Socio-cultural Conventionality and Children's Selective Learning

By

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Abstract

Children's rapid word learning skills has been the focus of many studies over the last three decades. These studies indicated that children are not only expert word learners, but they are also very selective when learning new words (Sabbagh & Henderson, 2013). Although many studies have shown children's selectivity when learning words, still little is known about the motives behind children's selectivity or the mechanisms by which this selectivity works. The major aim of the present dissertation is to advance the current understanding on children's selective learning. In four studies, we explored whether preschoolers would learn new words or facts from speakers who violated a familiar non-linguistic socio-cultural convention. In Study 1, thirty-six 4-year-olds heard novel words either from a boy puppet who wore a skirt or a boy puppet who wore pants. When then tested for their memory of the words, children who heard the words from the skirt-wearing boy puppet were less likely to produce and remember the word-referent link after a brief delay. Study 2 showed that children learned new words from a skirt-wearing boy puppet equally well when the puppets presented the words slowly; thereby suggesting that violation of a well-established socio-cultural convention affects children's learning especially under high cognitive load. By replicating the design of Study 1, Study 3 showed that children learned new words from a skirt-wearing boy puppet when the boy puppet gave an excuse for wearing the skirt, suggesting that it was the conventional violation and not simply the anomaly of a skirt-wearing boy that affected children's learning in Study 1. Study 4 showed that children's bias against learning from the skirt-wearing boy puppet did not extend to facts about the origins of the toys. Taken together, these results suggested that when acquiring conventional knowledge in learning situations

in which their processing capacities are taxed, young children show selective learning from a speaker who follows the socio-cultural conventions of their community.

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Chapter 1: Introduction

Imagine that you are in your pediatrician's office with your 4-year-old daughter for her yearly health exam. The doctor is about to check her heart. He tells your daughter "*OK, let me get my stethoscope*". He, then, grabs the stethoscope and informs your daughter "*Now, I am going to listen your heart with my stethoscope. Stand still, OK?*". A few hours later, you are at home preparing dinner while your daughter is playing with her toys nearby. You hear her saying to her teddy bear "*Now, I am going to check your heart with my stethoscope*". Amazed by your daughter's word learning skills, you tell your spouse "*This is just incredible! She heard the word 'stethoscope' at the doctor's office just this afternoon. I bet she learns every single new word she hears!*".

You are right to be amazed by your daughter's word-learning skills. Young children's word-learning skills are indeed remarkable. Studies on children's word learning indicated that by age 5, children have a vocabulary of 5000-8000 words, meaning that between the ages 2 and 5, they add 5-to-9 new words to their vocabulary every day (e.g., Anglin, 1993; Bloom, 2000; Carey, 1978, 1982; Golinkoff & Hirsh-Pasek, 1999). But, does it mean that children learn every single new word they encounter? Although one might think that it would be advantageous for children to learn every word-referent link they are presented with, existing research on word acquisition actually suggests the contrary. There is some evidence in the literature indicating that children would be very much prone to making many word-learning errors if they were to learn every new word they hear. For instance, Henderson and Sabbagh (2010) recently showed that when talking about unfamiliar objects with their young children, parents

provide words more than half of the time even when they are not sure about the correctness of the word (e.g., '*this is a strange looking car*'; '*this might be a drum*'). Considering these findings, it is very likely that children would be at risk of acquiring many incorrect words if they were to learn every single novel word they hear. Acquiring incorrect word meanings might be problematic for young children because they can be very difficult to correct (Sabbagh & Shafman, 2009). Many studies have shown that when learning new words, young children have a tendency to map a referent with single word only, and when presented with a new word, children prefer to associate the new word with an unfamiliar object (e.g., Golinkoff & Hirsch-Pasek, 1994; Markman, 1992; 1996). Thus, if the initial word children learn for an object is made in error, they are likely to preserve the error for a long time, and correct it very slowly (Sabbagh & Shafman, 2009).

Fortunately, a number of studies conducted in the developmental literature have shown that children do not acquire every new word-referent link they are presented with (e.g., Birch, Vauthier, & Bloom, 2008; Clèment, Koenig, & Harris, 2004; Harris, 2007; Henderson, 2007; Henderson, Sabbagh, & Woodward, 2013; Sabbagh & Baldwin, 2001; Sabbagh & Shafman, 2009; Sabbagh, Wdowiak, & Ottaway, 2003). These studies indicated that when learning words from others, young children are indeed remarkably selective. Although it is well established in the literature that children are selective learners, we still do not know much about the motives behind children's selectivity or the mechanisms by which this selectivity works. The major aim of the present dissertation is to advance the current understanding on children's selective learning. In the coming paragraphs, I first briefly describe the findings from existing studies on children's

selectivity and then explain how this thesis contributes to the current body of research on selective learning.

Existing studies indicated that when learning from others, young children take many factors into account before trusting their informant. For instance, they consider informants' knowledge states (e.g., Sabbagh & Baldwin, 2001; Sabbagh et al. 2003; Sabbagh & Shafman, 2009), past accuracy (e.g., Jaswal & Neely, 2006; Koenig, Clèment & Harris, 2004; Koenig & Harris, 2005; Pasquini, Corriveau, Koenig, & Harris, 2007; Koenig & Harris, 2005), and even familiarity of their accent (e.g., Kinzler, Corriveau, & Harris, 2011). In the example above, before accepting the label her doctor provided, your daughter might have assessed whether the doctor was knowledgeable about the label; whether he was accurate about other labels he had provided in the past; and whether he spoke the language with a familiar accent.

Why do children bother considering these factors before accepting new words from others? Different accounts are present in the literature to explain the motivation behind children's selectivity. For example, some researchers argue that when learning words, children take all these factors into account because words are a set of social conventions (e.g., Henderson & Graham, 2005; Kalish & Sabbagh, 2007; Sabbagh & Baldwin, 2005; Sabbagh & Henderson, 2007; 2013; Tomasello, 2001). Just like any other social convention, word meanings are agreed and prescriptive. That is, as speakers of English language, we all agreed to use certain sounds refer to particular things. When referring to objects, events or concepts, we could only use those agreed sounds. Because we know that if we use any other sound, we would not only be wrong but also (most likely) would not be able to communicate with people around us. Consider the following

example: as a part of an English speaking community, we all agree on calling flat sweet baked goods as 'cookies'. We expect that all other members of our linguistic community would share the meaning of the word cookie. And, among speakers of the English language, referring to a cookie with a term other than the word 'cookie' is not only different or strange; but it is also wrong (see Sabbagh & Henderson, 2007 for a discussion). Within the psychological literature, this pragmatic principle of language has been called *conventionality* (E. Clark, 1993; 2007; Diesendruck, 2005). In the selective learning literature, the proponents of conventionality explanation argue that children may show poor learning from the ignorant, unreliable or foreign-accented speakers because they assume that these speakers would be less likely to provide them with a word meaning that would be conventional (i.e., correct and shared) in children's own linguistic community (Henderson, 2007; Sabbagh & Henderson, 2007; 2013).

An alternative explanation for children's performance in the selective learning studies is that children are not concerned about conventionality per se, but they are interested in learning only from knowledgeable and accurate informants (e.g., see Harris & Corriveau, 2011; Koenig, 2010 for reviews). Different from conventionality explanation, this explanation suggests that children do not necessarily use ignorance, unfamiliar accent or unreliability as a cue to conventionality, but they simply ignore information from others whenever they have a reason to doubt the correctness of the information provided. Existing evidence in the literature supports both of these accounts. As noted before, various studies indicated that when a speaker expressed ignorance of a referent-word link (e.g., *I don't know which one is a modi- maybe this one is a modi*) or when the speaker consistently provided incorrect labels in the past (e.g., calling a ball a

shoe), children avoid learning from these speakers (e.g., Koenig, Clèment, & Harris, 2004; Koenig & Harris, 2005; Sabbagh & Baldwin, 2001; Sabbagh et al., 2003; Sabbagh & Shafman, 2009).

The major aim of the present research is to advance the current understanding of children's selective learning. In the present dissertation, I conducted a set of studies and monitored children's learning of words and objective facts from a speaker who appears to be a knowledgeable speaker of children's language (in this case, English), yet clearly shows a willingness to violate a well-established social convention about how to dress in children's society (namely, a boy puppet who likes to wear skirts). I reasoned that if children's selective word learning is driven by considerations of conventionality, then children who hear the words from the skirt-wearing boy puppet might be less likely to produce and remember the novel words compared with those in a control condition who hear the same words from a pants-wearing boy puppet. However, the difference between these two conditions might be less evident when the skirt-wearing boy puppet provides them with objective facts because unlike words, objective facts are not considered to be social conventions. Thus, children's learning of objective facts might depend less on speaker's adherence to social conventions.

Another aim of the present research is to investigate the mechanisms through which children's selective learning works. Although it is well established in the literature that children are selective when learning words, we do not know much about how this selectivity works (but, see Sabbagh & Shafman, 2009 and Koenig & Woodward, 2010). There are at least two possibilities for how children might avoid learning from unconventional speakers. One possibility is that children explicitly ignore the words

provided by the unconventional speakers because they recognize that these words are unlikely to be conventional. A second possibility is that children are implicitly biased against learning from unconventional speaker. Existing literature on cognitive biases indicated that such biases are mostly likely to manifest themselves under cognitive load (e.g., Gilbert & Hixon, 1991; Liittschwager & Markman, 1994; Mendes & Koslov, 2012). As a part of the present research, I manipulated cognitive load across two word-learning tasks and explored the mechanism by which children's selective learning from unconventional speakers occurs.

The body of this dissertation consists of a total of seven chapters. The next chapter (Chapter 2) is a literature review in which the theoretical approach guiding this research is described, the relevant evidence from existing research and the questions explored in the present research are explained. Chapter 3, Chapter 4, Chapter 5 and Chapter 6 are the study chapters with methods and results. Each study chapter is followed by a brief summary of the findings and a short discussion. Chapter 7 is the General Discussion in which the results from all studies are discussed together in length. The implications of the findings and some possible directions for future research are also given in Chapter 7.

Chapter 2: Literature Review

Conventions are arbitrary rules that govern numerous acts we engage in every single day (Lewis, 1969; Marmor, 2009). It is because of these conventions we do not show up at work in our pajamas, we greet the teller at the bank, we engage in small talk with our neighbors, we shake hands when we are introduced to a new colleague. We follow these arbitrary rules in our everyday interactions, and expect other members of our society to share and follow them as well (Kalish & Sabbagh, 2007).

Great examples of how conventions guide everyday interactions can be found in the popular TV series, *Seinfeld* (Delaney, 2006). The following exchange is from the episode called '*the Dinner Party*' of the TV show, *Seinfeld* (Larry & Chenores, 1994).

> *Elaine*: Maybe we should stop off on the way and get a bottle of wine or something.
> *George*: What for?
> *Elaine*: These people invited us for dinner. We have to bring something.
> *George*: Why?
> *Elaine*: Because it's rude, otherwise.
> *George*: You mean just going there because I'm invited, that's rude?
> *Elaine*: Yeah.
> *George*: So, you're telling me, instead of being happy to see me, they're going to be upset because I didn't bring anything. (*To Jerry*) You see what I'm saying?
> *Jerry*: The fabric of society is very complex, George.
> *George*: I don't even drink wine. I drink Pepsi.
> *Elaine*: You can't bring Pepsi.
> *George*: Why not?
> *Elaine*: Because we're adults?
> *George*: You telling me that wine is better than Pepsi? Huh, no way wine is better than Pepsi.
> *Jerry*: I'm telling you George, I don't think we want to walk in there and put a big plastic jug of Pepsi on the table.
> *George*: I just don't like the idea that every time there is a dinner invitation there's this annoying little chore that goes along with it.
> *Jerry*: You know, you're getting to be an annoying little chore yourself.

This short exchange between the main characters of *Seinfeld* summarizes the core characteristics of conventions quite well: conventions are arbitrary. In other words, conventions exist only because people within a given socio-cultural setting agreed on following them (Gergely & Csibra, 2006; Lewis, 1969). Conventions are prescriptive: they may not be the best or even the most effective ways of doing things but they are certainly treated as the 'correct' ways. In the example above, George, Elaine and Jerry discuss the conventional way of attending to a dinner party and George clearly expresses his reluctance for following a particular social convention (i.e., bringing wine to a dinner party). Elaine and Jerry first try assuring him that this is the correct way of attending to a dinner party. When George keeps insisting on not following the convention, Elaine and Jerry bluntly ignore his arguments. Indeed, George is right about the fact that in many cases, the reasons for following conventions are not obvious. That is, there is no proximal or obvious reason for following conventions most of the time but the members of society are still expected to follow them. Therefore, when George keeps asking that his friends give him a reason for following that particular convention, Jerry simply replies '*the fabric of society is very complex, George*'.

