, & Tomasello, 2006). Around 2 years of age, children also successfully coordinate simple actions with peers – for example, simultaneously pulling a handle – and they start monitoring each other’s actions and attention states (Brownell, Ramani, & Zerwas, 2006). Hence, already early in life, human children possess some of the crucial prerequisites for engaging in a variety of collaborative endeavours.

An even more complex form of coordination requires not only the coordination of actions but also of decisions. A central approach to investigating adults’ abilities to do this has been that of formal coordination problems. These describe situations in which multiple individuals share a goal and are interdependent in achieving this goal, as they

*Correspondence should be addressed to Sebastian Grueneisen, Department of Developmental and Comparative Psychology, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany (email: sebastian_grueneisen@eva.mpg.de).
need to converge on the same of multiple potential solutions. In addition, according to the classic formulation, they have to do so without communicating (Schelling, 1960). Real world examples of coordination problems include, for instance, which side of the road to drive on, where to meet someone in a foreign city, or whether to dress formally or informally at a dinner party, which have in common that everyone attempts to choose the same strategy as their interaction partners – or in more technical terms, to converge on one and the same equilibrium (e.g., see Harsanyi & Selten, 1988, on the problem of equilibrium selection). In laboratory studies, people are often surprisingly efficient at solving these problems and they manage to do so by mutually identifying the most salient solution given the specific context, for example by going to the most prominent landmark when trying to meet a friend in a foreign environment (see Mehta, Starmer, & Sugden, 1994, for further examples).

Recent research indicates that children start mastering formal coordination problems at the late preschool age. In one study, for instance, dyads of children were shown to be able to use a salient option as a focal point for achieving coordination (Grueneisen, Wyman, & Tomasello, 2014a): To receive a reward, children were required to insert a ball each into the same of four boxes. They had to achieve this without any communication and without seeing their partner's choice. Identical pictures were attached to three boxes whereas a unique – and thus salient – picture was attached to the fourth box. Children aged five and older were more likely to choose the box marked with the salient picture compared to a control group who was presented with the same options but was not required to coordinate with a partner.

By the age of six, children also show evidence of using higher-order mind reading in peer coordination (Grueneisen, Wyman, & Tomasello, 2014b): Here, two children also had to choose the same of four boxes without communicating. One clearly marked box contained a higher reward making it the obvious solution at training. At test, however, children were informed separately that the largest reward was mistakenly placed into a different box. Children were told that either their partner did not know this (i.e., had a false belief about the location of the highest reward) or their partner did not know that they knew this (i.e., had a second-order false belief). In both cases, children adjusted their own choices in response to their partner's belief state only if coordination was necessary but not when they could choose independently. Moreover, if children are given the option to communicate in stag hunt coordination games – a game where players have to choose between retrieving a secure low-value pay-off alone and coordinating with a partner to get a high-value pay-off – they readily do so, both verbally and non-verbally, and thereby manage to achieve coordination already at around age four (Duguid, Wyman, Schirmer, & Tomasello, 2014; Wyman, Rakoczy, & Tomasello, 2012). Thus, at late preschool age, children are able to solve a variety of coordination problems both with and without communication.

Another potentially effective way to solve coordination problems without communication is through conformity. This is because successful coordination relies on everyone's convergence on the same coordination strategy (Lewis, 1969). For instance, when witnessing several people driving on the left-hand side of the road in a foreign country, one might reason that in future encounters other people are likely to do so too, and therefore, the best way to achieve coordination is to simply do what everyone else does. Hence, conforming to majorities might be a simple and efficient way to coordinate even with largely unfamiliar others.

