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Selective Learning and Teaching among Japanese and German Children

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Abstract

Despite an increasing number of studies demonstrating that young children selectively learn from others, and a few studies of children's selective teaching, the evidence almost exclusively comes from Western cultures, and cross-cultural comparison in this line of work is very rare. In the present research, we investigated Japanese and German children's selective learning and teaching abilities. We found clear cultural differences. Japanese children were better at selectively teaching an ignorant person over a knowledgeable person than at selectively learning from knowledgeable others. By contrast, German children were better at choosing to learn from a knowledgeable rather than from an ignorant person than at selectively teaching ignorant others. The present findings suggest that the development of human learning and teaching, especially the tendency to take into account others' knowledge status, is strongly affected by cultural background.

Keywords: *cultural learning; social learning; learning; teaching; cross-cultural*

Selective Learning and Teaching among Japanese and German Children

One defining characteristic of humans is that we share an immense amount of knowledge with others. Advancement and achievement of great human knowledge was only possible by building on past knowledge. Indeed, human evolutionary success would not have been able without learning from others and teaching each other (Tomasello, 2009). Through observational learning and explicit instruction from others, collective constructs are cumulatively inherited, transmitted to individual subjects, differentiated and enriched (Boyd, Richerson, & Henrich, 2011). Increasing evidence shows that children are very good social learners, selectively learning from a knowledgeable person over an ignorant person. By contrast, evidence concerning selective teaching (i.e., selectively choosing the recipient of children's own teaching) is scarce and not straightforward compared to the social learning literature. This is surprising given that already young children teach each other (e.g., Howe, Porta, Recchia, & Ross, in press). Interestingly, moreover, despite different cultural practices in learning and teaching, cultural variations in children's selective teaching and learning have not been systematically studied, and thus, are poorly understood. The present research, therefore, intends to fill in this gap in the literature by investigating cross-cultural differences and similarities concerning selective learning and teaching in young children.

A large amount of evidence shows that young children selectively learn from others around them (Harris, 2012). Children around the age of 4 years learn from those who have provided accurate information rather than inaccurate information in the past and from those who provide information confidently rather than those who provide information hesitantly (e.g., Koenig & Harris, 2005; Sabbagh & Baldwin, 2001; Scofield & Behrend, 2008). In addition, by 3.5 years they selectively seek help from competent rather than incompetent others (Paulus &

Moore, 2011). There is evidence for such selective learning in infants (Koenig & Echols, 2003). Moreover, children around 4 and 5 years old are sensitive to the reasons and source of others' past knowledge states (i.e., whether an informant's previous ignorance was due to temporary circumstances and whether the informant's previous knowledge was due to help from others) and selectively learn from those who seem genuinely knowledgeable (Einav & Robinson, 2011; Nurmsoo & Robinson, 2009).

In particular, children are sensitive to gaps in others' knowledge, and learn selectively from more knowledgeable teachers (Baldwin & Moses, 1996; Sabbagh & Baldwin, 2001). Importantly, this sensitivity is likely to be a necessary, but not sufficient, component of teaching (Astington & Pelletier, 1996; Kruger & Tomasello, 1996; Olson & Bruner, 1996). More specifically, young children have some understanding that teaching should be directed toward ignorant learners, not knowledgeable learners. In a study by Ziv and Frye (2004), for example, children aged 3~4 and 5~6 years were asked to identify a teacher and a learner. Children heard a story involving a teacher, a first student who knew how to read and a second student who did not know how to read. When children were asked whom the teacher would teach, they responded that the teacher should teach the student who did not know how to read. In another story, one student knew how to play a game but neither the teacher nor the other student knew how to play. Children responded that the student who knew how to play the game should teach the fellow student as well as her own teacher. This suggests that children as early as 3 years of age understand that the presence or absence of knowledge determines who can be a teacher or a learner, as opposed to the pre-established status of being a teacher or a pupil. This line of work demonstrates that children have an understanding of selective teaching based on others' knowledge states, but do they actually selectively teach others accordingly?

