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**I won't tell: Young children show loyalty to their group by keeping group secrets**

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Under Review

Word Count: 5,925

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Abstract

Group loyalty is highly valued. However, little is known about young children's loyal behavior. This study tested whether 4- and 5-year-olds (*N*=96) remain loyal to their group even when betraying it would be materially advantageous. Children and four puppets were allocated to novel groups. Two of these puppets (either in-group or out-group members) then told children about their group's secret book and urged them not to disclose their secret. Another puppet (not assigned to either group) then bribed children with stickers to tell the secret. Five-year-olds, but not 4-year-olds, were significantly less likely to reveal the secret in the in-group than the out-group condition. Thus, even young children are willing to pay a cost to be loyal to their group.


*Keywords:* Loyalty, Group Membership, Group Norms, Secrets

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Across human cultures, loyalty is highly valued (Haidt & Joseph, 2004). We expect our group members to stick with the group and to be trustworthy in their dealings with fellow in-group members (Brewer & Brown, 1998). Individuals who abandon or betray their group are often punished harshly. In times of war, deserters can be executed and, even in times of peace, defectors are judged very negatively by their group members (e.g., Singer & Radloff, 1963). One particularly reprehensible offense is betraying the secrets of one's group to an outgroup. Traitors and spies are held in contempt by group members and often punished harshly as well.

Why is loyalty so important to us? Living in groups has been critical to humans' success. Only by cooperating with others have we been able to survive and flourish (Boyd & Richerson, 2009; Roberts, 2005). For cooperation to be stable and successful, group members must be able to trust and rely on each other over time (Tomasello, Melis, Tennie, Wyman, & Herrmann, 2012). Loyalty is particularly valued in situations in which defection or betrayal would harm the group, but would be advantageous for the individual (e.g., Levine & Moreland, 2002; Zdaniuk & Levine, 2001). Consequently, group members are often expected to sacrifice personal benefits for the good of the group as a whole (Brewer & Silver, 2000). It is this personal sacrifice that puts an individual's loyalty to the test and makes it visible in its strongest form.

Kindergarten age is known to be an important period for the development of group-related attitudes and behavior. For example, a number of studies have found that children around this age have reliable preferences for their in-group members (e.g., Aboud, 2003; Bigler & Liben, 1993; Dunham, Baron, & Carey, 2011; Dunham & Emory, 2014; Kinzler & Spelke, 2011). Also, from around the age of 4, group membership has been found to influence children's learning (Kinzler, Corriveau, &

Harris, 2011) and motivation (Master & Walton, 2012), and guide their expectations and judgments about other people's behavior (Chalik & Rhodes, 2014; Rhodes & Chalik, 2013). Yet, to our knowledge, there have been no studies demonstrating that young children make personal sacrifices for the sake of the group.

The majority of research on this topic has investigated how children evaluate the loyal or disloyal behavior of others rather than on their own sense of loyalty to the group. In these studies, loyalty is typically defined as preferentially interacting with, or saying positive things about, in-group members. For example, Castelli, De Amicis, and Sherman (2007) found that White children between 4 and 7 years of age favor other White children who positively interact with a racial in-group member (i.e., a White child) over White children who interact with a racial out-group member (i.e., a Black child). Another set of studies investigated children's judgments of in-group and out-group peers who expressed normative versus deviant statements (e.g., saying positive things about their in-group only versus also saying positive things about their out-group, respectively). Five- to 12-year-old children generally preferred normative to deviant in-group members (e.g., Abrams, Rutland, & Cameron, 2003; Abrams, Rutland, Cameron, & Ferrell, 2007; Abrams, Rutland, Pelletier, & Ferrell, 2009).

The only study that has investigated whether children positively evaluate individuals who pay a cost in order to remain loyal to the group was conducted by Misch, Over, and Carpenter (2014). Four- and 5-year-old children watched a video of two groups competing. The video was paused when it became clear that one of the groups was going to win. Children then watched as two members of the losing group spoke, in counterbalanced order. One individual stated that she would like to win, and therefore would leave her group in order to join the winning group (disloyal individual). The other individual stated that, although she would like to win, she

would stay with her group (loyal individual). Thus, the loyal person had to sacrifice a personal benefit (winning) in order to remain loyal and stay with her group. Children were asked to judge the two individuals' niceness, trustworthiness, morality, and deservingness of a reward. Five-year-olds clearly preferred the loyal over the disloyal person for most questions, while 4-year-olds only showed a tendency in the same direction.