Furthermore, this might be a coordination strategy that is particularly intuitive to children. This is because, on the one hand, children possess sophisticated imitative and
social learning skills (Meltzoff, 1995; Tomasello, Kruger, & Ratner, 1993) enabling them to swiftly pick up information provided by others. On the other hand, children appear naturally sensitive to information provided by majorities. For example, from around age two, children preferentially copy behaviours displayed by majorities (Haun, Rekers, & Tomasello, 2012). Likewise, children are more likely to trust information provided by members of a consensus than individuals who diverged from the majority view (Corriveau, Fusaro, & Harris, 2009). Interestingly, previous research has shown that girls tend to conform more than boys (Haun & Tomasello, 2011). While the reasons for this are not clear, these results are congruous with findings of early sex differences of basic imitative abilities (Nagy, Kompagne, Orvos, & Pal, 2007). So far, no sex differences have been found in children’s social coordination abilities (Duguid et al., 2014; Grueneisen et al., 2014a,b). Yet, given these previous findings of sex differences in majority influence and imitation skills, conformity might be a coordination strategy where one might expect sex differences to be present as well.

However, different studies have also shown that children do not rigidly copy majority behaviours but instead appear rather flexible in their conformist tendencies. For instance, children conform less if the majority’s actions contradict children’s prior conventional knowledge (Seston & Kelemen, 2013), and their tendency to endorse information provided by members of a majority persists longer if the majority is from an in-group than from an outgroup (Chen, Corriveau, & Harris, 2013). Moreover, children are more likely to conform if members of the majority are present than when being unobserved (Haun & Tomasello, 2011). This flexibility suggests that children are able to adjust their conformist tendencies depending on the specific context, which raises the possibility that they might be able to do so deliberately in order to reach specific social goals.

Here, we explored whether children can strategically use conformity to a majority to coordinate with peers in the absence of communication. To do this, we devised a coordination game where two balls had to be inserted into the same of four boxes for a reward to be released. Children were led to believe that they would play together with a partner who was already familiar with the game. They would each get one ball and thus had to select the same box to be rewarded. At test, however, an experimenter told children that their partner – in reality a stooge – had already inserted one ball and then had to go home, thus requiring children to coordinate without communication. Before making a choice, children were invited to watch a video showing how other children from the stooge’s peer group played the game. A majority of these children went to the same of the four boxes, whereas a minority chose a different box. Two boxes were never chosen in the video, and these boxes contained higher pay-offs so that – presumably – children would naturally prefer to choose these boxes. If, however, children reasoned that their partner was likely to have behaved in the same way as the majority, following the majority themselves would have been an effective coordination strategy. In an analogous control condition, children went through the exact same procedure (i.e., they also met the stooge; they were told that the stooge had inserted a ball and then had to leave; they watched the demonstration video, etc.) but just before they made a choice the experimenter pretended to have found the stooge’s ball and instead of one, children received two balls. The control condition thus measured how likely children were to conform in this setting when no coordination was required. We hypothesized that children would follow the majority more often when coordination was necessary (experimental condition) than when they could choose independently (control condition).
Method

Participants
Sixty-four 5-year-old children (5 years, 3 months to 5 years, 9 months; 50% females) participated in the study. Two additional children were excluded due to experimental error. Children were mostly Caucasian and came mainly from middle-class backgrounds. They were recruited from urban day care centres. Stooges were of roughly the same age as target children (5 years, 4 months to 6 years, 4 months) and were mostly recruited from a database of parents who volunteered to take part in child development studies. In some large day care centres, stooges were recruited on-site from different groups than target children if — according to the teachers — children from different groups were unfamiliar with each other.

Procedure

Introduction
Upon entering the test room, a first experimenter (E1) introduced the target child to a peer stooge and a second experimenter (E2). In half of the cases, the stooge was of the same sex as the target child and in the other half of the opposite sex. The stooge was wearing an orange t-shirt, and E1 explained that the stooge was on the orange team, among whom the game that the target child was about to learn was played regularly (group markers were used to emphasize that the stooge was from the same peer group as the children in the demonstration video; see below). The target child was then invited to be on the orange team as well and to put on an orange t-shirt. E1 also mentioned that the stooge had brought a video showing how the orange team plays the game. E1 then explained that the stooge had to leave briefly but would return later for the two children to play one round of the game together. After the stooge had left the room together with E2, the target child was introduced to the game.