There is some suggestion that young children are capable of selectively communicating information as a function of the knowledge states of the recipients. For example, toddlers adjust their conversation to the competence of their conversational partners (Shatz & Gelman, 1973; Shwe & Markman, 1997; see also Liszkowski, Carpenter, & Tomasello, 2008) and 3~5-year-old children adjust their teaching to another person's knowledge states (Ronfard & Corriveau, 2016). Nevertheless, evidence is not straightforward with respect to selecting whom to teach. A recent study demonstrates that children aged 3 to 6 prefer to inform a previously knowledgeable person rather than an ignorant person (Kim, Kalish, Weismen, Johnson, & Shutts, 2016). In the study, children were presented with two people, one of whom constantly provided accurate information, and the other, who constantly provided inaccurate information, and were asked to choose one of them to inform about a novel piece of information they both expressed ignorance about. Children selected a previously accurate person rather than a previously inaccurate person (Experiments 1-3). Even when one of the potential learners expressed their ignorance whereas the other person claimed to know the information, children continued to inform the person who already knew the piece of information (Experiment 4). Kim et al. (2016) proposed that other motivations, such as affiliation with people having more knowledge and resource may contribute to children's decisions about whom to teach and inform. By implication, unlike some of the theoretical proposals presented above, children's sensitivity to existing knowledge gaps may not necessarily guide their decision to select less informed others as teaching targets.

Cultural variations in selective learning and teaching. Unfortunately, a majority of the existing studies of selective teaching and learning exclusively concern children from Western countries, mostly from English speaking countries (USA or UK). Yet, Western cultures have been suggested to be 'particularly unusual compared to the rest of the species' (Henrich, Heine,

& Norenzayan, 2010, p. 61). Indeed, ethnographic observation shows that learner-oriented teaching, which is often encouraged in Western cultures, is not a prevalent form of teaching across other cultures (Kline, 2014). Rather, in some cultures, learners participate in everyday activities in which they watch others perform daily tasks and gradually become able to perform them on their own. In addition, it has been argued that children's social and cultural learning abilities might be affected by sociocultural processes and experiences (Heyes, 2012; Heyes & Frith, 2014). For example, Shneidman, Gaskins, and Woodward (2016) demonstrated that directed teaching is rare in Yucatec Mayan culture and Yucatec Mayan infants' learning from others differed from US counterparts. Therefore, we have good reasons to hypothesize that selective learning and teaching vary with culture early on in human development. Indeed, a few recent studies reported cultural variation in young children's selective learning (Chan & Tardif, 2013; Lucas, Lewis, Pala, Wong, & Berridge, 2013; see also Matsui, Yamamoto, Miura, & McCagg (2016) for Japanese children's selective learning abilities): a higher level of selective learning in Turkish preschoolers than in Chinese or British children (Lucas et al., 2013) and a stronger tendency to accept a conflicting report by a teacher in kindergartners from USA with strong prior knowledge as compared to counterparts from Hong Kong (Chan & Tardif, 2013). Except for these studies, to our knowledge, there is relatively a lack of empirical studies that systematically investigated selective learning – let alone selective teaching – of children developing in different cultural backgrounds. Thus, although a few studies examined either selective learning or selective teaching, no studies directly compared selective learning and selective teaching in a cross-cultural perspective.

The present research, therefore, aimed to bridge this gap by investigating whether selective learning and teaching vary with culture. To this end, we compared Japanese children to