Of course, particular conventional forms vary both subtly and widely across socio-cultural communities. For instance, wine may not be the most appropriate drink to bring if the hosts of the dinner party are following Buddhist faith (George might have had a better shot at convincing his friends to bring Pepsi in this case). Following conventions is crucial for all members of society. A number of researchers have argued that understanding and learning about socio-cultural conventions might be particularly important for the younger members as young members may be more likely to rely upon

conventions of their society during knowledge acquisition (e.g., H. Clark, 1995; Henderson, Sabbagh, & Woodward, 2013; Rogoff, 2003; Sabbagh & Henderson, 2007; 2013; Sabbagh & Kalish, 2007; Tomasello, 2008; Tomasello, Carpenter, Call, Behne, & Moll, 2005).

In the following pages, I will first briefly describe the perspectives regarding the origins and the significance of appreciation of conventionality in children's knowledge acquisition. In doing so, I raise the question whether children show sensitivity to conventions of their community during knowledge acquisition and lay the groundwork for children's selective learning from members of their own society.

2.1 The development and the significance of appreciation of conventionality in children's knowledge acquisition: A developmental framework

In the developmental literature, the development of appreciation of conventionality and the role that it plays in knowledge acquisition fit within two different frameworks. One is the shared intentionality or 'we' intentionality framework, which argues that humans have a unique set of socio-cognitive abilities and an intrinsic motivation to engage with each other and share goals, intentions and other psychological states. This intrinsic motivation and the unique sets of socio-cognitive abilities are referred as '*shared intentionality*' (e.g., Carpenter, 2011; Rakoczy, 2007; Tomasello, 2006; 2011; Tomasello et al., 2005; Tomasello & Carpenter, 2007). Within this framework, it is argued that the development of appreciation of conventionality is achieved only through shared intentionality. And, this development is important because once it is achieved; it plays a key role in learning from other members of society (e.g., Carpenter, 2011; Tomasello & Carpenter, 2007).

The second framework is more socio-cultural one that argues that the development of appreciation of conventionality (as in any other part of socio-cognitive development) is achieved by participating in social practices involving behaviors and habits within one's own cultural community (Kalish & Sabbagh, 2007; Tsethlikai & Rogoff, 2013). The socio-cultural framework emphasizes how having cultural engagement in a particular community marks one's membership in that community and learning about its socio-cultural practices (including its socio-cultural conventions) makes knowledge acquisition possible (e.g., Rogoff, 2003; Rogoff, Goodman, Turkanis, & Bartlett, 2001; Rogoff, Paradise, Mejía Arauz, Correa-Chávez, & Angelillo, 2003; Tsethlikai & Rogoff, 2013). Below, I give a more detailed account of how each framework characterizes the development of conventionality and its significance for children's knowledge acquisition process.

As noted above, the shared intentionality framework argues that the unique sets of socio-cognitive abilities and intrinsic motivation are what make human social cognition so special. They use the term *shared intentionality* or *'we' intentionality* to refer to these special sets of abilities and motivation (Tomasello et al., 2005). According to this view, humans are the only species in the animal kingdom that are able to engage in various social practices- ranging from carrying out a simple conversation with one another to forming governments- because of shared intentionality. Different from other primates, humans start showing these unique socio-cognitive abilities and motivation to engage with other members in their community very early in the development (see Carpenter, 2011 for a review). That is, within the first year of life, human infants start sharing psychological states with others through engaging in four types of behaviors: forming

joint attention episodes (i.e., attending an external object together with another person); sharing attention and interest in nonverbal communication (e.g., declarative pointing); working together toward a joint goal; and imitation (Tomasello & Carpenter, 2007).

The proponents of the shared intentionality view argue that out of these four behaviors, imitating others is the origin of appreciation of conventionality (Carpenter, 2011; Tomasello & Carpenter, 2007). Starting from the first year of life, infants develop the understanding that through imitation they can convey the message of '*you are like me*' and '*I am like you*' to other people (e.g., Carpenter, 2011; Carpenter & Call, 2009; Meltzoff, 2005; Nielsen, 2006; Nielsen, Simcock, & Jenkins, 2008; Tennie, Call, & Tomasello, 2006). And, by engaging in repeated imitation, this understanding evolves into the preliminary form of appreciation of conventionality, which is '*we are alike and this is how we do things in our group*' (Buttelman, Zymj, Daum, & Carpenter, 2012; Carpenter, 2011; Rakoczy, Warneken, & Tomasello, 2008; Tomasello & Carpenter, 2007).

The shared intentionality perspective claims that the appreciation of conventionality might be particularly important in children's knowledge acquisition from others. As children develop an appreciation of conventionality, they start understanding that when a member in their community shows them doing something in a particular way; it marks the action as prescriptive, generalizable, cultural knowledge (i.e., *this is the way everyone must do it in our community*) (Buttelman, Zymj, Daum, & Carpenter, 2012; Carpenter, 2011; Gergely & Csibra, 2006). A recent study by Rakoczy, Warneken and Tomasello (2008) provided some support for this notion that young children have some understanding of the prescriptive nature of conventionality and use this understanding

when interacting with other members in their community. In the study, 2-and 3-year-old children first were shown how to play a novel game in a certain way. Then, a puppet was introduced to the game. Children as young as 2-years-old expected the puppet (i.e., another member of their community) to play the game in the same way as shown before, and objected in very explicit terms when the puppet played in a different way. Rakoczy and colleagues concluded that children have at least a preliminary understanding of the prescriptive nature of conventionality in the second year of life and this understanding forms the basis of children's cultural learning from other members of their community (see Tomasello & Carpenter, 2007 for a discussion).

As noted at the beginning of this chapter, the socio-cultural framework provides a second perspective on the appreciation of conventionality and the role this appreciation plays in knowledge acquisition. This framework argues that the development of appreciation of conventionality (as in any other part of social or cognitive development) is achieved by participating in social practices involving behaviors and routines within one's own cultural community (Kalish & Sabbagh, 2007; Paradise & Rogoff, 2009; Rogoff, Moore, Najafi, Dexter, Correa- Chávez, & Solis, 2007; Tsethlikai & Rogoff, 2013). Contrary to the shared intentionality framework, the proponents of the socio-cultural framework do not clearly identify special socio-cognitive abilities or particular underlying cognitive mechanisms that are prerequisite for the development of appreciation of conventionality (Kalish & Sabbagh, 2007). They instead describe a process called '*intent community participation*' and claim that this process makes any knowledge acquisition, including learning about conventions, possible for younger members of a community (e.g., Rogoff et al., 2007; Rogoff & Paradise, 2009; Rogoff,

Paradise, Mejía Arauz, Correa-Chávez, & Angelillo, 2003; Tsethlikai & Rogoff, 2013). *Intent community participation* refers to children's learning by keen observation and intentional pitching in (Correa-Chávez, Roberts, & Martinez, 2011; Rogoff et al., 2007; Rogoff & Paradise, 2009). Within the socio-cultural framework, it is argued that to acquire any kind of knowledge, children need to immerse themselves in their socio-cultural community by actively observing and eagerly participating in ongoing community activities (Rogoff, 2003). Although children play an active role in knowledge acquisition, they are not all alone. More knowledgeable members in children's communities (usually older members) actively provide guidance to young, novice members (Paradise & De Haan, 2009; Rogoff, 2003; Rogoff & Paradise, 2009).

Various developmental researchers have argued that the socio-cultural framework provides a rich account for children's motivation to learn social and cultural conventions of their community (e.g., Callanan, Siegel, & Luce, 2007; Kalish & Sabbagh, 2007). For instance, building on Rogoff and colleagues' socio-cultural theories, Callanan et al. (2007) argued that children have a special motivation to learn about conventions because by learning conventions, they would be able to communicate effectively and become a part of their community. Similar claims were made by Kalish and Sabbagh (2007). Kalish and Sabbagh (2007) argued that following socio-cultural conventions marks one's membership in a community. Thus, by acquiring and following conventions of their own community, children would develop a belonging to their community (Kalish & Sabbagh, 2007). Callanan et al. (2007) also claimed that the socio-cultural framework could shed some light on how children come to see conventions as the 'right' ways of engaging with one another. As noted before, within the socio-cultural framework, it is suggested that

inexperienced members of a community are guided by more knowledgeable, expert members. Based on this, Callanan and colleagues (2007) argued that the expert members might have a goal of teaching the novices the conventional or correct ways of engaging with one another (i.e., *this is how it is done in our community*). There is some evidence in the literature supporting this view. For instance, a number of studies showed that parents usually provide children with information relevant to conventionality during their daily conversations or play times with children (e.g., *this one is called a whale; this is used to collect raindrops*) (e.g., Callanan & Sabbagh, 2004; Henderson & Sabbagh, 2010; Luce & Callanan, 2006; Siegel & Callanan, 2007). Therefore, it is possible that through guidance of more experienced community members, children come to understand that conventions (whether linguistic, cultural or social) are the correct ways of engaging with other members.

In sum, the development of appreciation of conventionality fits within two different developmental frameworks. The shared intentionality perspective claims that human infants develop an understanding of conventionality only because they develop unique sets of socio-cognitive skills and motivation. This perspective highlights the prescriptive nature of conventions and argues that human children follow conventions as they think these are the correct ways of engaging with other community members. The socio-cultural framework, on the other hand, suggests that children's active participation and keen observation make any knowledge acquisition possible. According to the socio-cultural perspective, children are motivated to follow conventions for two reasons: first, by following conventions, they develop a belonging to their community and second, more experienced member of their community encourage young members to follow them.

Although each account emphasizes different ways for the development of appreciation of conventionality and children's motivation of following them, they both accept that conventions are crucial in children's learning as they demonstrate how *children's own* community acts. Considering this, one could argue that recognizing and following conventions of their community might help children to selectively learn the information that is likely to be conventional (or correct) in their own community. Then, the question is whether children recognize conventions of their own community and use them during knowledge acquisition.

Over the last decade, a growing number of studies have been conducted on whether children appreciate information about conventionality during knowledge acquisition (e.g., Henderson, 2007; Henderson, Sabbagh, & Woodward, 2013; Kinzler, Corriveau, & Harris, 2011; Sabbagh & Baldwin, 2001; Sabbagh et al., 2003). The next section of this dissertation is the review of this research. In the following paragraphs, I review the existing evidence on young children's understanding of conventionality and argue that young children are selective learners in some instances that might be relevant to conventionality.

2.2 Appreciation of Conventionality and Children's Learning: Evidence from word learning literature

Much of what we know on children's appreciation of conventionality comes from word learning studies (e.g., Henderson, 2007; Sabbagh & Baldwin, 2001; Sabbagh & Henderson, 2007; Sabbagh et al., 2003; Sabbagh & Shafman, 2009). Word learning might be the paradigm case of acquiring conventional knowledge as the relation between a word and its referent is arbitrary (de Saussure, 1983; Kalish & Sabbagh, 2007). That is,

there is no relation between a given object, event or concept and its name (E. Clark, 1988; 1993; 2007; Sabbagh & Henderson, 2007). It is only through human intention and communication that some word is used for one object rather than another (Kalish & Sabbagh, 2007; Tomasello, 2008; 2011). Even though the link between a word and its referent is arbitrary, it is not subjective in the common sense. That is, one can still judge the correctness of the link in a linguistic community by considering what other members of the community use to refer to the same link. Consider the 'cookie' example in the previous chapter: there is no objective reason to call a small sweet flat-baked good "cookie". Yet, when referring to this good, we use the word "cookie" because all English-speaking people agree on the word "cookie" and its meaning. And, referring to a cookie with a different word other than the *cookie* is not unusual, but it is just wrong (Sabbagh & Henderson, 2007).

Recent research has indicated that children understand this conventional (i.e., prescriptive and shared) nature of language quite early in development. Below, I provide a review of the evidence on children's sensitivity to the conventional nature of language in the first few years of life and then discuss the findings of the existing studies on conventionality and children's selective learning.

2.2.1 Children are sensitive to the conventional nature of language early in development

Findings from a growing number of studies indicated that children know that word meanings are prescriptive and shared between members of a given linguistic community quite early in life (e.g., Chouinard & Clark, 2003; Clark, 2003, 2007; Diesendruck, 2005; Henderson & Graham, 2005; Henderson & Woodward, 2012; Koenig & Echols, 2003). For instance, a study by Koenig and Echols (2003) revealed that once

word-referent links are formed, 16-month-old infants expect speakers from their community to use the same links (i.e., when referring to a common object, such as a ball; infants expect a member in their linguistic community to only use the word 'ball'). And, more interestingly, infants even correct the speakers who do not use these pre-established labels. In the study, when a member of their linguistic community provided an incorrect label for a common object (e.g., labeling a ball a duck), 16-month-old infants looked significantly longer at the speaker and a majority of the infants even attempted to correct the speaker by pointing at the object or providing the correct label for the object. However, the infants did not engage correcting behaviors as often when the label was provided by an audio-speaker or by a speaker who did not have visual access to the toys (i.e., facing back speaker). These results suggested that infants as young as 16-months, seem to understand the prescriptive nature of language, namely using a different label (i.e., duck) intentionally to refer to a common object (i.e., ball) is not only strange but also 'wrong'.