We thus know that children positively evaluate loyal behavior, but we do not know whether they are loyal to the group themselves. Previous research has shown that even when children have knowledge of social norms, they do not necessarily follow them (Blake, McAuliffe, & Warneken, 2014; Smith, Blake, & Harris, 2013). To gain a fuller understanding of children's loyalty it is therefore important to investigate their actual loyal behavior to the group. The two studies that have investigated children's own loyalty to the group most directly were conducted by James (2001) and Nesdale and Flesser (2001). James (2001) interviewed 5- to 8-year-old children about their favorite sports teams. He found that 85% of the children predicted that their team preferences would not change even if their team lost their games. Although this study is suggestive, again there is little reason to assume that children's predictions about how they would act and their actual behavior will converge, especially when loyalty is costly. Indeed, Nesdale and Flesser (2001) directly assessed children's loyalty and showed that children were *not* loyal to the group when it incurred a cost in terms of status. They assigned 5- to 8-year-old children to either a high-status or a low-status group (allegedly based on drawing skills). Then, children were asked whether they would like to change their group. Children who belonged to the high-status group expressed their loyalty by communicating their wish to stay with their group, while children who belonged to

the low-status group did not. In summary, findings using verbal measures of children's loyalty have produced mixed results and we do not yet know whether children are able to actually behave in a loyal way towards their own group.

The aim of the current study therefore was to investigate children's own loyal behavior, and to examine the extent to which children would remain loyal even when they have to pay a personal cost for the sake of the group. We assessed children's loyalty by testing their willingness to keep a group's secret. As mentioned above, one severe form of disloyalty can be telling a group's secret to another group. We know from previous research that even young children understand the importance of secrecy (at least at times). From the age of 4 years, they understand that some information is not appropriate for disclosure (Kim, Harris, & Warneken, 2014), and think that keeping a secret is an important indicator of a person's trustworthiness (Rotenberg, Michalik, Eisenberg, & Betts, 2008). Furthermore, children at this age are able to keep secrets in certain contexts themselves (Peskin & Ardino, 2003). Children's willingness to keep a group's secret can thus be used as a measure of their loyalty to the group.

Children were assigned to novel, and minimal, color groups and then told a secret by two members of either their own group or their out-group, and were asked not to tell the secret to anyone. Then, a new, neutral character appeared and prompted children to disclose the secret, bribing them with stickers if they did not tell immediately. Thus, to be loyal, children would have to forego receiving the stickers that were offered in exchange for the secret information.

Our main interest was in 5-year-old children, as previous studies have shown that children around this age 1) show in-group bias in other contexts even when groups are minimal (Dunham et al., 2011; Dunham & Emory, 2014), 2) report feeling

enduring preferences for real-world groups such as sports teams (James, 2001), and 3) value loyalty from a third-party perspective (e.g., Abrams et al., 2003; 2007; 2009; Castelli et al., 2007; Misch et al., 2014). In addition we also tested 4-year-olds because previous research has shown developmental change in understanding of loyalty between 4 and 5 years of age (Misch et al., 2014). We predicted that 5-year-old children would show loyalty to their group even when it incurred a cost. We did not have a strong prediction about the 4-year-olds; rather we were interested in exploring whether a similar developmental increase between 4 and 5 years would be seen in children's own loyal behavior as is seen in their understanding and evaluation of loyalty in others (Misch et al., 2014).

Method

**Participants**

*Five-year-olds.* We tested 48 five-year-old children (24 girls and 24 boys, age range 5;0;14-5;9;27, *M*=5;5;02). Four additional children were tested but excluded for experimenter error (3) or failing the manipulation check at the end of the study (1; for more information see the Procedure section).

*Four-year-olds.* We tested 48 four-year-old children (24 girls and 24 boys, age range 4;0;15-4;9;21, *M*=4;6;19). Thirteen additional children were tested but excluded for failing the manipulation check at the end of the study (7), camera malfunction (2), not responding at all (1), interruption of the procedure by a teacher or the child (to go to the restroom) (2), and experimenter error (1).

Children were recruited and tested in their daycare centers in a mid-sized city. No SES or ethnicity data were collected, but approximately 98% of the population from which the sample was drawn are native [blinded].

**Materials and design**

Children were tested by three female experimenters: the moderator (M) and two puppeteers (E1 and E2). Each puppeteer played one female and one male hand puppet (Figure 1). The two puppets played by E1 were the secret holders. In the in-group condition the child was allocated to the same group as the two secret holders played by E1; in the out-group condition the child was allocated to the same group as the two puppets played by E2. A fifth puppet, the briber "Siri" (Figure 2), was later played by M.



*Figure 1.* The puppets used in the study: a) The secret holders played by E1 wearing yellow group markers, b) The puppets played by E2 wearing green group markers.



*Figure 2.* Siri bribing the child with 5 stickers.