Training
The game consisted of four identical wooden boxes. Inside each box was a mechanism that released gummy-bears when two balls were inserted into it. E1 and the child first retrieved gummy-bears from a single apparatus by each inserting one ball (rewards were collected in a container for the child to take home after the experiment).

All four boxes were then baited with two gummy-bears each, and children played two more practice rounds with E1. In the first practice round, children inserted their ball first into one of the boxes after which E1 put his ball into a different box resulting in a failure to release the candies. This failure trial was supposed to highlight that the gummy-bears would only be released if both balls were inserted into the same box. Choosing different boxes, on the other hand, would leave everyone empty-handed. In the next practice round, E1 inserted his ball first and children could then retrieve the rewards by matching E1’s choice of box.

Manipulation
E1 first attached pictures to the boxes showing different numbers of gummy-bears, which E1 explained, corresponded to the number of gummy-bears inside each box. As can be
seen in Figure 1, two boxes – the ones in the middle – contained four gummy-bears, whereas the other two boxes – the ones on the sides – contained only two. Next, E1 informed the target child that in the following round, he or she would play together with the stooge. E1 then ostensibly placed one ball on the floor in the middle of the test room and said that this would be the stooge’s ball. E1 and the child then left the test room to fetch the stooge. Their search was unsuccessful, however, and they returned to the test room. To keep children focused on the game during the search, E1 asked two reminder questions about the mechanism of the apparatuses. (‘Do the gummy-bears come out if the two balls are inserted into different boxes? Do they come out if both balls are put into the same box?’, with corrective feedback given by E1.)

In the meantime, E2 re-entered the test room and removed the stooge’s ball. In the experimental condition, she then put one ball into each box. In the control condition, she placed the stooge’s ball underneath a sweater lying in the middle of the room (see Figure 1). Otherwise, the set-up was identical in the two conditions. When E1 and the target child returned, E2 told them that the stooge had to go home but had inserted his or her ball before leaving. E2 then left the test room whereupon E1 pointed out to the target child that the stooge’s ball was indeed gone. The target child then faced the challenge of having to choose the same box as the stooge in order to win gummy-bears. After seemingly contemplating about what to do next, E1 suddenly said: ‘I have an idea! I will now show you the video that [name of the stooge] brought and that shows how the orange team plays the game. That will probably help you’. Before playing the video on a laptop computer, E1 instructed the child to watch carefully which boxes the other children chose (it was emphasized that the stooge was not in video).

The video consisted of five short clips separated by two-second blank sequences. Each clip showed a pair of children in orange t-shirts walking up to one of the boxes, inserting a ball each, and collecting the rewards. The boxes looked identical to the ones in the test room and had identical pictures attached to them. A majority of four pairs went to the same box – one of the boxes containing two gummy-bears – and a minority consisting of one pair went to a different box – the other box containing two gummy-bears. The
additional two boxes containing higher numbers of gummy-bears were used to provide children with an incentive for non-conformity. This was done because previous research has shown that children tend to conform even when no coordination is necessary (Haun et al., 2012). Hence, by using an incentive for non-conformity, we hoped to keep baseline conformity rates low. This was done to differentiate children’s general inclination to conform and their ability to follow a majority strategically to coordinate where the latter would have to exceed baseline conformity rates to grant the interpretation of a deliberate coordination strategy. Moreover, using four boxes – rather than only one majority and one minority box – reduced the chance level to 25% which we hoped would make it easier to distinguish deliberate coordination strategies from random choosing. Whether the majority chose the box on the left- or right-hand side and whether the minority pair appeared first, in the middle, or as the last pair of the video sequence was counterbalanced. After watching the video, E1 and the child sat down opposite the four boxes.