In the line with these findings, Henderson and Graham (2005) demonstrated that when a speaker from a certain linguistic community introduced a novel word-referent link, 24-month-old children assumed that a second speaker from the same linguistic community would share the knowledge of the newly learned word-referent link even though the second speaker was not present when the link was learned. Using the same task as in Henderson and Graham's (2005) study, Graham, Stock, and Henderson (2006) showed that even toddlers as young as 19-months expected speakers from the same linguistic to share the word meanings, but not the speaker's preferences for a given object.

Similar findings on children's appreciation of the conventional nature of language early in development were reported by other researchers as well. For instance, using a visual-habituation paradigm, Buresh and Woodward (2007) investigated whether 13-month-old infants expect words and object preferences to be shared between the members of their linguistic community. The results revealed that 13-month-olds expect word meanings, but not object preferences, to be consistent across the members of a given linguistic community. Following this study, Henderson and Woodward (2012) recently used a similar paradigm to test younger infants and replicated these findings with infants as young as 9-months of age. Taken together, these studies suggested that children might be sensitive to the shared nature of language within the first year of life.

Another piece of evidence for children's sensitivity to conventionality in language learning comes from parent-child conversations. E. Clark and colleagues studied numerous parent-child conversational interactions (e.g., Chouinard & Clark, 2003; E. Clark, 1992; 1993; 2007; 2008; Clark & Chouinard, 2000; Clark & Wong, 2002). These studies revealed that after using an incorrect word to refer to a common object, children, as young as 2-years-old, immediately engage in repairs. These findings suggest that children are aware that language is prescriptive and are focused on learning and using the communicative conventions of their own language.

Taken together, these studies show that children's understanding that word meanings are conventional insofar as they are prescriptive and shared emerges in the late infancy and early preschool period. The question is, then, whether children use this understanding during word acquisition. In the following section, I review the research on

children's selective word learning and argue that young children are selective learners in some instances that might be relevant to conventionality.

2.2.2 Conventionality and Selective Word Learning

As noted before, words are valuable communicative tools because their meanings are agreed on and used by members of a given linguistic community. Within the conventionality framework, a referent-word link is considered to be correct only if the link is shared between the members of that linguistic community. In line with this assumption, a link is considered to be incorrect if it is unlikely to be shared by other members of the linguistic community. This assumption is called the '*error-avoidance effect*' of conventionality (see Sabbagh & Henderson, 2007 for a discussion). Considering this, if children's word learning is really tuned to conventionality, then they may be more likely to learn the word-referent links that would be correct and shared in their community and they may avoid learning when there is any indication that the link would not be likely to be correct and shared.

A growing number of studies indeed indicated that children's word learning may be affected by conventionality. One line of evidence for this comes from the studies with ignorant speakers. In one study, Sabbagh and Baldwin (2001) examined whether preschool children would learn novel words from a speaker who appear to be either knowledgeable or ignorant of an object's conventional label at the time of labeling. In the ignorant speaker condition, the speaker clearly expressed his ignorance of the referent-word link (e.g., *I don't know which one is a modi- maybe it is this one*). In the knowledgeable condition, the speaker appeared to be knowledgeable of the label (e.g., *I know exactly which one is a modi- it is this one*) at the time of the labeling. The findings

revealed that when an ignorant speaker presented the word-referent link, 3- and 4-year-old children were less likely to produce and remember the link than when the same link was provided by a knowledgeable speaker. In line with the conventionality assumption, these results suggest that children avoid learning the labels provided by ignorant speakers, probably because these labels would be unlikely to be correct in their linguistic community, and thus, shared by the rest of the linguistic community.

Although the conventionality framework provides a viable explanation for these findings, it is not the only plausible explanation. As discussed by Sabbagh and Baldwin (2001), it is possible that children's poor performance in the ignorant speaker condition was because they have a general preference to avoid any learning from speakers who show any signs of hesitation. To address this, the authors conducted a second study where they had the speaker show hesitation at the time of labeling in both conditions and manipulated the speaker's knowledge of the conventional label. Children were tested in one of the two conditions: (1) *friend made* condition in which the children were told that the toys that were associated with novel labels were made by experimenter's friend or (2) *speaker made* condition in which the children were told that the toys were made by experimenter himself. In the *friend made* condition, the speaker hesitantly used a novel word to refer to the toy that was made by his friend (i.e., *my friend said one of these toys she made is a modi, but I don't know which one*). In the *speaker made* condition, the experimenter was again hesitant when using the label, but his hesitation did not reflect ignorance of the conventional label (i.e., *I would really like to call one of these toys I made a modi, but I don't know which one*). The authors predicted that if children were sensitive to any signs of hesitation when learning labels, they would show the same

amount of learning in both conditions. However, if children were concerned about making a word-learning error, then they would avoid learning in the *friend made* condition but not in the *speaker made* condition. This is because objects made by others usually have established conventional established names. Results indicated that 4-year-old children learned the conventional label for the object in the *speaker made* condition, but not in the *friend made* condition. These findings suggest that children's word learning might be tuned to appreciation of conventionality: children avoid learning words if there is any evidence implying that words may not be correct, and consequently, may not be shared by the other members of their linguistic community.

Further evidence for the effects of conventionality on word learning comes from the study by Sabbagh, Wdowiak, and Ottaway (2003). Sabbagh and colleagues investigated whether children encoded the word-referent links produced by ignorant speakers. In the experiment, 3-to 4-year-old children first heard a word-referent link from an ignorant speaker. Then, a second speaker, without providing special information about her relative knowledge or ignorance, used the same word to refer to a different object. The authors reasoned that if children had some memory for the word provided by the ignorant speaker, then they would experience proactive interference and show difficulty learning from the second speaker compared to the control condition in which children were introduced to an ignorant speaker but the speaker did not provide any word-referent links. Results showed no difference between the control condition and the ignorant speaker condition suggesting that preschool children did not encode the word-referent links offered by ignorant speakers.

Studies with incorrect labelers also provide evidence for children's appreciation of conventionality in word learning (e.g., Jaswal & Neely, 2006; Koenig, Celement, & Harris, 2004; Koenig & Harris, 2005). In one of these studies, Koenig and colleagues (2004) presented children with a series of labeling episodes where two speakers were labeling objects that were familiar to the children (e.g., a ball). One of the speakers repeatedly provided wrong labels for the presented objects (e.g., calling a ball a shoe). The other speaker always provided the correct labels (e.g., calling a ball a ball). In the testing condition, children were presented with an unfamiliar object and each speaker used a different label to refer to the object. When asked what the object is called, 3- and 4-year-olds were more likely to select the label provided by the speaker who had previously used the established conventional labels when referring to the familiar objects.

Children's preference for 'correct labelers' was replicated in a number of studies (e.g., Birch, Vauthier, & Bloom, 2008; Corriveau, Meints, & Harris, 2009; Einav & Robinson, 2010; Harris & Corriveau, 2011; Jaswal & Neely, 2006; Kim, 2009; Koenig, 2012; Koenig & Harris, 2005; Koenig & Woodward, 2010; Pasquini, Corriveau, Koenig, & Harris, 2007; Scofield & Behrend, 2008). These studies showed that children as young as 2-year-old take speaker's past accuracy into account when learning words (Brooker & Poulin-Dubois, 2013; Koenig & Woodward, 2010); 3-year-olds mistrust the speaker and avoid learning words from them even after a single error (Pasquini, Corriveau, Koenig, & Harris, 2007); 3-and 4-year-olds preferred learning labels from a young child than learning from an incorrect adult (Jaswal & Neely, 2006); they are more likely to generalize the labels provided by accurate speakers (Birch, Vauthier, & Bloom, 2008; Kim, 2009); they monitor for previous inaccuracy and prefer neutral informant over

incorrect informant (Corriveau, Meints, & Harris, 2009); and they continue to avoid learning from incorrect speakers even after significant time passed (Corriveau & Harris, 2008). Taken together, these findings suggest that children are less likely to accept labels from speakers who had failed to provide conventional labels in the past (see Harris & Corriveau, 2011 and Koenig, 2012 for a review). Children's avoidance of learning in these cases might be because of conventionality. That is, children in the above studies might assume that speakers, who had repeatedly failed to provide conventional labels in the past, would be unlikely to provide a label that is correct in their linguistic community and shared by other members.

Studies from ignorant and incorrect speakers provide interesting yet indirect support for the importance of conventionality in word learning. More direct evidence that children are attuned to the shared nature of language comes from recent studies by Henderson, Sabbagh, and Woodward (2013). In their first study, Henderson et al. introduced three novel toys to preschool children. In one condition, the experimenter told that her friend purchased the toys when she was in a faraway country and that one of the toys is called '*uzma*' (e.g., *while Sue was on her trip in Japan, she bought an uzma. An uzma is a new kind of toy that is special for kids who live in Japan*). In the other condition, the children were told that the friend purchased the toys when she was downtown and that one of these toys is called 'uzma' (e.g., *while Sue was on her walk to downtown, she bought an uzma. An uzma is a new kind of toy that is special for kids who live around here*). Following this interaction, the friend, Sue, entered the room to get back her toys and while she was in the room, she used the label '*uzma*' to refer to the one of the toys. After a brief delay, children were given a comprehension test by the experimenter and

their learning in each condition was monitored. The results indicated that children were less likely to remember the name of a toy when told that the toy was from '*Japan*', but performed well when told that the toy was purchased from '*downtown*'. The authors reasoned that it might be possible to bolster children's performance in the faraway condition by adding retrieval cues during the comprehension test. Therefore, they conducted a second study where, instead of the experimenter, they had the same speaker (i.e., the experimenter's friend, Sue) ask the comprehension questions at the end. The results indicated that adding a retrieval cue did help children in the faraway condition: children in the faraway condition were still less likely to remember the word-referent link than those in the nearby condition. Taken together, these findings suggest that children avoid learning words when there is evidence indicating that the words might not be shared by other members of their linguistic community (also see Henderson, 2007 for similar findings).

In sum, existing research suggests that children might be sensitive to information relevant to conventionality when learning words. Although the majority of studies on children's understanding of conventionality were conducted in the field of word learning, there are some other domains in which appreciation of conventionality might affect children's learning. The next section of this chapter reviews the evidence from these domains.

2.3 Appreciation of Conventionality and Children's Learning: Evidence from Other Domains

2.3.1 Conventionality and Tool Use

A vase is used to hold flowers. A fork is used to eat. Is it possible to use a vase or a fork to perform different ends? For instance, could we use a vase to drink our morning coffee or could we use a fork to brush our hair? Sure, we could. But, we do not. And the question is 'why'? Some researchers argue that when learning how to use new objects, we look at what everyone else is doing with these objects and learn what '*proper*' functions these objects serve (e.g., Casler & Kelemen, 2005; 2007; Casler, Terziyan, & Greene, 2009; German, Truwax, & Defeyder, 2007; Kalish, 1998; Kelemen & Carey, 2007; Tomasello, 1999). In other words, these researchers propose that when learning about functions of the tools, we just watch other members of our society and agree on the proper ways of using the tools. In this sense, learning the *proper* tool use is a very similar process to learning the *correct* words to refer to the objects.

There is some evidence to suggest that children are sensitive to the role of conventionality in tool use. For example, consider a recent study conducted by Casler, Terziyan, and Greene (2009). In the study, 2-and 3-year-old children were first taught familiar and novel functions of six artifacts. Then, they were introduced to a puppet. The puppet used the artifacts either in a conventional way (i.e., the way children were taught) or in atypical way (i.e., different than what children were taught). Children's spontaneous responses to the puppet were coded. The results indicated that both 2-year-olds and 3-year-olds quickly responded to atypical uses of novel artifacts (by protesting, tattling etc.). These findings suggested that just like word learning, artifact use is guided by

conventionality: children are aware that there are *prescribed* ways in tool use and expect everyone to follow these ways when using tools.

As reviewed at the beginning of this chapter, children are selective word learners and their selectivity in word learning might be guided by conventionality. Do they show similar kind of selectivity when learning artifact functions? Existing studies provide some evidence that children's selectivity might be also relevant to conventionality when learning tool use. For instance, in a recent study, Zymj, Buttelman, Carpenter, and Daum (2010) showed that shortly after their first birthdays, infants learn selectively from reliable and unreliable models. In the study, these authors assigned 14-month-olds in one of the two conditions: (1) the reliable condition where the infants watched an adult experimenter manipulating the familiar objects in conventional ways (i.e., he is wearing a shoe on his foot) (2) the unreliable condition where another group of infants watched the same adult experimenter using the familiar objects in unconventional ways (i.e., wearing a shoe on his hand). After watching the experimenter demonstrating conventional and unconventional uses of object for a number of times, the infants were shown another clip in which the experimenter performed a novel action using a novel artifact. Then, the infants were presented with the same artifact in the video. The authors were interested in infants' imitation rates of the novel action across conditions. As expected, infants in the reliable condition were more likely to imitate the experimenter's action than the infants in the unreliable condition. These results indicated that infants are sensitive to the past reliability of the actor when learning novel artifact functions. Infants in the unreliable condition avoid copying the actions perhaps because they assume that these actions

would not be the '*proper*' functions of the novel artifacts and thus they would not be shared by the other members of their community.