German children. We decided to examine German children as coming from a prototypical Western culture. We decided to compare them to Japanese children as prior research of cultural differences pointed to fundamental differences between interdependent or collectivistic cultures such as Japan and independent or individualistic cultures such as Germany (Triandis, 1993). An individual from a collective culture tends to see herself as interrelated with others whereas an individual from an individualistic culture tends to see herself as independent from others (Markus & Kitayama, 1991) and this cultural difference leads to different cognitive styles, including attentional focus and reasoning, with Asians attending more to context and relationships as compared to Westerners (e.g., Nisbett, Peng, Choi, & Norenzayan, 2001). Decisions concerning selective teaching and learning may also be subject to these cultural differences (Kline, 2014). Asian children's judgments are more easily influenced by consensus than Western children's (Chen, Corriveau, & Harris, 2013; Corriveau, Kim, Song, & Harris, 2013) perhaps due to an emphasis on group harmony and relationship in these collectivist cultures (Kağıtçıbaşı, 2005). Moreover, social experiences shape the ways in which children learn from others (e.g., Shneidman et al., 2016) and the kinds of expectations they have about others (Biro et al., 2015; Johnson et al. 2010). Specifically, infants develop different expectations of how others would behave in social interaction depending on how their caregivers responded to their own needs measured by attachment styles (e.g., Biro et al., 2015). In particular, mothers' sensitivity differs in Japanese compared to US samples, and thus attachment styles vary between the two. Japanese caregivers as compared to US counterparts respond to infants' needs in an anticipatory manner, addressing them even before they arise, whereas US caregivers allow infants' independence, waiting for the infants to express their own needs (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000). Given all these considerations, we expected

Japanese children as compared to German children to be less selective in learning because independence and autonomy, and thus individual's decision, are emphasized less in Japan than Germany, and Japanese children are more used to their needs being readily met without expressing them. For the same reason, however, we expected Japanese children to develop selective teaching earlier because teaching as a way to meet others' needs – in this case providing information- and as a way to consolidate homogeneity in a group may be more frequent in Japan than in Germany.

Method

Participants. Four-year-old ($N = 48$, 26 girls, 22 boys, $M = 4.52$ years, Range = 4.18 ~ 4.98 years) and 6-year-old ($N = 48$, 26 girls, 22 boys, $M = 6.32$ years Range = 6.00 ~ 6.82 years) Japanese children and 4-year-old ($N = 48$, 25 girls, 23 boys, $M = 4.55$ years, Range = 4.17 ~ 4.96 years) and 6-year-old ($N = 48$, 26 girls, 22 boys, $M = 6.34$ years, Range = 6.01 ~ 6.86 years) German children participated. Eight Japanese children were excluded due to the following reasons: experimenter error (2 younger children), providing unrelated responses or no responses (3 younger children, 1 older child), distraction (1 younger child) or suspected developmental delay (1 younger child). Ten German children were excluded due to experimenter error (5 younger and 4 older children) or failure to complete the task (1 younger child). Roughly equal number of boys and girls participated in each task (see below). Children from both countries were recruited via preschools and lab database lists. The present study was approved by the research ethic committee in both institutions in Germany and Japan: Kyoto University, Japan under the study title of “Development of metacognition from 3- to 6-year-old children” and by Ludwig Maximilian University, Munich, Germany under the study title of “Divided Metacognition: when epistemic norms conflict”.

Design and procedure. Children were tested individually in a laboratory or a quiet room in their preschool. They viewed a video clip of puppets who differed in their knowledge states concerning the hidden contents of a box. Half of the children received a teaching condition and the other half a learning condition. In the learning condition, children did not see the contents of the box whereas in the teaching condition, children saw the contents of the box. In both conditions, children received three trials. Every trial differed in terms of how exactly knowledge states were established. However, in all trials, one puppet knew the contents of the box whereas the other puppet did not. For example, one puppet looked inside the box whereas the other did not. See supplementing material for a detailed script. Every trial involved a different set of puppets, a box and objects but was maintained across two tasks. Every trial started with a scene with a box in the middle and each puppet in an opposite side, but in an equal distance from the box. Which puppet was knowledgeable or ignorant and whether the knowledgeable puppet went first or second were counterbalanced across participants as well as the order of the trials.