Test
In a between-subject design, children were randomly allocated to either the experimental or the control condition. First, in order to assess how well children had attended to the video, E1 consecutively pointed to each of the boxes and asked: ‘How often did children in the video go to that box?’ E1 did not provide any feedback in response to children’s answers. Next, children were asked to make a choice. In the experimental condition, E1 gave one ball to the child with the following instruction: ‘[name of the stooge] has already inserted his/her ball. Now you have the other ball. Off you go’. The control condition was identical except that before the child was asked to make a choice, E1 lifted the sweater and – to his apparent surprise – found the stooge’s ball underneath (E1 performed an analogous lifting action in the experimental condition). He then handed two balls to the child with the instruction: ‘[name of the stooge] did not insert his/her ball after all. Now you have both balls. Off you go’. As, in the experimental condition, each box already contained one ball, all children were rewarded regardless of their choice. This was done to prevent children from feeling that they had made an incorrect choice and so that all children had identical experiences before being asked to give reasons for their choice.

Finally, once children had retrieved their rewards, E1 asked them to provide a justification for their choice of box by asking, ‘Why did you choose that box?’ If children did not respond, E1 encouragingly said, ‘Well done, this worked really well’ and then repeated the question. In case children provided ambiguous answers (e.g., ‘because I wanted to’), E1 asked ‘Why did you want this one and not one of the other boxes?’ Children then collected all rewards acquired throughout the experiment and were thanked for their participation.

Results
An overview of children’s choices is shown in Figure 2. Overall, children followed the majority significantly more often when coordination was necessary (experimental condition: 46.9%) than when they could choose independently (control condition: 12.5%), Fisher’s exact test, \( p = .005 \), Cramer’s \( \phi = .376 \). Moreover, children in the experimental condition followed the majority box more often than would be expected by chance (i.e., 25%, binomial \( p = .006 \)). This was not the case in the control condition where children hardly ever chose the majority box. Instead, children in the control
condition were more likely than chance to choose one of the boxes containing a higher number of gummy-bears (binomial $p < .001$). Children in the experimental condition were also more likely to follow the majority than the minority (binomial $p = .019$), which, again, was not the case in the control condition (binomial $p = .688$).

Next, given that previous studies have reported that females conform more than males (Bond & Smith, 1996; Haun & Tomasello, 2011), we ran further analyses to test for potential sex differences. We ran a logistic regression model using the glm function in R (R Core Team, 2012) including condition, sex as well as their interaction as test predictors. We also controlled for the sex of the stooge (same as or opposite of the target child), the position of the dissenter in the video demonstration (first, middle, or last) as well as the orientation of the majority (left or right) by including these as control predictors (we did not include these variables as test predictors because we did not have theoretical or empirical reasons to assume that they would affects children’s choices). The dependent variable was whether or not children followed the majority. Overall, the model was significant when comparing it to a null model including only sex of the stooge, position of the dissenter, and orientation of the majority, likelihood ratio test: $\chi^2(3) = 15.889$, $p = .001$, Nagelkerke’s $R^2: .313$, indicating that the test predictors and/or their interaction strongly affected children’s choices. Further analysis revealed that the interaction between condition and sex was significant, likelihood ratio test comparing the full model with a reduced model not including the interaction: $\chi^2(1) = 3.967$, $p = .046$, Nagelkerke’s $R^2: .094$. We followed up this result by running the logistic regression model for the two conditions separately (including sex as a test predictor, and sex of the stooge, position of the dissenter, and orientation of the majority as control predictors). This revealed a significant effect of sex in the control condition, likelihood ratio test comparing the full model to a reduced model not including sex, $\chi^2(1) = 8.937$, $p = .003$, Nagelkerke’s $R^2: .603$, but not in the experimental condition, $\chi^2(1) = 0.121$, $p = .728$, Nagelkerke’s $R^2: .005$. As can be seen in Figure 3, girls and boys followed the majority at

![Figure 2. Children’s choices in the experimental and the control condition.](image-url)
similar levels in the experimental condition. In the control condition, however, a sizable proportion of the girls still conformed, whereas conformity rates in boys dropped to zero.