More direct evidence for the role of conventionality in tool use comes from a very recent study by Buttelman and colleagues (2012). In this study, the authors monitored infants' learning of functions of novel artifacts from an actor who speaks infants' native language or from an actor who speaks a language different than infants' own language. The results indicated that infants are more likely to copy the actions of the actor who speaks infants' native language. These results suggest that just after their first birthday, infants might have some understanding that members of their own society would be more likely to provide them with relevant or proper information about artifact functions.

Taken together, these results suggest that when learning about tool use, children might be sensitive to information relevant to conventionality not long after their first birthday.

2.3.2 Conventionality and Play

It is widely known that many species engage in playful activities in the animal kingdom. But, humans are the only species that plays games that are truly rule-governed and conventional in nature (Rakoczy, 2007). A good example for a truly rule-governed, conventional game that humans enjoy playing would be chess. When playing chess, two players agree to follow a pretty strict, artificial set of rules: there are a certain number of pieces in a chess set and these certain pieces move in certain ways. For instance, a knight can move two squares horizontally and one square vertically, or two squares vertically and one square horizontally; a bishop is limited with diagonal movement; a queen combines the moves of the rook and the bishop. When playing chess, players must follow

these rules exactly. Playing chess outside of these well-established rules would not be odd or different but would be wrong (Kalish & Sabbagh, 2007; Rakoczy, 2007).

Starting from the second year of life, human children engage in sophisticated rule-governed, conventional play. A number of researchers argue that children develop awareness of the normative structure of play quite early in development (e.g., Rakoczy, 2006; 2007; Rakoczy, Warneken, & Tomasello, 2008; Tomasello & Rackozy, 2007). Studies investigating children's understanding of the conventional nature of play demonstrated that within the second year of life, children start developing an understanding that each game has its own set of rules and players are supposed to follow these rules (Rakoczy, 2007). As discussed earlier in this chapter, Rakoczy, Warneken, and Tomasello (2008) showed that when taught a simple rule game, 2-to 3-year-olds expected a puppet to follow the rules of the game and provided normative responses (e.g., protest, critique, or teaching) when the puppet failed to do so.

Also, similar to the existing research on other domains of conventional knowledge (i.e., word learning and tool use), children also show selectivity when learning game rules (Rakoczy, Warneken, & Tomasello, 2009; Rakoczy, Hamann, Warneken, & Tomasello, 2010). For instance, in the study by Rakoczy, Warneken, and Tomasello (2009), 4-to 5-year-old children first watched reliable and unreliable puppets providing labels for common objects and using common tools. As in previous studies, the reliable puppet provided correct labels (e.g., calling a shoe, shoe) and successfully used the objects (e.g., using a pen to draw a picture), whereas the unreliable puppet provided incorrect labels for the common object (e.g., calling a shoe, ball) and failed to use the common object (e.g., failing to use the pen to draw a picture). Then, both puppets demonstrated how to play a

game (e.g., a *baffing* game) in different ways. As expected, the results showed that when children were asked how to play baffing, they were more likely to imitate the reliable puppet than the unreliable puppet. In a separate study, Rakoczy, Hamann, Warneken, and Tomasello (2010) extended these findings by showing that when presented with adult versus peer models, 3-year-olds preferred learning the simple rule games from the adult models rather than the peer models. These findings suggested that children are more likely to accept the information from adults perhaps because adults are the ones who usually provide children with conventional information.

Taken together, existing research suggests that starting from the second year of life, children show sensitivity to the normative nature of play and as in the other domains of conventional knowledge acquisition, when provided with conflicting information about how to play a game, they selectively learn from reliable or more experienced (i.e., adults over peers) informants. This might be because children recognize that the reliable or experienced informants are more likely to show them the correct ways of doing things, that would be shared by other members in their socio-cultural community than the unreliable or inexperienced informants.

2.3.3 Conventionality and Categorization

Categorization is the process of grouping similar objects, individuals or entities together (Kalish, 2007; Kalish & Sabbagh, 2007). As many researchers have argued, this process of deciding on the similarity of two objects, individuals or entities may not be always very clear-cut (e.g., Kalish & Sabbagh, 2007; Murphy & Medin, 1985). For instance, as Kalish (1998a; 2007) discussed at length, it might make sense to categorize whales with fish on the basis of similarity, but it is not really correct to categorize whales

as fish. As seen from this example, simply taking similarity into account might lead to erroneous conclusions (see Kalish, 2007 for a discussion).

How, then, do people decide on categories? As some researchers argued, when making judgments about categorization, people might view categories as '*prescriptive*' (i.e., either right or wrong) (Kalish, 2005; 2006; 2007). Existing studies show that in certain cases, rightness of the categorization comes from entity's natural properties (Kalish, 1998a; 2002; 2007; Keil, 1989; Murphy & Medin, 1985). For instance, when children and adults were asked about whether a white-tailed deer would be similar to a mule deer or a horse, the majority picked the mule deer and stated that grouping white-tailed deer with a horse is just wrong (Kalish, 1998a).

In some other cases, on the other hand, the correctness of categorization is judged by whether that particular categorization judgment would be shared by other members of community or culture (Kalish & Sabbagh, 2007). This kind of judgment is solely socially constructed. Evidence from the categorization literature suggests that both adults and young children acknowledge that some categories are socially constructed or, in other words, conventionalized (e.g., German & Defeyder, 2000; German, Truxaw, & Defeyter, 2007; Kalish, 1998; 2002; 2005; 2007; Tomasello, 1999; 2008; Turiel, 1983; Viola & Kalish, 2002). For instance, a study by Kalish (1998b) has shown that by the time they are four, children understand that it would be '*correct*' to categorize cereals together with other breakfast foods (e.g., egg and milk) in their culture, but they also accept that in some other cultures, cereal might be correctly grouped with dinner foods (Kalish, 1998b; 2005).

Taken together, existing research has suggested that the process of categorization might be affected by judgments of conventionality: both preschool children and adults seemingly acknowledge that there might be correct, conventionalized ways to categorize objects, individuals or entities in their own culture and they also accept that in other cultures, these ways might not be the same.

2.4 Summary

In this chapter, I reviewed the existing evidence in the literature for the effects of conventionality on children's learning. A number of studies have shown that children are more likely to accept information from others when they believe that the information would be correct in their community and shared by other community members. If there are any signs suggesting that the presented information may not be correct or shared in children's cultural or linguistic community (e.g., signs of ignorance or unreliability), they would avoid learning altogether.

Although the findings from these studies provide some evidence that children are sensitive to conventionality information during knowledge acquisition, they do not rule out equally plausible alternative explanations. For instance, many of the studies in the literature focused on the speaker's knowledge states or past reliability (e.g., whether the speaker is knowledgeable or reliable when providing labels; using tools; or playing games). Even though children's appreciation of conventionality provides a viable explanation for the findings of these studies, it is still possible that children in the studies are not concerned about conventionality per se, but are simply more interested in learning from knowledgeable or reliable speakers. That is, perhaps children in these studies are just making judgments about speakers' epistemic credentials (i.e., whether the informants

are likely to *know* the *correct* labels, actions or the rules of the game) and avoid learning when there is any evidence suggesting that the information provided may not be correct (see Henderson, Sabbagh, & Woodward, 2013 and Scofield, Gilpin, Pierruci, & Morgan, 2013 for a related discussion).

There is some evidence in the literature indicating that the knowledge explanation alone may not be enough to account for children's performance in the selective learning studies. For instance, when Henderson and colleagues (2013) presented children a speaker that was presumably knowledgeable (i.e., children had no reason to doubt the speaker's epistemic credentials), but provided a label that would not be shared in children's linguistic community (i.e., labeling a toy bought from a foreign country), children avoided learning the label. At first blush, Henderson et al.'s findings might be considered as a direct evidence for the conventionality explanation. Yet, as also argued by these authors, these findings might provide support for a broader, more general principle than conventionality, namely the principle of *relevance*. In Henderson et al.'s (2013) study, children might be making judgments about the prospective relevance of a novel word and avoid learning when the word is unlikely to be relevant to their future conversations with their linguistic community. Therefore, children's performance in the study might not be because of the conventionality. Children might avoid learning due to the fact that the novel word would not be relevant (thus, useful) for the future conversations in their linguistic community.

The present research was conducted to test the conventionality explanation. In the present dissertation, I explore whether children consider the socio-cultural conventionality of the speaker during knowledge acquisition. In the rest of this chapter, I

describe the present research and how it contributes to the current understanding of the role of conventionality in children's learning.

2.5 The Present Study

Clearer evidence that children are specially tuned to learn information that is likely to be conventional within their socio-cultural community might come if children avoided learning from speakers who showed evidence that they did not adhere to other socio-cultural conventions. There are some hints that this may be the case. For instance, Kinzler, Corriveau, and Harris (2011) recently showed that 4- to 5-year-olds preferred to learn the functions of novel objects from a speaker who spoke with a familiar accent over a speaker who spoke with a foreign accent. These findings dovetail nicely with others showing that even young infants preferentially attend to speakers who speak with familiar accents (Kinzler, Dupoux, & Spelke, 2007; Shutts, Kinzler, McKee, & Spelke, 2009). Considering that accent is one of the clearest signs that someone does not adhere to one's own socio-cultural conventions, a strong interpretation of these findings would be that children indeed consider the socio-cultural conventionality of a speaker when acquiring new information.

Yet, three important issues remain. First, although detection of a foreign accent might license an inference that the speaker is part of a different socio-cultural community that has different socio-cultural conventions, it might also license several other inferences that are unrelated to conventionality. For instance, existing research shows that adults attribute more favorable qualities, such as attractiveness, knowledge, trust and intelligence, to a speaker who speaks with a native accent than a speaker with a foreign accent (Anisfeld, Bogo, & Lambert, 1962; Bourhis, Giles, & Lambert, 1975). Although it

is not yet known whether children make the same judgments, these findings at least call into question the extent to which the foreign accent findings are about socio-cultural conventionality, per se (e.g., see Cohen & Haun, 2013 for evidence that preschoolers use accent when forming friendships). Second, showing that children prefer to learn from speakers who have a familiar rather than foreign accent falls short of showing that children use judgments about conventionality to guide the acquisition process. That is, it is not clear whether children would show evidence of learning from a speaker with a foreign accent if that speaker were the only one available (see e.g., Kim, 2009; Lucas & Lewis, 2010 for a related discussion). Third, accent could be indicative of knowledge of the language. That is, children might make the assumption that a foreign-accented speaker is not as knowledgeable about the language as a native-accented speaker and for that reason, they may choose to learn from the native-accented speaker.

The goal of the present studies, then, is to build on this emerging body of work to determine the extent to which children consider the socio-cultural conventionality of the speaker when acquiring new knowledge. In four studies, we investigated whether children would learn new words (Studies 1, 2 and 3) and facts (Study 4) from a speaker who appears to be a knowledgeable speaker of children's language (in this case, English), yet clearly shows a willingness to violate a well-established socio-cultural convention about how to dress – namely, a boy puppet who likes to wear skirts.

To test the effects of a speaker's violation of socio-cultural conventionality on children's word learning, we presented children with a challenging, indirect labeling scenario and monitored their learning from a skirt-wearing boy puppet and a pants-wearing boy puppet in Study 1. We reasoned that the puppet's violation of a gender-

specific dress convention might constitute a particularly salient manipulation of the socio-cultural conventionality because past research has shown that preschoolers are very sensitive to gender related conventions and have robust gender stereotypes by age 4 (Cvencek, Greenwald, & Meltzoff, 2011; Eichstedt, Serbin, Poulin- Dubois, & Sen, 2002; Serbin, Poulin-Dubois, & Eichstedt, 2002). If children's selective word learning is driven by considerations of conventionality, then children who hear the words from the skirt-wearing boy puppet might be less likely to produce and remember the novel words compared with those in a control condition who hear the same words from the pants-wearing boy puppet.

Study 2 was conducted to investigate the mechanisms through which children's selective learning works. Although it is well documented in the literature that children are selective when learning words, we know little about how this selectivity works (though, see Sabbagh & Shafman, 2009 and Koenig & Woodward, 2010). There are at least two possibilities for how children might fail to learn from unconventional speakers. One possibility is that children use explicit or controlled strategies to avoid learning from unconventional speakers. It is well established in the developmental literature that starting from preschool years, children could strategically direct their attention when learning new information (Enns & Trick, 2006; Enns, Brodeur, & Trick, 1998; Sabbagh & Shafman, 2009). Thus, it is possible that when faced with unconventional speakers, children deliberately fail to attend to any words presented by these speakers because they assume that unconventional speakers are unlikely to provide them with conventional labels (see Sabbagh & Shafman, 2009 for a related discussion). Another possibility is that children's learning is more implicitly affected. There is some evidence in the literature

suggesting that children might be implicitly biased against learning from unconventional speakers. The first set of evidence for this possibility comes from the social psychology literature. There is a rich literature on how adults show implicit biases when interacting with marginalized (e.g., racially or physically stereotyped) members in their community (e.g., Gilbert & Hixon, 1989; Mendes & Koslov, 2012; Nosek et al., 2007). These studies indicated that when interacting with the marginalized people, adult participants have trouble controlling the implicit assumptions and associations especially under high cognitive load. Based on these findings, it is possible that children in the present studies have difficulty controlling these implicit biases when faced with a marginalized member of their community (i.e., a skirt-wearing boy), and that, in turn, might affect their learning.