In the learning condition, in every trial, the two puppets provided a conflicting report about the contents and children were asked to endorse one of the reports (“This one said, there is a scarf in the box and this one said there is a hat in the box. What do you think is inside? Do you think there is a scarf like this one said (pointing at the puppet) or a hat like this one said (pointing)?”). In the teaching condition, in every trial, the two puppets did not provide any reports, but instead in the beginning of the trial, the contents were revealed to the children and at the end of the trial, children were asked to choose one of the puppets to inform about the contents they previously saw (“You know what’s inside the box but you get to tell only one of them what’s inside the box. Who should you tell? Can you point?”).

Data coding. In the learning condition, children's choice of the report supplied by the knowledgeable puppet was given a score of 1 and their choice of the report supplied by the ignorant puppet was given a score of 0. In the teaching condition, children's choice of the ignorant puppet was given a score of 1 and their choice of the knowledgeable puppet was given a score of 0.

Results

Figure 1 presents the mean proportion of trials in which children provided accurate responses as a function of culture, task and age. These accurate scores were analyzed via a 2 (Age group: Younger vs. Older) X 2 (Task type: Learning vs. Teaching) X 2 (Country: Germany vs. Japan) ANOVA with all factors as between-subjects factors. There was a significant main effect of Age, $F(1, 184) = 8.90, p = .003, \eta^2 = .04$. Older children displayed better performance than younger children. An interaction between Task type and Country was also significant, $F(1, 184) = 14.46, p < .001, \eta^2 = .07$. A simple effect of Task type shows that Japanese children were better in selective teaching than in selective learning, $F(1, 184) = 4.93, p = .03, \eta^2 = .03$, whereas German children did better in selective learning than teaching, $F(1, 184) = 9.97, p = .002, \eta^2 = .05$. A simple effect of Country shows that German children displayed better selective learning than Japanese children, $F(1, 184) = 11.52, p < .001, \eta^2 = .06$, whereas Japanese children were better in selective teaching than German children, $F(1, 184) = 3.93, p = .05, \eta^2 = .02$. None of the other main effects or interaction effects were significant. Observed power for the significant main effect of Age was 84%, and 97% for the interaction of Task type and Country.

Next we compared children's scores to chance (1.5). Both younger and older German children were significantly more likely to learn from a knowledgeable person than from an ignorant person, Younger: $t(23) = 2.16, p = .042$, Cohen's $d = .44$; Older: $t(23) = 2.82, p = .01$,

Cohen's $d = .58$. Neither younger nor older Japanese children's selective learning differed from chance level, Younger: $t(23) = -1.67, p = .11$, Older: $t(23) = 0, p = 1.0$. By contrast, only older Japanese children were significantly more likely to teach an ignorant person than a knowledgeable person, $t(23) = 3.25, p < .01$. Cohen's $d = .66$, which was not the case for younger Japanese: $t(23) = -.23, p = .82$, older German: $t(23) = .56, p = .58$ or younger German children: $t(23) = -1.84, p = .08$. See Figure 1 for details.

Discussion

The present research study is the first investigation to directly compare selective learning and teaching of 4- and 6-year-old preschool children developing in two different cultural backgrounds. We found that the development of selective teaching and learning differed significantly between Japanese and German children. More specifically, Japanese children were better than German children in selective teaching. By contrast, German children were better than Japanese children in selective learning. Thus, the current study reveals that the relative strength of children's performances between selective teaching and learning, as well as their developmental trajectories, vary with cultural background.

An increasing number of studies have shown that children are great social learners from early age. In particular, children selectively learn from others (e.g., Mascaro & Sperber, 2009; Rakoczy, Warneken & Tomasello, 2009; Sabbagh & Baldwin, 2001). For example, they learn more from more knowledgeable others than from ignorant others (Sabbagh & Baldwin, 2001). Moreover, children understand that teaching should be directed toward those who lack rather than those who already have a piece of knowledge, and tend to direct their information sharing toward a person who lacks the information (e.g., Ziv & Frye, 2004; but see also Kim et al., 2016). However, the current literature is limited in two ways: 1) existing data are almost

exclusively from Western cultures, and cross-cultural comparison is very rare 2) selective learning and selective teaching are not directly and systematically compared. Our study contributes to both lines. We discuss these below in more detail.