A set of green and yellow scarves (two puppet-sized scarves and a child-sized scarf in each color; see Figure 1) were stored in a box with a lid.

The group's secret was a brown, hardcover book with text but almost no pictures in it. A small stack of cardboard boxes was located on one side of the test room (on the right-hand side from the child's perspective, close to the wall) to serve as a hiding place. The stickers used to bribe children were colored circles in blue, red, green, and yellow (see Figure 2). The fifth and final sticker was red and heart-shaped. Thirty large marbles and a marble bag were also used to keep children occupied immediately prior to the telling of the secret. To assess children's liking of all five puppets, a 5-point Likert scale was used, with drawings of faces with expressions that ranged from very sad (1) to very happy (5), along with a photograph of each puppet.

Across children, we counterbalanced the color of the child's group (so that half of the children in each condition were in the yellow group, and the other half were in the green group) and the color of the secret holders' group (so that half of the time they were in the yellow group, and half of the time they were in the green group). Furthermore, we counterbalanced the order in which the puppets were presented in the liking test (see below).

The puppets were a mix of boys and girls but the more active puppets in the study were matched to the child's gender. For example, when the participant was a girl, the girl puppets sat on either side of her during group allocation, and the secret holder puppet who asked the post-test question was female. The bribing puppet, Siri[1], was also always matched to the child's gender.

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[1] The name 'Siri' was chosen because it is not a very common name and so unlikely to be the child's name or the name of a close friend. It was also useful in that it could be used for both the female and the male puppet.

**Procedure**

Children were picked up by all three experimenters from their classroom. At the start of the procedure, there was a brief warm-up phase in which the child became acquainted with the adult experimenters and the four puppets who would later be allocated to groups. First, M introduced the child to the puppets and then asked the puppets to introduce themselves. Following this, M asked each of them two questions, either about what they had eaten for breakfast or about how they had travelled to the kindergarten that morning. This was done in order to make the child feel comfortable in the situation and to establish that the puppets should be treated as if they were children.

*Group allocation.* After the warm-up, M allocated the child and the four puppets to groups. She did this by saying "Today, we need two different groups. We will have a yellow group and a green group. First of all, we need to know which group everyone belongs to." M then picked up the box and explained that in this box there were yellow and green scarves, and that she would now pull out one scarf for each of them, thereby finding out which group they belonged to. Then, one by one, she allocated each puppet and the child into groups by apparently randomly drawing yellow and green scarves out of the box and placing them on each individual's neck. Group allocation always started with the child's in-group same-gender puppet, then proceeded to the out-group same-gender puppet, then to the child, the out-group other-gender puppet, and finally the in-group other-gender puppet.

*Secret telling.* After the group allocation, M said that next they would need the marbles that were lying on the floor in one corner of the room. She noticed that the marble bag was missing and asked the child to come with her to look for the bag outside of the room. This was an excuse so that E1 and E2 could leave the room

unseen and wait in an adjacent room. When M and the child returned with the marble bag, M pretended to be surprised that the others were missing and asked the child to put all the marbles into the bag while she looked for the others outside. When the child had just finished putting the marbles into the bag (as monitored by M on a video screen just outside of the room), the two puppets played by E1 entered the room, appearing not to notice the child. They were holding a book and looking for a place to hide it. They said, "The coast is clear! Let's find a place to hide the secret book of the yellow/green group!" They then appeared to notice the child and explained that this was their group's secret book. While doing so, they asked the child four times not to tell anyone about the book (e.g., "This is the secret book of the yellow/green group. You should not tell anyone about the secret book of the yellow/green group, ok?"). They showed the book to the child, and, after the child watched them hide the book behind the boxes, they left.

*Bribing.* A fifth, unfamiliar puppet entered the room, played by M. The puppet's gender matched that of the child and the puppet did not belong to either of the groups (he/she was not wearing a scarf). With a somewhat sneaky voice, the puppet introduced herself ("Siri") and asked the child for her name. Then Siri said, "I think the yellow/green group has hidden something secret here somewhere, and I want to know what it is. Will you tell me?" If the child refused to tell, Siri offered the child a sticker by placing it in front of herself and saying, "Look, I have a sticker here. You can have it if you tell me the secret of the yellow/green group." If the child still refused to tell the secret, Siri offered the child up to five stickers in the same manner (Figure 2). Each time, if the child did not say anything in response to the bribing, Siri waited 5 seconds before she offered the next sticker. If the child told the secret, Siri took the book out of the hiding place and admired it briefly before putting it back in

place. If the child revealed both the location ("behind the boxes") and what the secret

was ("a book"), the test phase ended. If the child mentioned only one of these, Siri

directly asked for the other part ("Oh, a book! And where is it?" or "Oh, behind the

boxes! And what is it?"). Before leaving, Siri put the child's stickers to the side and

told the child that she could take them later. If the child refrained from telling the

secret across all 6 trials, Siri put the stickers away and left.