The second set of evidence for implicit bias explanation comes from the word learning literature. There is some evidence in the word learning literature indicating that children follow certain implicit constraints or biases when learning new words (e.g., Diesendruck, Gelman & Lebovitz, 1998; Golinkoff, Shuff-Bailey, Olguin, & Ruan, 1995; Hirsh-Pasek, Golinkoff, & Hollich, 2000; Markman, 1991; Markman & Watchtel, 1988; Waxman & Kosowski, 1990). Many language researchers argue that these biases make word learning efficient by reducing acquisition errors and ruling out unlikely word-referent alternatives (e.g., Bloom & Markman, 1998). Yet, children do not always follow them, meaning that biases manifest themselves only in certain contexts. Existing literature on word learning biases indicated that children use such biases especially when their cognitive resources are taxed (e.g., Liittschwager & Markman, 1994). Based on these two separate lines of evidence, in Study 2 we reduced the cognitive load by extending the time spent per word in the labeling episode. We reasoned that if children

have a “hard-and-fast rule” that prevents them from learning from the unconventional speakers then we would see similar levels of learning across Study 1 and 2. However, if children’s learning is more implicitly affected then the difference between the two groups might be particularly evident in Study 1.

In Study 3, children were given a different a reason for the boy wearing the skirt which does not entail on the boy’s part an intentional behavior that contravenes a well-established socio-cultural convention. We reasoned that if children still show poor learning from this speaker, then distraction due to speaker’s unusual appearance might be responsible for poor learning from the skirt wearing boy puppet in all studies.

In Study 4, we explored the extent to which children’s considerations of a speaker’s socio-cultural conventionality affected their acquisition of more objective facts. If preschoolers’ sensitivity to the socio-cultural conventionality of the speaker is broadly applied, then children who received the information from the skirt-wearing boy puppet might be less likely to produce and remember the facts compared with those in a control condition who heard the information from a pants-wearing boy.

Chapter 3: Study 1

3.1 Methods

3.1.1 Participants

Thirty-six 4-year-olds (*M* = 4:04; range 3:11 to 4:11; 18 girls) participated in the study[i]. This age group was chosen because past research indicated that children show sensitivity to information relevant to conventionality in this age (Henderson, 2007; Henderson, Sabbagh, & Woodward, 2013; Sabbagh & Baldwin, 2001; Sabbagh & Henderson, 2013). An additional seven children were tested in the study but excluded from the current data set for the following reasons: child did not pass the control questions in the skirt condition (1); child did not pay attention during the labeling episode (1); parental interference (1); child reported feeling sick during the experiment (1); experimenter error (2); one of the toys broke during the play session (1). All parents reported that their children were typically developing.

Children were recruited through the Developmental Database at Queen's University Psychology Department. Families residing in the city of Kingston who had previously expressed interest in volunteering for child development studies were contacted and invited to participate in the study. All participants received either a $10 gift certificate for local bookstores (e.g., Chapter/Indigo) or a child-sized t-shirt for participation. The majority of children were from Caucasian families and English was their primary language.

3.1.2 Materials

3.1.2.1 Toys

Two sets of unfamiliar and nameless toys were used in the study. There were 3 toys in each set. All of the toys were constructed using the parts of Zolo™ and Sea Bonz™ toys. Each toy was constructed to make sure that it has an interesting action associated with it (see Figure 1).

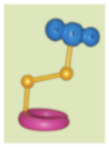
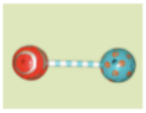
	Toy Pairs		
Toy Sets in Trials	Pair 1	Pair 2	Pair 3
Trial 1			
Trial 2			

Figure 1. Toy Sets and Pairs

3.1.2.2 Puppets

Two full body puppets (63.5 cm) were used in the current study. Both puppets were male. One puppet wore a shirt and a skirt. The other one wore a shirt and pants (See Figure 2). A trained female undergraduate research assistant, whose native language is

English, acted as an experimenter in the study[ii]. The experimenter manipulated and spoke for the puppets throughout the study. Both puppets used in the study were made by the SillyPuppets™ company.

Figure 2. Puppets used in the study

3.1.2.3 Novel Words

Children were introduced to two novel words, *modi* and *toma*. These two words were selected because they were unfamiliar and followed the phonotactic constraints of English (Fulkerson & Waxman, 2007; Grassman & Tomasello, 2010).

3.1.3 Design

This study used a between subject design in which participants were randomly assigned to one of the following two conditions: (1) *Skirt Condition,* in which the word-object link was provided by a male puppet who violated a well-established social convention by wearing a skirt; (2) *Pants Condition*, in which the word-object link was

provided by a puppet who wore pants. In both conditions, children were presented with the same set of nameless and novel toys (see Figure 1). The novel words (i.e., *modi* and *toma*) were associated with one toy in each set.

All children participated in two trials. The word *modi* was always introduced in the first trial and the word *toma* was always introduced in the second trial. One toy from Set A and one toy from set B comprised the target toys in two trials. Toys were assigned into target pairs and the target pairs always occurred together one toy per trial (see Figure 1).

All toys acted as targets equally often in both conditions. The position of the target toy (left, centre or right) was counterbalanced across children. The target position differed between trials. The position of the target toy during the early comprehension tests (left, centre or right) was also counterbalanced across children. Finally, the question asked first in a delayed comprehension task (i.e., *modi* or *toma*) was counterbalanced across participants.

3.1.4 Procedure

After children and parents arrived at the lab, children were engaged in warm-up play with the experimenter. In the meanwhile, the parents read the letter of information and signed the consent form. After children were comfortable with the experimenter, the experimenter asked them if they would like to play another game in a playroom. Once the children agreed on playing, the experimenter led children to the playroom. All children were tested individually in a quite room in the Early Experience Lab at Queen's University. Parents stayed in the waiting area and watched the study on a closed-circuit television monitor.

After entering the playroom, children were asked to sit on a small red chair at a child-sized table. The experimenter sat across children and the experiment got started (see Figure 3 for room setup). The same five-episode structure was used in both trials: (1) label Introduction (2) play session (3) label training (4) elicited production test and (5) early comprehension test (see Sabbagh & Baldwin, 2001 for a similar design). A warm-up session in which the children were introduced to the puppet preceded the first trial. At the end of the first trial, the second one began. A delayed comprehension test involving both labels and all six novel toys were administered at the end of the experiment. Since both trials were very similar, I will describe the first trial and delayed comprehension test in detail below and then briefly explain the minor differences between the first and the second trials.

Figure 3. Room Setup

3.1.4.1 Warm-Up

The experiment got started when the experimenter asked children whether they were ready to play a game. In the pants condition, the experimenter mentioned she has a

friend called Dave and told children that Dave is from Kingston just like them. She then asked whether they would like to meet Dave (see Appendix A for the full script). After getting a confirmation from children, she introduced the puppet. In the skirt condition, the children were first asked two questions to determine their familiarity with the dress convention under consideration (i.e., *(1) Can you tell me who wears skirt, boy or girls? (2) What if a boy wore a skirt like to the store or something, would his friends think that was normal or strange*[iii]*?*). Following, the experimenter mentioned her friend Dave and added that Dave is from Kingston just like them. Before introducing the puppet, the experimenter explained that Dave likes to wear skirts (i.e., *Dave is just like the other boys except for one thing: Dave likes to wear skirts. All his friends wear pants but Dave wears skirts. His friends all think that is weird but they still like him*) (see Appendix A for the full script). In both conditions, the puppets were manipulated by the experimenter who also spoke for the puppets in a slightly different tone of voice. After meeting puppet Dave, children in both conditions proceeded to the label introduction.

3.1.4.2 Label Introduction

The puppet greeted children first and then told the experimenter that he brought some toys for them. Then, he explained that his friend made the toys and one of the toys is a modi. After telling the experimenter and child that they could play with the toys, the puppet gave an excuse and disappeared. The experimenter reviewed what Dave said and ask children to say the novel word ('*Oh, Dave said there is a modi in this bag. Can you say modi*?'). After children repeated the novel word, the experimenter declared that she did not know what a modi is ('*Yeah, Dave said modi is a toy. Hmm, I don't know what a*

modi is. Let me see… There are three toys here. I guess one of them is a modi'). She then took the three toys out of the bag and put them on the table in front of her.

3.1.4.3 Play Session

After highlighting that she never played with these toys before, the experimenter suggested children that they could play with the toys. She then started playing with each toy separately to 'figure out' what each toy does ('*You know what I have never played with these toys before. Let's find out what they do*'). The experimenter and children took turns playing with each toy. After the experimenter 'figured out' what the toy does, she passed the toy to children and encouraged them to play with the toy. The experimenter ensured that children spent equal amount of time playing with each toy.

3.1.4.4 Label Training

After all toys were played with, the experimenter removed the toys from children's reach and announced that Dave is coming back (*Oh! Here comes Dave again!*). After giving a brief explanation for what he did while away, Dave told the experimenter that he needs to pack the toys up to take them home. He then asked the experimenter to help him with packing. As the experimenter placed the toys into the bag, Dave provided the novel label for the target toy and referred to the other two toys as '*that one*' (e.g., '*Oh, you got that one, you got that one, you got the modi*').

To make the word-learning task challenging, we made sure that the labeling episode was very brief in both conditions (i.e., the training lasted approximately 5 seconds in each trial). The order in which the target toy is labeled was counterbalanced across participants. All children heard the novel label *modi* seven times throughout the

first trial. After packing up the toys, Dave told he would take the toys home now and disappeared again (*OK, I will take the toys home now. See you later! Bye!*).

3.1.4.5 Elicited Production Test

The elicited-production test was adapted from the Sabbagh and Baldwin (2001) study. The label training was immediately followed by an elicited production test for both conditions. The children were told that they would play a picture book game. In this game, the experimenter would show them some pictures and children were supposed to name the pictures. The experimenter also added that some of the pictures might be hard so if children did not know the name, they could say 'I don't know'.

The picture book had two pictures of each target object and two pictures of the distracter objects and seven pictures of familiar objects (e.g., cat, telephone). The pictures of target and distracters were interspersed randomly with the familiar objects with the following constraints: all three novel objects were presented before any novel object was repeated and no more than two novel objects were presented consecutively (see Figure 4 for sample pictures).

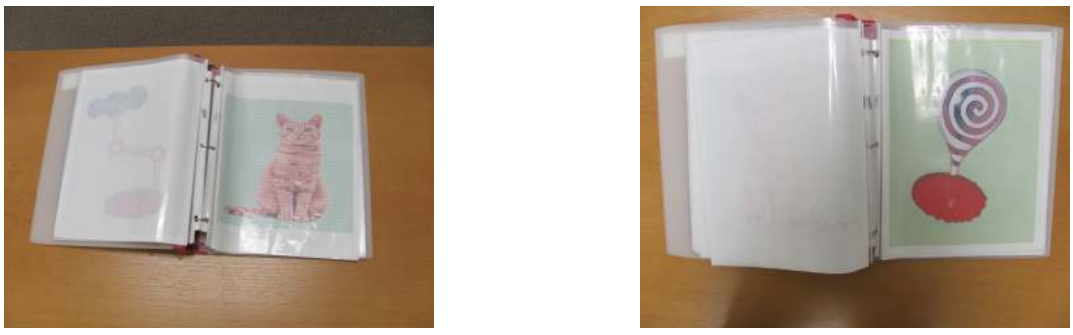


Figure 4. Sample pictures from picture book

The presentation of pictures always followed the same sequence for all participants. After each picture, the experimenter asked children what the picture is (‘*What is this*?’). For the second presentation of the novel objects, if the child said ‘I don’t know’ or provided a label other than the one involved in training, the experimenter asked two follow-up questions: (1) ‘*What does this one do when you play with it?’* (2) ‘*Is it called anything special?’.* These questions were not asked if children provided the novel label even when the usage was incorrect.

3.1.4.6 Early Comprehension Test (3-Item)

Immediately after the elicited-production test, the early comprehension test was administered. In this test, the experimenter took the three toys out of the bag and without looking at the toys, she asked the comprehension question (‘*Oh, look- here are Dave’s toys again. Can you tell me which one of these is a modi*?’). After children pointed at one of the toys, the experimenter collected all toys and put them in the bag.

3.1.4.7 Trial 2

The second trial started immediately after the comprehension test. The second trial had the same five episodes structure as the first trial (i.e., *(1) label introduction (2) play session (3) label training (4) elicited production test, and (5) early comprehension test*). Only the scripted conversations between the puppet and the experimenter, target toys and the novel word used in training (i.e., toma) were different. (see Appendix A for full script). A different picture book with the same constraints as in Trial 1 was used in the elicited production test. After the second trial, children participated in a task that was unrelated to the present procedure and lasted approximately 5 minutes[iv]. Following that, they were given the delayed comprehension test.