A considerable number of studies provided evidence that Western children selectively learn from knowledgeable compared to non-knowledgeable others (see Harris, 2012; Mills, 2013). Our findings on German children's selective learning are consistent with this large body of evidence. However, in contrast to these findings, Japanese children did not show such a pattern of selective social learning. Notably, there was also no developmental change in Japanese children: performance of 6-year-old children was no better than those of 4-year-old children. Our study, therefore, demonstrates the existence of considerable cross-cultural differences in children's selective social learning (see also Lucas et al., 2013; Shneidman et al., 2016). Our results inform recent theoretical claims that human social and cultural learning might itself be a consequence of sociocultural processes (Heyes, 2012; Heyes & Frith, 2014) and ask for further research to explore the developmental origins of selective learning. ,

Notably, our findings seem at first glance not to fit with those of Matsui et al. (2016) who documented 3- and 4-year-old Japanese children's good performance in selective learning. On a closer inspection, the two studies differ in at least two ways. First, in Matsui et al., speaker (un)certainty was explicitly marked in a sentence. Japanese children may largely rely upon these linguistic markers over other cues to selectively learn from others granting that it is a regular conversational practice in Japanese culture for speakers to explicitly indicate their (un)certainty (see also Matsui et al., 2009 for the finding that linguistic markers benefit Japanese children's performance in a false belief task in comparison to German children). Second, our learning content involved episodic knowledge whereas theirs concerned semantic knowledge (object

labels). Some argued that semantic knowledge promotes fast learning in young children especially when it is delivered with a speaker's pedagogical cues (e.g., direct eye gaze; Csibra & Gergely, 2009). Japanese children's advantage in processing linguistic markers of speaker certainty along with the benefit of semantic knowledge for fast learning may explain Japanese children's selective learning in Matsui et al. (2016). Nevertheless, incompatible findings between the two studies should be addressed by future studies systematically investigating selective learning and teaching of semantic and episodic knowledge in young children.

Interestingly, concerning cross-cultural differences in young children's selective teaching, we found a reversed pattern: Japanese children were better in selective teaching than their German counterparts who failed to discriminate knowledgeable and ignorant learners. The finding of cross-cultural differences in children's development of selective teaching lends some support for theoretical proposals that human teaching varies by culture (Kline, 2014; Shneidman et al., 2016) and provides evidence that this is already present early in development. Although we did not find an age difference in the overall analysis, it is worth noting that in the teaching task only older Japanese children were more likely to select an ignorant person than a knowledgeable person whereas younger children performed at chance.

The implications of the present findings also extend to a systematic comparison between children's selective learning and teaching. Prior studies of selective learning were conducted independently of those of selective teaching. Theoretically, it is argued that a critical component for both selective teaching and learning is the understanding of a knowledge gap between a learner and a teacher (Sperber et al., 2010). Moreover, learning from others and teaching others require the same rational inferential processes of understanding others' minds (see Landrum, Eaves, & Shafto, 2015). Our findings question these perspectives. In the present research, we

directly compared children's performance in selective learning and selective teaching. Children did not show equivalent performance between learning and teaching tasks. Japanese children did better in selective teaching than in selective learning. German children did better in selective learning than selective teaching. This might suggest that selective learning and selective teaching do not fully depend on one single and shared mechanism. Rather, they may recruit different social pragmatic forms of understanding shaped by children's own experiences in a given culture. Indeed, social factors (e.g., expressing respect, a desire to belong), and not just epistemic considerations, play a role in selective learning (Jaswal & Kondrad, 2016). Hence, just as prior social experiences are bound to affect children's dispositions to learn from others (Shneidman et al., 2016), this might also – and perhaps even more so – be the case for selective teaching.