To examine children’s verbal justifications in relation to their choices, we coded justifications as referring to the majority in the video demonstration, as referring to the rewards in the boxes, or as ambiguous (see Table 1 for a summary). This latter category mostly consisted of responses in which children mentioned a personal preference (e.g., ‘because I wanted this one’; ‘because I knew this one was better’) but upon further probing would not specify any reasons for this. We found that children who chose the majority box in the experimental condition were more likely to justify their choices by explicitly referring to the majority in the video demonstration than children who did not follow the majority, Fisher’s exact test, $p = .001$, Cramer’s $\phi = .639$. Children who did not follow the majority in the experimental condition, on the other hand, were more likely to give ambiguous justifications than children who followed the majority, Fisher’s exact test, $p = .031$, Cramer’s $\phi = .434$. While justifications mentioning the pay-offs were generally rare in the experimental condition, a majority of children in the control condition justified their choices by explicitly referring to the pay-offs. In contrast, hardly any children in the control condition mentioned the video demonstration (see Table 1).

Finally, we analysed whether there was a relation between children’s choices and the accuracy of their video descriptions (whether or not they correctly stated how often children went to each box in the video). Descriptions were coded as correct if they implied that a majority – but not necessarily the exact number – went to one box and a minority went to a different box and if no categorical mistakes were made, for example that children sometimes went to the boxes containing four gummy-bears. This revealed that children who followed the majority in the experimental condition were not more...
likely to provide correct descriptions of the video than children who did not follow the majority (66.7% and 52.9%, respectively), Fisher’s exact test, $p = .491$, Cramer’s $\phi = .139$.

Likewise, children who followed the minority mostly provided correct video descriptions, suggesting that they did not simply misremember the majority behaviour.

**Discussion**

Our results demonstrate that 5-year-old children can strategically use conformity to a majority to coordinate with peers in the absence of any communication. When children were required to choose the same of four boxes as their partner (experimental condition), they were significantly more likely to follow the majority than when they could choose a box independently (control condition). When justifying their choices, children who conformed tended to explicitly refer to the numerical majority in the video demonstration, lending further support for the interpretation that conforming was a deliberate strategy. Indeed, children in the control condition and children who did not conform in the experimental condition hardly ever mentioned the majority in the video demonstration. Instead, non-conformers in the experimental condition mostly failed to provide coherent justifications for their choices, which suggests that they may have been unable to devise deliberate coordination strategies. Alternatively, these children may have felt somewhat uncomfortable for going against the group and may therefore have felt inhibited in justifying their choice. Children in the control condition, on the other hand, mostly justified their choices by referring to the pay-offs, indicating that they had understood that they could independently choose according to their personal preference. Hence, our findings cannot be explained by a general preference for conformity in preschool children. Children selectively followed the majority only when coordination was required, whereas all but a few children diverged from the majority and opted for the highest pay-off when the need to coordinate was removed in an otherwise identical situation.

Interestingly, we obtained a significant interaction between condition and sex. In the control condition, which assessed children’s baseline preference for conformity in this setting, girls followed the majority more often than boys. This result is congruent with previous findings with both children and adults showing that females are more likely to conform than males (Bond & Smith, 1996; Haun & Tomasello, 2011). It is interesting to note that all four girls who followed the majority in the control condition played with girl

---

**Table 1.** Children’s justifications for their choices

<table>
<thead>
<tr>
<th>Experimental</th>
<th>Control&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Followed majority</td>
<td>Did not follow majority</td>
</tr>
<tr>
<td>Explicitly referred to the majority in the video</td>
<td>10</td>
</tr>
<tr>
<td>Referred to pay-off</td>
<td>0</td>
</tr>
<tr>
<td>Ambiguous</td>
<td>5</td>
</tr>
</tbody>
</table>

Note. <sup>a</sup>Due to experimental error, one child in the control condition was not asked to provide a justification.
stooges. Children in our study are likely to have assumed that their partner behaved like the majority and girls in the control condition may have been more motivated to match their partner’s assumed choice when that partner was also a girl – even though there was no functional necessity to do so. Relatedly, girls have previously been found to show a stronger preference for activities endorsed by members of their own gender than boys (Shutts, Banaji, & Spelke, 2010). Moreover, the reported sex differences are in line with findings of early sex differences in basic imitative skills (Nagy et al., 2007) and might reflect a higher motivation in girls to align with one’s social group. In the experimental condition, on the other hand, children of both sexes conformed at equal levels, suggesting that there are no sex differences in the capacity to strategically use conformity for coordination purposes. Correspondingly, no sex differences were found in previous studies on children’s strategic decision-making in coordination problems (Grueneisen et al., 2014a,b; Wyman et al., 2012).