3.1.4.8 Delayed Comprehension Test (6-Item)

After the unrelated task was over, children left the room with the experimenter for two minutes. Meanwhile, a second experimenter placed all toys from both trials on the table[v]. The placement was random with respect to the location of the targets and distracters. After all toys were placed on the table, the second experimenter left the room. Then, the main experimenter and children returned to the room. Immediately after entering the room, the experimenter asked children to stand beside the table. After children took a look at the toys, the experimenter asked the first question [i.e., *Oh, look! Here are Dave's toys again. Can you show me which one of these is the modi (or toma)*]. After children point at one of the objects, she asked the second question [i.e., *Can you show me which of these is the toma (or the modi)?*]. The order of the questions (i.e., modi or toma) was counterbalanced across participants.

3.2 Results

3.2.1 Children's answers to the control questions in the skirt condition

Fourteen out of 18 children in the skirt condition passed the control questions at first try. For the four children who failed to provide the expected answers for the control questions (i.e., *girls* for the first question and *strange* for the second question), the experimenter repeated the question for the second time. For two of the four children, parents reported that the child might not know the meaning of the word '*strange*' so the experimenter asked the question using the word '*weird*'. All children included in the current dataset passed the control questions.

3.2.2 Coding for the time spent in labeling episodes

To make sure that the puppets' pace in label training did not differ across conditions, a coder who was blind to the hypotheses of the current study coded the total time spent in the labeling episodes in both conditions. No difference was found between the conditions, suggesting that the puppets spent the same amount of time during label training across the two conditions (M = 10.44; range: 8 seconds to 14 seconds for pants condition; M = 10. 28; range: 8 seconds to 14 seconds for the skirt condition; $t(34) = 0.33$, $p = .74$).

3.2.3 Scoring for the elicited production, early and delayed comprehension tests

For the elicited production data, children were given a point for each time they produced the novel word when shown the target toy. If children used the novel label to refer to one of the distracter objects, they were not given any points. As children were given two trials and possible scores were ranged from 0 to 2 on a given trial, possible maximum score in this task was 4. The early comprehension test is scored by giving children a point for each time they chose the target toy. Possible scores were ranged from 0 to 2. Similarly, children received a score upon picking the right object in the delayed comprehension test. Scores were ranged from 0 to 2.

3.2.4 Control Analyses

Control analyses were conducted to see whether there is trial or gender effects on children's scores across two conditions. Analyses revealed no main effects or interactions involving trial factor. Since there were no significant main effects or interactions for the trial factor, data from the early comprehension test and the production test were collapsed

across two trials. Similarly, no main effects or interactions were found involving gender. Thus, all of the analyses conducted were collapsed across males and females.

3.2.5 Focal Analyses

3.2.5.1 Elicited-Production Test: Children mostly provided correct labels for the familiar objects in the elicited-production test (range: 75-100%). Also, all children who did not provide labels for novel toys correctly identified the function of the toys when they were asked the control question (i.e., "*what does this one do when you play with it*?"). Thus, children's failure to provide label for novel toys could not be explained by forgetting their experience with the object.

An independent sample t-test showed that children in the pants condition significantly produced more labels when referring to the target toys (M = 1.78; SD = 1.21) than children in the skirt condition (M= .89; SD = 1.27), t (34) = 2.14, p = .040; cohen's d = .72. A fisher's exact test showed that children in the pants condition were significantly more likely to produce the target labels at least once (see Table 1), p = .015 (2-tailed).

	Production of Target Labels	
Condition	None	1 or more
Pants	3	15
Skirt	11	7

Table 1. Number of times target labels produced at least once across conditions of Study 1

3.2.5.2 Early Comprehension Test

An independent sample t-test showed that there was no significant difference in children's performance on the early comprehension test across conditions, $t(34) = .29$, $p = .77$. Children's performance was just as strong in the skirt condition ($M = 1.50$, $SD = .51$) as it was in the pants condition ($M = 1.55$, $SD = .61$). A fisher's exact test indicated that the distribution of scores was not different across two conditions (see Table 2), $p = .49$ (2-tailed).

	Selection of Target Objects		
Condition	None	1	2
Pants	1	6	11
Skirt	0	9	9

Table 2. The distribution of scores in the early comprehension test in Study 1

One-sample t-tests comparing performance in each condition to chance ($\mu = .67$) showed that performance was significantly above chance in both the skirt condition, $t(17) = 6.84$, $p = .001$, and in the pants condition, $t(17) = 6.10$, $p = .001$. Altogether, these results suggested that children in both conditions correctly remembered and identified the target object in the early comprehension tests.

3.2.5.3 Delayed Comprehension Test

In contrast to the early comprehension test, an independent sample t-test indicated that the delayed comprehension test showed a condition effect, $t(34) = 2.02$, $p = .052$, $d = .68$. Here, as in the elicited production data, children showed poorer performance in the skirt condition ($M = .72$, $SD = .82$) than in the pants condition ($M = 1.28$, $SD = .82$). This effect, however, fell short of statistical significance in fisher's exact test $p = .13$ (2-tailed) (see Table 3 for distribution of scores).

	Selection of Target Objects		
Condition	None	1	2
Pants	4	5	9
Skirt	9	5	4

Table 3. The distribution of scores in the delayed comprehension test in Study 1

Finally, one-sample t-tests comparing performance in each condition to chance ($\mu = .33$) showed that children were well above chance in the pants condition, $t(17) = 4.87$ $p = .0001$, but marginally significant in the skirt condition, $t(17) = 2.01$ $p = .061$.

3.2.5.4 Comparison of Early Comprehension and Delayed Comprehension Scores:

Although children's scores were lower in the delayed comprehension test than the early comprehension test in both conditions, the difference between two test scores is much higher in the skirt condition ($M = 1.50$, $SD = .51$ for the early comprehension test and $M = .72$, $SD = .82$ for the delayed comprehension test in the skirt condition; $M = 1.55$,

SD = .61 for the early comprehension test and *M* = 1.28, *SD* = .82 for the delayed comprehension test in the pants condition). The difference between the scores might suggest that children may have a weaker, temporary semantic representation of the word-referent link especially when the link was provided by the unconventional speaker. To explore this pattern in depth, we transformed participants' raw scores in each test (0, 1, or 2) to their percent-rank within the chance distribution for each test. A direct statistical test of the raw 3- and 6-item test data was not appropriate because the scores in the 6-item test were expected to be lower than those from the 3-item test due to the lower baseline probability of correct responding by chance in the 6-item test. Children with raw scores of 0 were given 0 in the percent-rank transformation for both early comprehension and delayed comprehension tests. Children with raw scores of 1 or 2 in the early comprehension test (i.e., test with 3 items) test were given a .44 or a .89, respectively. Children with raw scores of 1 or 2 in the delayed comprehension test (i.e., test with 6 items) were given a .67 or a .97, respectively. This transformation equated the means expected by chance in the both tests (see Sabbagh & Shafman, 2009 for a similar analysis).

A mixed-design 2 (condition: skirt versus pants) X 2 (test type: early comprehension versus delayed comprehension) ANOVA with test as a within-subjects factor was run. Results indicated a significant main effect for test, $F(1, 34) = 4.43$, $p = .043$. Not surprisingly, children in both conditions performed better in the early comprehension test than the delayed comprehension test. Interaction between condition and test was marginally significant, $F(1, 34) = 3.295$, $p = .078$.

Although the interaction was marginally significant, visual inspection of the means strongly suggested that there was a more precipitous decline in performance in the skirt condition relative to the pants condition. To test whether this drop is significant, a paired sample t-test was run ($p < .025$)[vi]. The results indicated a significant difference for skirt condition, $t(17) = 4.08$, $p = .0007$ but not for the pants condition, $t(17) = 1.57$, $p = .13$.

Taken together, these results suggest that when a word-referent link was provided by a speaker who violates a well-established social convention, children might form a weak, temporary semantic representation of the word-referent link that decays quickly.

3.3 Discussion

Findings from Study 1 revealed that children showed more robust learning of new words from a pants-wearing boy puppet as opposed to a skirt-wearing boy puppet. The results indicated that children in the pants condition were more likely to produce the word and remember the word-referent link after some delay than children in the skirt condition. These findings suggest children may take into account a violating conventionality in an unrelated domain (i.e., socio-cultural) and use it to guide their acquisition of conventional knowledge in a different domain (i.e., word learning).

Although these findings are very intriguing, two things about the pattern of results should be noted: First, children's performance in the early comprehension test did not differ across two conditions. That is, children in the skirt condition performed as well as the children in the pants condition when asked the comprehension questions after a very short delay. Also, these children's performance was way above the chance level in the early comprehension test. Second, even though the results revealed a significant

difference between pants and skirt conditions in the delayed comprehension test, children's performance in the skirt condition almost differed from chance. These findings suggest that although children seemingly prefer learning from conventional speakers to unconventional speakers, they still show at least temporary learning from the unconventional speaker.

These patterns of findings are very intriguing as the previous studies with a similar design to our own have shown that when children think that word may not be 'correct' or 'relevant' in their linguistic community, they strongly block semantic learning (e.g., Henderson, 2007; Henderson, Sabbagh, & Woodward, 2013; Sabbagh & Baldwin, 2001; Sabbagh et al., 2003; Sabbagh & Shafman, 2009). In the present study, it is clear that children did not block learning altogether from an unconventional speaker. However, they still show some bias against learning from the skirt-wearing boy puppet. The existing literature on cognitive biases suggests that such biases are mostly likely to emerge in challenging learning environments (e.g., Liittschwager & Markman, 1994; Mendes & Koslow, 2012), Thus, the difference between the previous findings and our findings led us question how children, particularly in the skirt condition, would perform if the cognitive load is reduced such that the pace of the word presentation was not as fast as in the current study.

Study 2 was conducted to address this possibility. Children were again presented with a skirt-wearing boy puppet and a pants-wearing boy puppet but unlike Study 1 in which the labeling episode was very brief, in Study 2 the puppets took significantly longer to label the target toy (i.e., the experimenter slowed down her speech rate and introduced longer pauses between words when talking for the puppets in the labeling

episodes). We manipulated the rate of speech because manipulating speech rate let us keep the experimental paradigm similar across the studies. We reasoned that if children learn from the unconventional speaker in Study 2, then it might suggest that children have a bias learning from the speaker violating conventions. If children still show poor learning from the unconventional speaker, then this suggests that children might have a rule against learning from the speakers who are not likely to provide them with conventional labels.

Chapter 4: Study 2

4.1 Methods

4.1.1 Participants

Twenty-six 4-year-olds (*M* = 4:6; range 4:0 to 4:11; 11 girls) participated in the study[vii]. An additional six children were tested in the study but excluded from the current data set for the following reasons: child did not pass the control questions in the skirt condition (2); child did not pay attention during labeling (2); child did not complete the study (1), experimenter error (1).

As in Study 1, participants were recruited from a database of families who expressed an interested in volunteering for child development studies. Children received either a $10 gift certificate for a local bookstore or a child-sized t-shirt for participation. Majority of children were from Caucasian and English was their primary language. Parents reported that all children were typically developing with no developmental or language delay.

4.1.2 Materials

4.1.2.1 Toys, puppets and novel words

To make the two studies as comparable as possible, the toy sets (see Figure 1), the puppet pairs (see Figure 2) and the novel words (i.e., *modi* and *toma*) used in Study 1 were used in the current study.

4.1.3 Design

Similar to Study 1, children were randomly assigned to the pants condition or the skirt condition (*N* = 13 in each condition). All children participated in two trials. The

word *modi* was always introduced in the first trial and the word *toma* was always introduced in the second trial.

As in Study 1, the position of the target toy (i.e., left, centre or right) was counterbalanced across children. The target position differed between trials. The position of the target toy during the early comprehension tests (i.e., left, centre or right) was also counterbalanced across children. Finally, the question asked first in a delayed comprehension task (i.e., *modi* or *toma*) was counterbalanced across participants.

4.1.4 Procedure

Once children were comfortable with the experimenter, the experimenter asked them if they would like to play another game in a playroom. Children were tested in the same room as in Study 1. Parents stayed in the waiting area and watched the study on a closed-circuit television monitor. The same five-episode structure used in Study 1 was used in both trials of Study 2: (1) label Introduction (2) play session (3) label training (4) elicited production test and (5) early comprehension test. A delayed comprehension test involving both labels and all six novel toys were administered at the end of the experiment. The only difference between the procedures of Study 1 and Study 2 was that puppets took significantly longer in labeling the target toys in both trials of Study 2 (i.e., each training episodes lasted approximately 10 seconds). All other scripted conversations between puppet, experimenter and child were the same across studies. As in Study 1, all children heard the novel labels seven times in both trials

4.2 Results

4.2.1 Children's answers to the control questions in the skirt condition

Eleven of out of thirteen children in the skirt condition passed the control questions in their first attempt. The remaining two children passed the control questions when the experimenter asked the questions for the second time.