*Post Tests.* For further information, we asked children some questions after the

main test phase. After Siri had left, the same-gender secret holder puppet came back

"to check on the secret book" and asked the child, "Did you tell anyone about our

secret book?" After this, M (who was no longer holding Siri) presented the child with

the smiley scale and photos of each of the five puppets. For each picture she asked,

"How much do you like [puppet's name]; do you like her very much, a little bit, ok,

not too much, or not at all?" while pointing to the corresponding faces on the scale.

As a final question she also asked the child, "Did you tell Siri about the secret of the

yellow/green group?" and "Why did you tell/not tell?" The results for these additional

questions can be found in the supplemental materials.

*Manipulation Check.* Finally, M asked the children which group they

belonged to. If, as sometimes happened, children named their daycare class group, M

asked more specifically, "Are you in the yellow or the green group?" If children could

not remember their group membership (even though they were still wearing the group

marker scarf), they were excluded from the analyses (see Participants section).

*Debriefing.* After the experiment, E1 and E2 returned with their puppets, and

together with M and the child they played with a marble run. If the child had given

away the secret, the secret holder puppets additionally resolved the situation to ensure

that the child had no reason to feel guilty: One of the puppets "realized" that she had

mixed things up. She said that this book was not the secret book of their group, but just a book belonging to her sister that she had accidentally taken. She then openly showed the book to everyone. For children who had not given away the secret, this part was not necessary so the secret was not mentioned further.

Children did not receive any of the stickers they were bribed with. Instead, all children were given two very fancy stickers to take home as a thank you gift.

**Coding and reliability**

Our main interest was in whether children kept or told the puppets' secret. In addition, for those children who told the secret at some point during the bribing, we also investigated how quickly they told it (when this was possible statistically). For this analysis children received a score between 0 and 5: They received 0 if they told the secret immediately after Siri's first request, before she offered the first sticker. If they told the secret during the bribing phase, they received the score corresponding to the numbers of stickers that were offered in that trial (1-5). Thus, children who told the secret in order to get 1 sticker received a score of 1, and children who told the secret to get 2 stickers received a score of 2, and so on. To assess inter-rater reliability, an independent coder who was unaware of the hypotheses of the study coded a random sample of 25% of children from each age group for both measures together. Reliability (Cohen's weighted kappa) was excellent with $\kappa = .99$. Coding and results for the additional questions that were asked after the test phase was complete are described in the supplementary material.

Results

Preliminary analyses revealed no effects of children's gender or color group on the results. Therefore, we collapsed across these variables and do not consider them further.

*Five-year-olds*

We investigated how many children kept, versus told, the secret at any point during the test phase. Overall, the majority of children kept the secret (71%). However, children in the in-group condition (88%) were significantly more likely to keep the secret than children in the out-group condition (54%, Fisher's exact test, $p$=.024).[2] Figure 3 presents the percentage of 5-year-old children who told the secret in each bribing trial. Because only a small number of children ever told the secret (i.e., 3 in the in-group condition and 11 in the out-group condition), statistical analysis of their resistance to bribery was not appropriate.

*Four-year-olds*

Overall, 52% of the 4-year-old children kept the secret. Although numerically more children in the in-group condition (63%) kept the secret than children in the out-group condition (44%), results did not differ significantly between conditions (Fisher's exact test, $p$=.25).[3] Additionally, we checked whether the children who told the secret at some point were less susceptible to bribing in the in-group condition. There was no difference between conditions in how long it took children to tell the

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[2] Results do not change when the child who failed the manipulation check at the end of the procedure is included ($p$=.03).
[3] Results do not change when the the seven children who failed the manipulation check at the end of the procedure are included ($p$=.54).