How can we explain the present findings of cultural differences in young children's selective learning and teaching? We offer some - albeit speculative- explanations. Cross-cultural studies often interpret cultural differences in terms of the collectivist vs. individualist dimensions (Triandis, 1993). Japan compared to Germany is more closely aligned as a collectivist than an individualist culture. In Japanese culture, there is a great emphasis on putting others before oneself and caring for others. Presumably, selective teaching as a form of altruism, requires one to care about others who lack the relevant piece of information (Tomasello, 2009). Japanese children may be keen on attending to others' needs –in this case in providing information whenever it is needed. Note, however, that even among Japanese children, selective teaching was observed only in the older group. It is possible, then, that selectively teaching others (based on their knowledge states) requires more protracted experiences of having been taught by others and their own teaching experiences (e.g., exercising perspective taking). This

then also raises a question whether social factors other than attributed knowledge states may influence selective teaching (Kim et al., 2016). The present findings, along with the mixed evidence on selective teaching literature, suggest that selective teaching of *recipients* is shaped by prior socio-cultural experiences and prone to factors such as social goals and motives (e.g., a desire to belong to a group).

Moreover, the development of the authority concept may differ across culture, which in turn affects children's selective learning and teaching. Piaget (1932) believed that early in development young children attribute omniscient knowledge to adults and gradually they understand that even adults can be ignorant. Given that Japanese culture shows a higher degree of uncertainty avoidance (the extent to which the society regulates uncertainty by rules and laws and disapproval of deviants) and power distance (the extent to which members in the society are measured against each other by hierarchy and are willing to accept an unequal social status) than the German culture (Hofstede, Hofstede, & Minkov, 2010) it is possible that Japanese children are less used to being selective in their social learning (that is, deciding themselves from whom to learn and from whom not to learn). In contrast, a higher power distance and the exposure to various instances of teaching might have supported the development of teaching abilities in Japanese children. Moreover, Japanese children are confronted to a social constraint that is absent in German children's culture (Markus & Kitayama, 1991). They need to attend to their own proper place in the current social context of selective learning. Consequently, they tend not to question potential informers' comparative reliability. German children, in contrast, readily make such comparisons, because they feel entitled to assess opportunities to learn, independently of their own social status. More systematic research on cross-cultural differences in young

children's selective learning and teaching is necessary to clarify the ontogenetic origins of humans' unique ability for social learning and teaching (Kline, 2014).

Finally, one could argue that unlike German children Japanese children's lack of selectivity in the learning task might result from their unwillingness to outwardly admit their preference for one learning source over the other. They may be as selective as their German counterparts, but due to their cultural practices as discussed above they do not feel appropriate to publicly judge that one person is correct and the other is not. One way to address this might be to ask children's belief about the box contents in a private way (e.g., ensuring children that their answers will be confidential, asking them to indicate their responses in a piece of paper unknown to the experimenter and put it in a box with others' responses). Or, children's responses are measured in a more subtle way so that they do not feel obliged to express who is more right. For example, they might be allowed to ask one of the learning sources about the box contents instead of explicitly endorsing one over the other. On the other hand, one should also note that Japanese children did not refuse to respond in this task. Although their responses were not systematic, each participant decided to select an agent. This seems to speak against the view that Japanese children are unwilling to admit their preference for one learning source. Future research is needed to explore these possibilities in greater detail.

Some limitations should be mentioned. Children viewed puppets instead of real people. In real life settings, children's selective teaching as well as learning may be more easily elicited. Although children from both cultural groups come from similar socio-economic backgrounds, we did not completely control for this factor. Future studies would also benefit from directly comparing children's selective learning and teaching abilities using within-subject designs.

Taken together, social learning abilities and teaching abilities, among others, underpin cultural transmission across generations (Boyd, Richerson, & Henrich, 2011). Our findings suggest that cultural transmission is modulated by the practices of teaching and learning, which could be different across culture. Further investigations into delineating and identifying the exact cognitive and motivational components for selective learning and teaching will forward our current understanding of the uniquely human nature of learning and teaching.