4.2.2 Coding for the time spent in labeling episodes

As in Study 1, a coder, who is blind to the hypotheses of the study, coded the total time spent in the label training episodes in both conditions. No difference was found between the two conditions suggesting that labeling episodes did not differ in length across the two conditions, $t(24) = .62$, p = .54; $M = 20.76$; range: 15 seconds to 24 seconds for the pants condition; $M = 20.14$, range: 17 seconds to 23 seconds for the skirt condition.

The time spent in the labeling episode of Study 2 was compared to Study 1. The results indicated that the puppets took significantly longer in label training in Study 2 than they did in Study 1, $t(60) = 19.22$, $p < .0001$ (see Table 4 for the mean of the time spent in label training episodes across Study 1 and Study 2).

	Study	
Condition	Study 1	Study 2
Pants	10.44	20.76
Skirt	10.27	20.15

Table 4. The mean of time spent in label training across Study 1 and Study 2

4.2.3 Focal Analyses for Study 2

4.2.3.1 Elicited-Production Test: As in Study 1, children mostly provided correct labels for the familiar objects in the elicited-production test (range: 75-100%). All children who did not provide labels for novel toys correctly identified the function of the toys when they were asked the control question (i.e., "*what does this one do when you play with it*?"). Thus, this suggested that children's failure to provide label for novel toys could not be explained by forgetting their experience with the object.

An independent sample t-test showed that there was no difference in children's production rate across conditions, $t(24) = 1.04$, $p = .31$. Children's performance in the skirt condition ($M = 2.54$, $SD = 1.45$) was equally strong as children's performance in the pants condition ($M = 1.92$, $SD = 1.55$). Fisher's exact test also showed no difference in children's production rates across two conditions, $p = .64$ (2-tailed) (see Table 5 for distribution of scores).

	Production of Target Labels	
Condition	None	1 or more
Pants	4	9
Skirt	2	11

Table 5. Number of times target labels produced at least once across conditions in Study 2

4.2.3.2 Early Comprehension Test: Children in the skirt condition performed at ceiling in the early comprehension test *(M* = 2.00, *SD* = 0). Children in the pants condition performed well but not at ceiling (*M* = 1.69; *SD* = .48). Since the children in the skirt condition performed at ceiling, a one-sample t-test was conducted to explore the difference between conditions. Results indicated a significant difference in children's early comprehension scores between pants and skirt conditions, $t(12) = 2.31$, $p = .039$. One-sample t-test comparing performance to chance showed that children were systematically above chance in the pants condition, $t(12) = 7.75$, $p < .0001$. As children in the skirt condition already performed at ceiling, no test was run to compare their performance to chance.

Fisher's exact test revealed that children's distribution of scores was not significantly different across conditions, $p = .096$ (2-tailed) (see Table 6 for the distribution of scores).

	Selection of Target Objects		
Condition	None	1	2
Pants	0	4	9
Skirt	0	0	13

Table 6. The distribution of scores in the early comprehension test in Study 2

4.2.3.3 Delayed Comprehension Test: An independent sample t-test indicated no difference between children's performance between the pants condition (*M* = 1.30; *SD*

= .85) and the skirt condition (*M*= 1.15; *SD* = .98) in the delayed comprehension task $t(24) = 0.42$, p = .67. Fisher's exact test also indicated that the distribution of scores is not different across conditions, $p = .51$ (2-tailed) (see Table 7 for distribution of scores).

	Selection of Target Objects		
Condition	None	1	2
Pants	3	3	7
Skirt	5	1	7

Table 7. The distribution of scores in the delayed comprehension test in Study 2

One-sample t-tests comparing performance in each condition to chance showed that children were systematically above chance both in the skirt condition, $t(12) = 3.01$, $p = .01$ and the pants condition, $t(12) = 4.12$, $p = .001$.

4.2.3.4 Comparison of Early Comprehension and Delayed Comprehension Scores:

Although children's performance was well above chance in both conditions, their scores were lower in the delayed comprehension test than the early comprehension test both in the pants (M = 1.69; SD = .48 for the early comprehension test; *M* = 1.30; *SD* = .85 for the delayed comprehension test) and the skirt conditions (*M* = 2.00; *SD* = 0 for the early comprehension test; *M* = 1.15, *SD* = .98 for the delayed comprehension test). As in Study 1, we transformed participants' raw scores in each test (0, 1, or 2) to their percent-rank within the chance distribution for each test since a direct statistical test of the raw 3- and 6-item test data was not appropriate (i.e., scores in the 6-item test were expected to be lower than those from the 3-item test because of the lower baseline

probability of correct responding by chance in the 6-item test) (see page 51 and 52 for further details).

A mixed-design 2 (condition: skirt versus pants) X 2 (test type: early comprehension versus delayed comprehension) ANOVA with test as a within-subjects factor was run. Results indicated a main effect for test type $F(1, 24) = 5.108$, $p = .033$. Not surprisingly, children in both conditions performed better in the early comprehension test than the delayed comprehension test. Analyses indicated no other main effects or interactions.

Although analyses revealed no significant interaction between condition and test-type, $F(1, 24) = 1.95$, $p = .17$, the drop between the children's early comprehension and delayed comprehension scores is still intriguing, especially in the skirt condition. That is, children in the skirt condition performed at ceiling in the early comprehension test when they were asked for the target objects shortly after the labeling episodes. However, after a brief delay, their performance dropped. To test whether this drop is significant, a one-sample t-test was run for the skirt condition[viii] and a paired sample t-test was run for the pants condition. The results indicated a significant difference for skirt condition, $t(12) = 2.38$, $p = .035$. No significant difference was found between children's early and delayed comprehension scores in the pants condition, $t(12) = .67$, $p = .51$. These findings might suggest that even when the labeling episode is longer, children's representation of the word-referent link in the skirt condition might decay more quickly than children in the pants condition.

4.2.3.5 Study 1 and Study 2 Comparisons:

To explore further the possibility that there were differences in the extent to which children considered the socio-cultural conventionality of a speaker in a demanding or comparably less demanding task, we compared performance across Study 1 and Study 2 in a 2 (condition: skirt versus pants) X 2 (Study: Study 1 [fast pace] versus Study 2 [slow pace]) univariate ANOVA for each of the dependent measures (i.e., elicited production, early comprehension, late comprehension). Evidence that the information about socio-cultural conventionality affected performance differently across the studies would come in the form of an interaction between condition and study. The results revealed a significant interaction between condition and study only for the elicited production scores $F(1, 58) = 4.62$, $p = .036$). To follow-up the significant condition by study interaction, two independent samples t-tests were conducted ($p < .025$). The t-test for the pants condition did not reveal a significant difference in the number of labels children produced for the target objects across two studies, $t(29) = .29$, $p = .77$. In contrast, the t-test for the skirt condition showed a significant difference in the number of times that the target label was correctly produced by children across two studies, $t(29) = 3.35$, $p = .002$. That is, when the labeling pace is slow, children in the skirt condition were significantly more likely to produce a label for the target objects.

The results revealed no significant interactions between condition and study for the early comprehension scores. The only significant effect for the early comprehension scores was the main effect of study. Examination of this effect revealed that children in Study 2 were more likely to correctly identify the target toys in the early comprehension

tests than the children in Study 1. No significant main effects or interactions were found for the delayed comprehension scores.

4.3 Discussion

The main goal of the Study 2 was to explore the mechanisms through which children's selective learning works. The results indicated that children showed better learning from a skirt-wearing boy puppet when the puppet took longer while providing the labels. In contrast to Study 1, Study 2 revealed no differences in the children's production or delayed comprehension rates between the skirt condition and the pants condition. These findings suggest that children do not have an explicit rule against learning from unconventional speakers, and the socio-cultural conventionality of the speaker implicitly affects children's learning. As shown in Study 1, children showed bias against learning from the unconventional speaker when their cognitive resources were taxed. Yet, they learned equally well from this speaker when the cognitive load was reduced by keeping the labeling episode longer. Taken together, the findings from Study 1 and Study 2 suggested that socio-cultural conventionality of the speaker guides children's learning especially in more challenging learning environments.

Although this might be a viable explanation for these findings, alternative explanations cannot be completely ruled out. An alternative explanation for these results is that the oddity (in a statistical sense) of being confronted with a skirt-wearing boy puppet negatively affected children learning in Study 1, irrespective of concomitant judgments about socio-cultural conventionality. Perhaps, children in Study 1 were cognitively busy with trying to process this 'odd' speaker while they were also confronted with a challenging word-learning situation. This interpretation is slightly

different than the '*conventionality*' account as it emphasizes rather statistical regularity of being confronted with a skirt-wearing boy than judgments about conventionality of speaker's behavior.

The major aim of the next study was then to explore which account (i.e., conventionality or statistical regularity) explains the results of Study 1 better. In Study 3, we replicated the design of Study 1 and presented children with a skirt-wearing boy puppet again. However, unlike Study 1 in which the speaker's behavior was explained as a personal preference (i.e., "*Dave likes to wear skirts*"), in Study 3 children were given a different a reason for the boy wearing the skirt (i.e., "*Dave hurt his foot while playing and putting on pants hurts his foot. He has to wear a skirt till his foot gets better"*). Thus, in this study, the boy puppet presents children with a statistically anomalous skirt-wearing boy, but does so in a way that does not entail on the boy's part an intentional behavior that contravenes a well-established socio-cultural convention. If children show poor learning from this speaker then distraction due to speaker's unusual appearance may be responsible for poor learning from the skirt wearing boy puppet.

Chapter 5: Study 3

5.1 Methods

5.1.1 Participants

Eighteen 4-year-olds (*M* = 4:05; range 4:0 to 4:11; 9 girls) participated in the study. As in the previous studies, participants were recruited from a database of families who expressed an interested in volunteering for child development studies. An additional 4 children were tested in the study but excluded from the current data set for the following reasons: child did not pass the control questions (1); child did not pass the follow-up questions (1); experimenter error (1); English was not child's primary language (1). Parents reported that all children were typically developing with no known developmental or language delay.

Children received either a $10 gift certificate for a local bookstore or a t-shirt for participation. All children were residing in the city of Kingston. As in previous experiments, the majority of the participants were from Caucasian and English was their primary language.

5.1.2 Materials:

5.1.2.1 Toys and novel words

Same toy sets (see Figure 1), and the novel words (i.e., *modi* and *toma)* used in Study 1 and Study 2 were used in the present study.

5.1.2.2 Puppet:

The same puppet used in the skirt condition of Study 1 and Study 2 was used in the present study. To make the excuse more convincing, I wrapped the puppet's right foot with a medical band (see Figure 5).

Figure 5. Puppet used in Study 3

5.1.3 Design

All children were tested in the same condition. As in the previous studies, children participated in two trials. The word *modi* was always introduced in the first trial and the word *toma* was always introduced in the second trial.

The position of the target toy (i.e., left, centre or right) was counterbalanced across children. The target position differed between trials. The position of the target toy during the early comprehension tests (i.e., left, centre or right) was also counterbalanced across children. Finally, the question asked first in a delayed comprehension task (i.e., *modi* or *toma*) was counterbalanced across participants.

5.1.4 Procedure

Once children were comfortable with the experimenter, the experimenter asked them if they would like to play another game in a playroom. Children were tested in the same room as in the previous studies. Parents stayed in the waiting area and watched the study on a closed-circuit television monitor.

The same five-episode structure used in both trials of Study 3: (1) label introduction (2) play session (3) label training (4) elicited production test and (5) early comprehension test. A delayed comprehension test involving both labels and all six novel toys were administered at the end of the experiment.

The procedure in the current study was identical to the skirt condition of Study 1 differing only in three aspects: (1) at the beginning of the study, children were given an explanation for the boy wearing the skirt (i.e., *It hurts Dave to put on pants because his foot got hurt while playing so Dave cannot wear pants. He has to wear skirts*); (2) puppet's right foot was wrapped with a medical band to make the excuse more convincing; (3) after the delayed comprehension test, children were asked three follow-up questions to see whether they remember why the puppet wore skirts and what they think he would wear once his foot gets better (i.e., *do you remember what Dave was wearing: was he wearing a skirt or pants? Why was he wearing a skirt? Once his foot gets better, what do you think Dave is going to wear?*).

All other scripted conversations between puppet, experimenter and child were the same across studies (see Appendix B for the full script in Study 3).

5.2 Results

5.2.1 Children's answers to the control questions in the skirt condition

Fourteen of out of eighteen children in the skirt condition passed the control questions in their first attempt. The remaining four children passed the control questions when the experimenter asked the questions for the second time.

As described above, children were also asked three control questions to at the end of the experiment in the current study. 75% of the children passed these questions without having the experimenter repeat the questions. For the remaining children, the experimenter repeated the questions for the second time. All children in the current data set passed the control questions[ix].