secret (*M* bribing scores = 1.67 in the in-group condition and 1.14 in the out-group condition; Mann-Whitney exact test; $U = 50.5$, $p = .428$; see Figure 4).
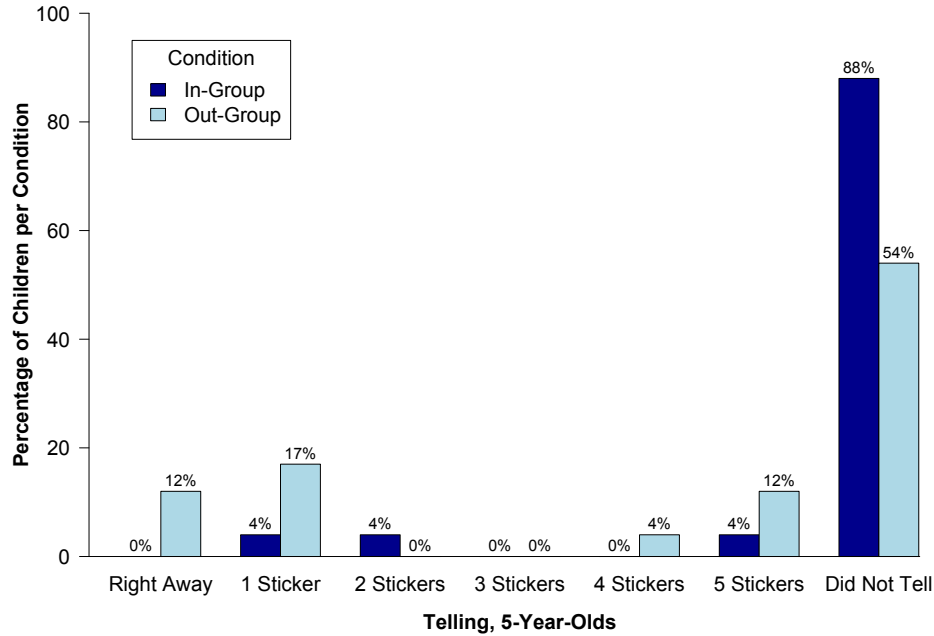


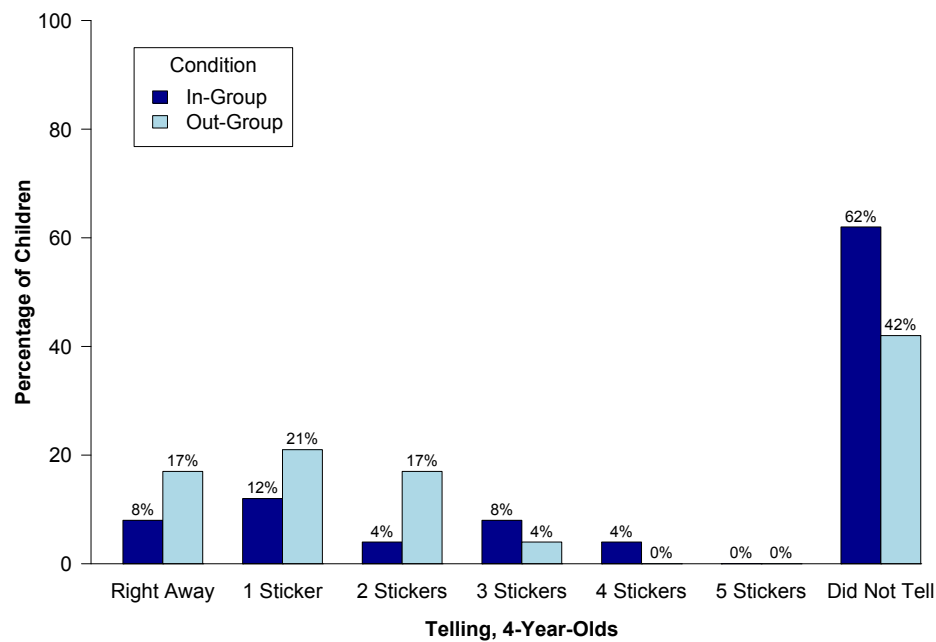*Figure 3.* Secret telling in each bribing trial for 5-year-olds.



*Figure 4.* Secret telling in each bribing trial for 4-year-olds.

*Age comparison*

To analyze the effects of age and condition, a Generalized Linear Model (GLM) was used with condition and age in years as factors, and the binomial measure of loyalty (i.e., telling the secret or not) as response variable. The full model differed significantly from the null model ($\chi^2$(3)=12.45, *p*<.01). Results of the full model showed that there was no interaction between age and condition (*p*=.33). The reduced model revealed a significant effect of condition (*Estimate*=-2.23, *SE*=0.45, *z*=-2.72, *p*<.01), indicating that, generally, children in the in-group condition were less likely to tell the secret than children in the out-group condition. The model also showed a trend for age (*Estimate*=0.88, *SE*=0.45, *z*=1.94, *p*=.052), indicating that 5-year-old children were marginally less likely to reveal the secret than were 4-year-old children.

Discussion

The aim of this experiment was to test whether young children show loyalty to their group. Results demonstrated that 5-year-old children were indeed loyal to their group: They were significantly more likely to keep a secret of their in-group members than a secret of out-group members. Remarkably, they were loyal even to the extent that they were willing to sacrifice a number of personal benefits in order to keep the secret, and even though the group was a minimal color group they had been assigned to only a few minutes before. When the 4-year-olds were considered separately, they were not significantly more loyal to their own group compared to the other group. However, their pattern of results went in the same direction as the 5-year-olds, and there was no significant interaction between age and condition.