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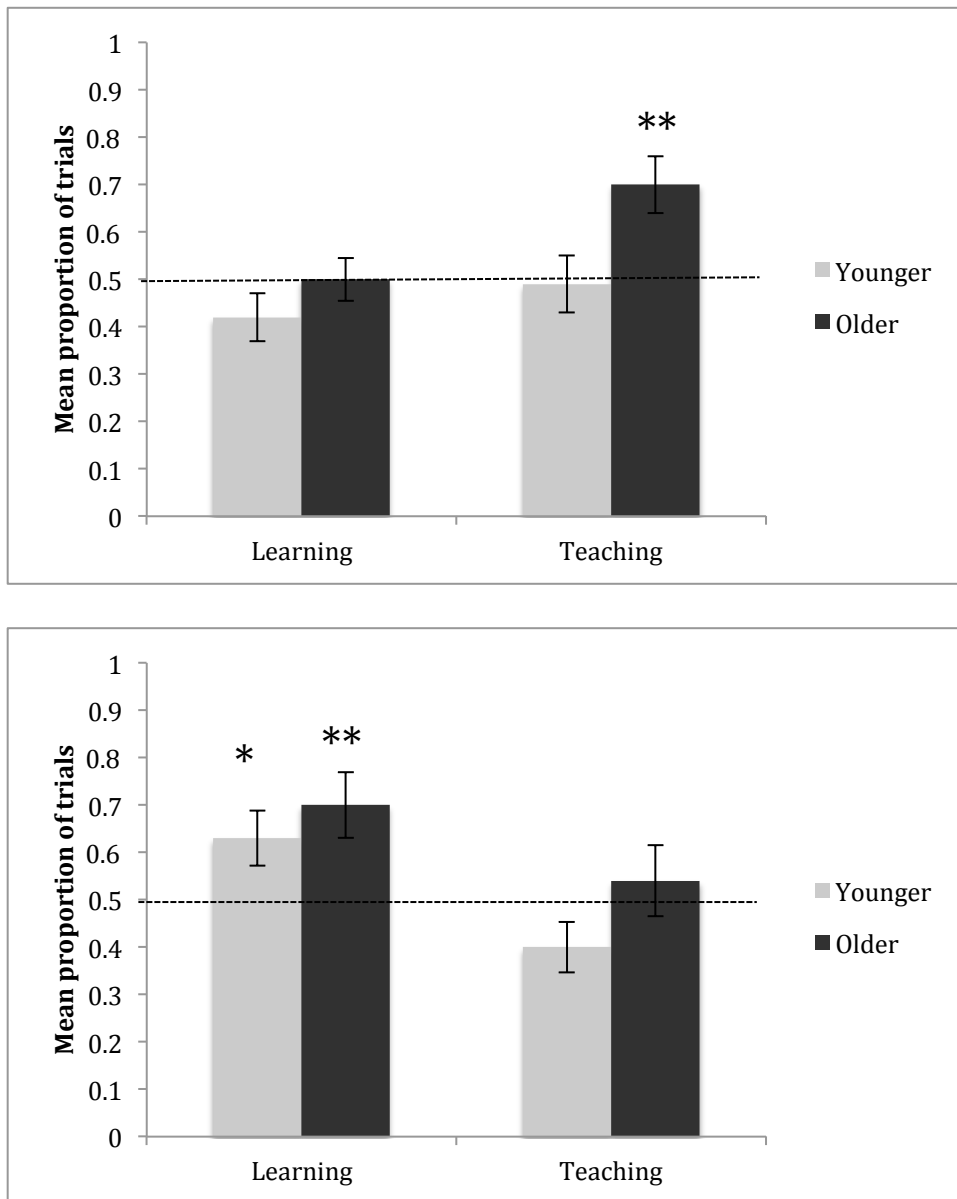


Figure 1. The proportion of accurate responses in selective learning and selective teaching among Japanese (upper panel) and German (lower panel) children. * $p < .05$, ** $p < .01$. Error bars indicate standard errors.