Furthermore, while conformity markedly increased when coordination was required, about half of the children in the experimental condition did not conform despite the fact that – from the child’s perspective – this was likely to result in coordination failure. One potential reason for this is that some children might have pursued a different coordination strategy. For instance, they may have reasoned that – regardless of how other children from the orange team have behaved – their partner probably preferred a box containing a higher reward. Moreover, they may even have expected their partner to choose the box that they themselves preferred and therefore concluded that their partner was likely to have picked one of the boxes containing a higher pay-off. While this possibility cannot be ruled out, it is certainly not reflected in children’s justifications for their choices. Only one of thirteen children who chose a box containing a higher pay-off in the experimental condition said he did so because he expected his partner to have done so too. Indeed, most children who did not conform failed to provide justifications from which any deliberate coordination strategy could be inferred. Rather, they were either unable to provide a coherent justification or mentioned a personal preference (e.g., ‘I wanted this one’).

It also seems unlikely that children’s attentiveness when watching the video can account for performance differences as non-conformers were as likely as conformers to accurately recall how often each box was chosen in the video descriptions. Instead, it appears that some children were unable to extract the ‘right’ information from the video demonstration – namely, that because the majority chose one particular box their partner was likely to have done so too. This may be related to the fact that children at this age are only starting to make consistent predictions of others’ behaviour based on their past behaviour (Kalish, 2002) or social category information (e.g., Rhodes & Gelman, 2008; but see Powell & Spelke, 2013, for a recent argument suggesting that even preverbal infants expect members of a social groups to act alike).

It should be noted, however, that successfully predicting the stooge’s behaviour was only one central requirement for solving the task. Another was to integrate this prediction into one’s own action and correspondingly choose the appropriate box oneself. Crucially, this had to be achieved in a particularly demanding paradigm where children were required to inhibit going to the largest reward. This reward structure was chosen to provide an incentive for non-conformity in the control condition and thus to be able to distinguish between children’s general motivation to conform and their ability to use conformity strategically to accomplish coordination. It may be, however, that limited inhibitory control capacities could have masked coordination abilities in some children, resulting in fairly low conformity rates even when coordination was necessary. Moreover, previous studies have shown that children at this age seem to be particularly willing to
choose risky high-pay-off options over more probable low-pay-off ones (Harbaugh, Krause, & Vesterlund, 2002; Paulsen, Platt, Huettel, & Brannon, 2012). Such a temptation to gamble may have led some children to choose the box containing the highest reward instead of the box their partner was more likely to have chosen. Future studies could thus incorporate additional measures of executive functions, risk-taking tendencies, and action prediction abilities to investigate in more detail which situational and cognitive factors facilitate or hinder children’s use of majority information in collaborative contexts.

Our results add to a growing body of evidence suggesting that by the late preschool years, children are capable of using a variety of different strategies to solve coordination problems with peers with and without communication (Duguid et al., 2014; Grueneisen et al., 2014a; Wyman et al., 2012). Furthermore, in line with previous studies (Chen et al., 2013; Haun & Tomasello, 2011), our results underline that children do not ‘blindly’ conform to majorities but instead flexibly use their conformist tendencies in order to achieve specific social goals. The ability to strategically use majority information allows them to achieve coordination even with unfamiliar others and thus broadens their capacity to collaborate with others for mutual gains.

Acknowledgements
We would like to thank Isabelle de Gaillande-Mustoe, Kassandra Sharron, and Jana Teichmann for helping in recruiting and collecting data. We thank Daniel Haun, Shona Duguid, Rebecca Koomen, Malinda Carpenter for helpful comments and discussions. We also thank Colleen Stephens and Roger Mundry for advice on statistics. Finally, we would like to thank all day care centres, parents, and children for their friendly cooperation.

References


Received 7 March 2014; revised version received 19 November 2014