This is the first study to demonstrate young children's own loyal behavior to the group, even in the strong sense of willingness to pay a cost to remain loyal. In contrast to previous research (Nesdale & Flesser, 2001), this suggests that children are sometimes willing to pay a cost in order to remain loyal to the group. These findings also extend previous research on children's verbal predictions of their own loyalty (James, 2001) and children's attitudes about other people's loyalty (e.g., Abrams et al., 2003; Abrams et al., 2007; Castelli et al., 2007; Misch et al., 2014) in demonstrating that even in direct social interactions in which children are tempted to be disloyal, they choose to remain loyal.

There were several interesting developmental findings. First, whereas 5-year-olds in the current study clearly showed loyalty to the in-group, 4-year-olds did not (although their pattern of results was similar, just weaker). These results are strikingly similar to those found by Misch et al. (2014) in a study of children's evaluations of individuals who were loyal vs. disloyal to their group in a third-party observation context. In that study, 5-year-olds significantly preferred the loyal to the disloyal individual, whereas 4-year-olds again showed weaker results in the same direction. Thus both of these studies suggest that 4-year-olds might be just beginning to understand and value loyalty to the group. It is likely that this overall pattern of results can be explained in part by several other developments that are taking place in children's lives at around the same age. For example, around this age, children's experience with group life (e.g., in preschool classes) increases and their attachment to their social groups grows (e.g., Aboud, 2003; Dunham et al., 2011; Kinzler & Spelke, 2011; Nesdale & Flesser, 2001). Relatedly, it may be that there is a transition from understanding commitments in dyadic interactions around the age of three (e.g., Gräfenhain, Behne, Carpenter, & Tomasello, 2009; Hamann, Warneken, &

Tomasello, 2012) to more group-based commitments by the age of five. It is also possible that older children are better at anticipating how their in-group would react to disloyalty than are younger children. In any case, as suggested by the similarities in results between the current study and that of Misch et al. (2014), development in children's understanding of loyalty appears to parallel closely development in their own loyalty to the group. It would be interesting for future research to investigate whether this relation between understanding and valuing loyalty in others on the one hand, and children's own loyal behavior on the other, holds within individual children.

Second, it is also worth noting that the 5-year-olds were better at keeping the secret overall than were the 4-year-olds. This replicates the results of Peskin and colleagues using a different task. They showed that although a majority of 4-year-olds are able to keep a secret, almost all 5-year-olds are able to do so (Peskin, 1992; Peskin & Ardino, 2003). A possible explanation for this transition is that a variety of relevant cognitive skills are developing in this age range, including inhibitory control and theory of mind. While inhibitory control is a cognitive ability that is connected to the ability to resist temptations (see, e.g., Metcalfe & Mischel, 1999), theory of mind helps children to understand the impact of telling on another person's feelings and has been shown to influence children's ability to keep a secret (Peskin & Ardino, 2003).

These findings bring up several avenues for future research. Among other things, it would be interesting to examine what factors influence children's loyalty. For example, research with adults shows that higher identification with the group increases group loyalty (Ellemers, Spears, & Doosje, 1997; Zdaniuk & Levine, 2001). In the current study, children were allocated to novel groups just a few minutes before the test. The use of minimal groups in the this study allowed us to control for such things as familiarity with the groups, previous experiences with group members, and

the status, size, and performance of the groups. However, children may feel a stronger sense of identification with real-world groups, and thus may be even more loyal to these types of groups. It is also possible that even younger children would be able to show loyalty to their group in a more naturalistic context. Other research with adults suggests additional factors that might influence loyal behavior, such as a threat to the group (Branscombe, Wann, Noel, & Coleman, 1993) and group status, performance, and stability over time (see Levine & Moreland, 2002). It would be interesting to study the influence of these factors in children as well.

Furthermore, it would be informative to investigate the nature of the sacrifices children would be willing to make to remain loyal. For example, would children give up a valuable personal belonging for their group? Also, as is often the case in the real world, it would be interesting to examine the impact of non-material sacrifices, such as paying a cost in terms of reputation or opportunities for future interaction.

Previous findings show that, at least by the age of five, children prefer members of their own group to members of other groups (e.g., Dunham & Emory, 2014; Rhodes, 2012) and understand some of the norms and obligations that come with membership in a group (e.g., Abrams et al., 2003; Killen, 2007; Schmidt, Rakoczy, & Tomasello, 2012). The current study extends these findings by demonstrating that young children not only understand and value loyal behavior (e.g., Abrams et al., 2003; 2007; 2009; Castelli et al., 2007; Misch et al., 2014), but are also loyal to the group themselves. Their willingness to sacrifice a personal benefit to be loyal indicates the strength of their commitment to the group. Thus, from an early age, children can be reliable members of their social groups who can be trusted to stick with their group even in difficult situations.

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Figure Captions

*Figure 1.* The puppets used in the study: a) The secret holders played by E1 wearing yellow group markers, b) The puppets played by E2 wearing green group markers.

*Figure 2.* Siri bribing the child with 5 stickers.

*Figure 3.* Secret telling across bribing trials for 5-year-olds.

*Figure 4.* Secret telling across bribing trials for 4-year-olds.

**Supplementary Material**

A number of supplementary measures were also collected. In order to explore the different strategies children used to avoid disclosing the secret, their verbal and behavioral responses to the bribing situation were coded. To assess children's reasons for keeping or disclosing the secret, one of the secret holders, as well as the moderator, subsequently asked children whether they had told the secret, and the moderator asked children why they told or did not tell. Finally, in order to explore whether the bribing results were mediated by liking, the moderator asked children to indicate how much they liked each of the five puppets. The results for these measures are reported below in the order they appeared in the procedure.

**Coding and Reliability**

*Refusal strategies.* When children refused to tell the secret, they often used strategies or excuses in their interaction with the bribing puppet. These strategies were coded into the following categories: Two related strategies were *prohibition* (e.g., "They told me not to tell anyone") and *secret* (e.g., "I won't tell, it's a secret"). The other strategies involved *denial* (e.g., "The yellow group was not here", "I don't know where they hid it"), *distraction* (e.g., "You can play with the marbles"), *stickers* (e.g., "I don't want your stickers"), and *other* (all other responses, e.g., "You have to look for yourself", "Stop it now!"). Depending on children's behavior, the number of responses children gave for this measure varied between 0 (when children told the secret in the beginning or when children used no strategy or just repeated their refusal to tell; e.g., "No, I won't tell!") and 5. Some children used the same strategy across all trials, and some children used different strategies in different trials. Thus, we counted how many children used each particular strategy (and multiple categories per child

were possible). A second coder who was unaware of condition coded 25% of children in both age groups. Reliability for categories of responses was excellent ($\kappa=.95$).

*Confessions to the secret holder.* After the main test, one of the secret holders asked the child the question: "Did you tell anyone about the secret book?" For only those children who had previously told the secret, responses were coded as *confessed* when children admitted that they had disclosed the secret to Siri (e.g., "yes"; nodding), as *denied* when children lied and claimed that they had not told the secret (e.g., "no"; shaking head), or as *no answer* when children did not respond or shrugged. Inter-rater reliability was perfect, with $\kappa=1$.

*Liking.* Children's responses to the smiley scale were coded with scores from 1 ("I don't like him/her at all") to 5 ("I like him/her very much") for each puppet (i.e., the two in-group puppets, the two out-group puppets, and Siri), separately. Inter-rater reliability was perfect, with $\kappa=1$.

*Confessions to the moderator and justifications.* At the end, the moderator asked children: "Did you tell anyone about the secret book?" Children's responses were coded in the same manner as the confessions to the secret holder, and reliability for this coding was perfect ($\kappa=1$). The moderator then asked the children why they told or did not tell the secret. Responses for <u>disclosing</u> the secret were divided into five categories: *Siri* (i.e., children's answer focused on Siri, e.g., "Because Siri wanted to know"), *stickers* (e.g., "Because I wanted the stickers"), *just because* (e.g., "Because I wanted to" or "Because I told it"), *no answer* (e.g., "I don't know", or when children said nothing), or *devaluation* (i.e., declaring either the secret or the betrayal as unimportant, e.g., "There was only writing in the book").

Responses for <u>keeping</u> the secret (including the children who untruthfully claimed that they kept the secret) were divided into five categories: *prohibition* (e.g.,

"I was not allowed to", "The others asked me not to tell it"), *secret* (e.g., "It was a secret"), *just because* (e.g., "Because I didn't want to tell"), *other*, and *no answer* ("I don't know", or when children said nothing). Because some children gave more than one reason, some responses fell into multiple categories. Reliability coding for children's justification categories was perfect, with $\kappa=1$.

**Results and Discussion**

*Refusal strategies.* When asked by Siri to reveal the secret, 87 children (91%) gave at least one refusal (sometimes before going on to reveal the secret later). Fifty-six percent of these children ($N$=49) gave a reason or used a particular strategy for their refusal. *Prohibition* was the most common reason given; it was used by 72% of these children. Twenty-two percent used *denial*, 8% referred to the *secret*, and *distraction* and *stickers* were used by 6% each. Fourteen percent also used various *other* refusal strategies (multiple categories per child were possible).

The strategies of referring to *prohibition* and *secret* show that children understood the restrictive nature of a secret and that they knew it was wrong to tell. Furthermore, the use of the other strategies indicates that children are already very creative when dealing with socially demanding situations.

*Confessions to the secret holder.* For the 37 children who told the secret at some point (39%), we were interested in whether they later confessed this to the secret holder or denied having told the secret. Most (78.4%) of these children denied telling the secret; 13.5% confessed and 8.1% gave no answer (see Table 1 for results reported separately for each age and condition).

Table 1

*Percentage of Children Who Told the Secret Who Confessed, Denied, or Gave no Answer to the Secret Holder's Question*

| Age group | Condition | Confessed | Denied | No Answer |
|---|---|---|---|---|
| 5-year-olds (*N*=14) | In-Group (*N*=3) | 33.3% | 33.3% | 33.3% |
|  | Out-Group (*N*=11) | 9.1% | 81.8% | 9.1% |
| 4-year-olds (*N*=23) | In-Group (*N*=9) | 0% | 88.9% | 11.1% |
|  | Out-Group (*N*=14) | 21.4% | 78.6% | 0% |

*Note.* The Ns include only children who had told the secret.

The fact that most children lied to the secret holder shows again that children understood the restrictive character of a secret. Any differences between conditions are difficult to interpret due to small and uneven sample sizes in the different cells.

*Liking scale.* To test whether children's loyalty might have been driven by increased liking of their own in-group, we analyzed whether children liked their in-group members more than their out-group members. However, there was no significant difference between the liking scores for in-group and out-group members in 5-year-olds (*M* score=3.83 for in-group and *M*=3.81 for out-group puppets; Wilcoxon exact signed-rank test, *p*=.88) or in 4-year-olds (*M* score=3.72 for in-group and *M*=3.51 for out-group puppets; Wilcoxon exact signed-rank test, *p*=.23). We also looked at whether children's loyalty was influenced by their in-group bias. The in-group bias score was created by calculating the difference between the liking scores for the in-group and the liking scores for the out-group puppets. It was then correlated with children's bribing score. So that children who did not tell the secret could also be

included in the analysis, we gave these children a score of 6. There was no correlation for either the 5-year-olds (Spearman's rank correlation, $\rho=.125$, $p=.393$) or the 4-year-olds (Spearman's rank correlation, $\rho=-.207$, $p=.156$). Thus children were not more loyal to their in-group members simply because they liked them more.

It is puzzling that no in-group bias was found in either age group. However, children's liking of the puppets might have been influenced by the fact that this measure was always taken at the end of the session.

*Confessions to the moderator and justifications.* The moderator also asked children whether they had told the secret. For the 37 children who told the secret at some point (39%), we were interested in whether they later confessed this to the moderator or denied having told the secret. In contrast to the way they responded to the secret holder, most of these children (81.1%) confessed to the moderator (see Table 2 for results reported separately for each age and condition).

Table 2

*Percentage of Children Who told the Secret Who Confessed or Denied When Answering the Moderator's Question*

| Age Group | Condition | Confessed | Denied |
|---|---|---|---|
| 5-year-olds (N=14) | In-Group (*N*=3) | 100% | 0% |
| | Out-Group (*N*=11) | 81.8% | 18.2% |
| 4-year-olds (N=23) | In-Group (*N*=9) | 66.7% | 33.3% |
| | Out-Group (*N*=14) | 85.7% | 14.3% |

*Note.* The *N*s include only children who had told the secret. All children responded to the moderator's question.

Thus while children were very reluctant to confess their disclosure to the secret holder, they were, in general, honest in their responses to the moderator. It seems reasonable that children tried to hide their betrayal from the secret holder, as most of them had previously agreed to keep the secret and thus their reputation and trustworthiness were at stake. The moderator, on the other hand, had been in the room (playing Siri) during the betrayal, so children might have reasoned that denying the betrayal to her made no sense because she already knew about their behavior.

The 30 children who had confessed their disclosure to the moderator were asked why they told the secret. A majority (53%) of their responses referred to *Siri*, 23% referred to the *stickers*, and 10% each fell into the categories *just because* and *no answer*. In 7% of the responses, children *devaluated* the secret or their behavior.

Of the 59 children who kept the secret, 58 truthfully said that they kept the secret. When giving their reasons for not telling, most of the responses referred to *prohibition* (59%) and *secret* (26%). Remaining reasons were *just because* (10%), *no answer* (5%), and *other* (2%). Thus, again, most of these children showed that they clearly understood the restrictive demands of a secret.