5.2.2 Coding for the time spent in labeling episodes

As in the previous studies, a coder, who is blind to the hypotheses of the study, coded the total time spent in the labeling episodes in both conditions. To make Study 1 and Study 3 as comparable as possible, time spent in the labeling episode in the current study was kept shorter than Study 2 (M = 12.9; range: 10 seconds to 15 seconds). Although the labeling episodes were kept significantly shorter in Study 3 than Study 2 ($t(42) = 12.8$, $p < .0001$), there was still a two-second difference between the means of labeling episodes of Study 1 and Study 3. The difference between Study 1 and Study 3 was also significant ($t(52) = 6.23$, $p < .0001$).

To test whether the range in the labeling length of Study 3 was correlated with children's performance, we ran a series of correlations. No significant correlation was found between the labeling length and children's elicited production, early comprehension and delayed comprehension scores ($r(16) = .035$, $p = .88$ for elicited

production; $r(16) = .175$, $p = .49$ for early comprehension and $r(16) = .-137$; $p = .59$ for delayed comprehension)

5.2.3 Focal Analyses for Study 3:

We elected to characterize children's learning in Study 3 in relation to the two conditions that were included in Study 1. This allowed us to determine the extent to which children's learning from a statistically anomalous speaker was more similar to that of an unconventionally-dressed or a conventionally-dressed speaker.

5.2.3.1. Elicited-Production Test: As in Study 1, children mostly provided correct labels for the familiar objects in the elicited-production test (range: 75-100%). All children who did not provide labels for novel toys correctly identified the function of the toys when they were asked the control question (i.e., "*what does this one do when you play with it*?"). Thus, this suggested that children's failure to provide label for novel toys could not be explained by forgetting their experience with the object.

Since the labeling time was not perfectly matched across two studies, one-way ANCOVAs were run with the pace as a covariate to assess children's performance in Study 3 and the two conditions of Study 1. Results indicated a marginally significant difference between the skirt condition of Study 1 and Study 3, $F(1, 33) = 3.46$, $p = .07$. Children in Study 3 were more likely to produce the target labels ($M = 1.83$, $SE = .26$) than children in the skirt condition of Study 1. No significant difference was found between the pants condition of Study 1 and Study 3, $F(1, 33) = .17$, $p = .68$. Fisher's exact test also confirmed that children in Study 3 were significantly more likely to produce the target label at least once than children in the skirt condition of Study 1 (see Table 8), $p = .015$ (2-tailed).

Condition	Target Labels Produced	
	0	1 or more
Pants	3	15
Skirt	11	7
Excuse	3	15

Table 8. Number of times target labels produced at least once in Study 1 and Study 3

5.3.2.2 Early Comprehension Test: As in Study 1, children in Study 3 performed well in the early comprehension test (M = 1.72, SD = .46). One-way ANCOVAs (i.e., pace as the covariate) revealed no difference between Study 3 and the skirt condition of Study 1, $F(1, 33) = 1.2$, p =.28 or the pants condition of Study 1, $F(1, 33) = .33$, $p = .85$. Fisher's exact tests comparing patterns of performance across the three conditions revealed no difference (see Table 9). A one-sample t-test showed that, as in both conditions of Study 1, children in Study 3 selected targets well above chance in the early comprehension test, ($\mu = .67$); $t(17) = 7.84$, $p = .025$.

Condition	Selection of Target Objects		
	None	1	2
Pants	1	6	11
Skirt	0	9	9
Excuse	0	3	15

Table 9. The distribution of scores in the early comprehension test of Study 1 and Study 3

5.3.2.3 Delayed Comprehension Test: Two one-way ANCOVAs were run to compare children's performance in the delayed comprehension test of Study 3 and two conditions of Study 1. Results revealed a significant difference between Study 3 and the skirt condition of Study 1, $F(1, 33) = 5.48$, $p = .025$. No difference was found between Study 3 and the pants condition of Study 1, $F(1, 33) = .023$, $p = .88$. Two fisher's exact tests showed that the distribution in Study 3 was marginally significant from the skirt condition of Study 1, $p = .065$ (2-tailed), but not the pants condition, $p = .54$ (2-tailed) (see Table 10). A one-sample t-test showed that children in Study 3 performed at above chance levels ($\mu = .33$), $t(17) = 4.69$, $p = .025$.

	Selection of Target Objects		
Condition	None	1	2
Pants	4	5	9
Skirt	9	5	4
Excuse	5	2	11

Table 10. The distribution of scores in the delayed comprehension test in Study 1 and Study 3

5.4 Discussion

The findings from Study 1 revealed that children show poorer learning from speaker who violates these conventions. These results suggested that socio-cultural conventionality of the speaker might be guiding children's learning especially in

challenging learning environments. Although this was a viable interpretation of the findings, a potential confound prevented us from making this conclusion strongly: children in Study 1 might have performed poorer in the skirt condition, not because they considered speaker's socio-cultural conventionality, but because the anomaly of being presented with a skirt-wearing boy induced a distracting cognitive load, which negatively affected children's learning in the difficult indirect labeling scenario we used. By replicating the design of Study 1, we tested this possibility in Study 3.

The main goal of the Study 3 was then to explore whether the uncommon sight of a boy wearing a skirt would negatively affect children's learning, even when wearing the skirt was not attributable to a preference that ran counter to the well-established socio-cultural dress convention. The results revealed that children were more likely to produce the target words and remember the words after a brief delay when the skirt-wearing boy puppet had some 'excuse' to wear skirts. These findings strengthen the claim that the socio-cultural conventionality of the speaker provides a basis for selective learning such that children learn more poorly from speakers who violate well-established socio-cultural conventions.

In our next study, we explored the extent to which children's considerations of a speaker's socio-cultural conventionality affected their acquisition of more objective facts. One possibility is that children's acquisition of word meanings constitutes a special case (or class of cases) in which selective learning might be particularly tuned to socio-cultural conventionality. As noted from the outset, there is no transparent mapping between a word and its referent; instead, the "correctness" of a given word meaning is stipulated by whether the meaning is shared within a particular socio-linguistic

community. It could be that children's emerging recognition of the conventional nature of word meaning (see e.g., Clark, 2007; Sabbagh & Henderson, 2007 for a review), causes them to be especially attentive to the socio-cultural conventionality of speakers when learning new word meanings. After all, if a speaker shows no regard for one well-established socio-cultural convention, then they may also show poor regard for the socio-linguistic conventions that are necessary to establish word meaning. If this were true, we might expect that a speaker's socio-cultural conventionality would not affect children's learning of more objective facts.

An alternative possibility is that children's sensitivity to a speaker's socio-cultural conventionality is more broadly applied. That is, perhaps upon being confronted with a speaker who violates a well-established socio-cultural convention, children adopt a generally skeptical stance that causes them to question that speaker's trustworthiness across a range of knowledge domains. If this were true, we might expect that children's learning of more objective facts would be selective based upon the socio-cultural conventionality of the speaker. Specifically, children might not learn even objective facts from a speaker who violated a well-known socio-cultural convention.

We investigated these possibilities by replicating the design of Study 1, but instead of hearing new words from a skirt-wearing or a pants-wearing boy puppet, children were provided with novel facts about the origins of the target toys. We elected to teach children origin information because past research showed that under typical circumstances, memory for origins shows similar dynamics to memory for labels thereby suggesting that the two kinds of information rely upon similar learning processes (Markson & Bloom, 1997).

Chapter 6: Study 4

6.1 Methods

6.1.1 Participants:

Thirty-six 4-year-old children (*M* = 4:05; range 4:0 to 4:11; 18 girls) were tested in the current study. Twelve additional children were tested but excluded from the data set for the following reasons: child did not pass the control questions in the skirt condition (2); child refused to participate in the delayed comprehension test (1); experimenter error (9).

All children were typically developing with no known developmental delay. Children received either a $10 gift certificate for a local bookstore or a t-shirt for participation. As in previous experiments, majority of children were from Caucasian and English was their primary language.

6.1.2 Materials and Procedure:

The design, materials, procedure, and coding were identical to the Study 1, differing only in the fact that instead of labels, children heard facts about the toys (e.g., *one of the toys comes from China/France*) either from a skirt-wearing puppet or a pants-wearing puppet. The questions asked in the production and comprehension tests were modified accordingly. In the elicited production test, children were presented with the same picture books as in the previous studies, but instead of asking the names of the object in the picture, the experimenter asked them where the object in the picture comes from. For the second presentation of the novel objects, if the child said 'I don't know' or provided some other location than the one involved in training, the experimenter asked

two follow-up questions: (1) '*What does this one do when you play with it?'* (2) '*Is it from any place special?'.* These questions were not asked if children provided the target location even when the usage was incorrect. In the comprehension tests, children were asked to pick the toy that comes from China/France.

Similar to the previous studies, children were participated in two trials. Children were always told that one of the toys comes from China in the first trial and one of the toys comes from France in the second trial.

Children's performance on the elicited production and comprehension test measures were scored according to the same principle as were used in the first two studies.

6.2 Results

6.2.1 Children's answers to the control questions in the skirt condition

Fourteen out of 18 children in the skirt condition passed the control questions in their first try. For children who failed to provide the expected answers for the control questions (i.e., *girls* for the first question and *strange* for the second question), the experimenter repeated the question for the second time. All children included in the current dataset passed the control questions.

6.2.2 Coding for the time spent in labeling episodes

A coder, who is blind to the hypotheses of the study, coded the total time spent in the labeling episodes in both conditions. No difference was found between two conditions, suggesting that labeling episodes did not differ in length across two conditions, $t(34) = 1.24$, $p = .22$; $M = 12.61$; range: 11 seconds to 14 seconds for the pants condition; $M = 12.1$, range: 10 seconds to 16 seconds for the skirt condition.

Similar to Study 1, we kept the labeling episode as brief as possible in Study 4. Yet, the labeling episode in Study 4 was two seconds longer on the average than in the labeling episode in Study 1 (M = 12.36 for Study 3; M = 10.36 for Study 1). The reason for this difference was that the length of the information provided in the labeling episode of Study 4 (i.e., "*That toy comes from China/France*") was different than the length of the information provided in the labeling episode of Study 1 (i.e., "*You got the modi/toma*"). Although the experimenter kept the labeling episode as brief as possible, the difference between two utterances in Study 1 and Study 4 caused a discrepancy in the duration of labeling episodes across two studies. Since there was no difference across conditions in the labeling episodes of Study 4, this difference was considered unproblematic.

6.2.3 Control analyses

Control analyses were conducted to explore potential trial or gender effects on children's scores. Analyses revealed a significant effect for trial in the elicited production data, $F(1, 34) = 4.361$, $p = .044$. Children showed better evidence for learning on Trial 1 (China) (M = 1.02, SD = .87) than on Trial 2 (France) (M = .63, SD = .86). No significant interaction between trial and condition factors was found for the elicited production test. Further, there were no significant main effects or interactions for the trial factor for the comprehension data. The trial effect in the elicited production data was probably due to fatigue between trials, as the elicited production test for Trial 2 occurred about 5 to 7 minutes after the elicited production test for Trial 1. Since there were no significant interactions with condition, the trial effect was considered unproblematic, and the results are reported collapsed across trials.

Preliminary analyses showed no main effects or interactions involving gender. Thus, all of the analyses conducted were collapsed across males and females.

6.2.4 Focal Analyses for Study 3

6.2.4.1 Elicited-Production Test: One important difference between this study and the preceding studies concerns the appropriate responses for the familiar objects in the elicited production test. Although the familiar objects have well known names, it is arguably less common to know about these objects' origins. Accordingly, when children were asked the test question for the familiar objects, half the children said that that they did not know the answer, while most of the remaining half provided answers pertinent to where the object might be acquired commercially (e.g., pet store, grocery, supermarket). Only four children answered familiar object test questions by naming a random country or city of origin (e.g., Canada, New Zealand, Kingston and Vancouver).

Regarding the novel toys that were presented, all children who said they did not know the answer for novel toys correctly identified the function of the toys when they were asked the control question (i.e., "*what does this one do when you play with it*?"). Thus, children's failure to provide origin information for novel toys could not be explained by forgetting their experience with the object.

To test whether children's performance differed across two conditions, an independent samples t-test was run. The results indicated no difference between the pants condition (M = 1.66, SD = 1.24) and the skirt condition (M = 1.61; SD = 1.37) suggesting that children produced the target information equally well in both conditions, $t(34) = .13$, $p = .88$ (see Table 11 for distribution of scores).

Condition	Production of Target Information	
	None	1 or more
Pants	3	15
Skirt	4	14

Table 11. Number of times target information (i.e., China/France) produced at least once in Study 4

6.2.4.2 Early Comprehension Test: An independent samples t-test showed that there were no differences in the extent to which children recalled the origins of the toys in the pants condition (M = 1.77, SD = .43) versus the skirt conditions (M = 1.72, SD = .67), $t(34) = .30$, p = .77. The fisher's exact test showed that there were no significant differences in the distribution of responses across conditions, $p = .18$ (2-tailed) (see Table 12). One sample t-tests comparing performance in each condition to chance ($\mu = .67$) showed that children were systematic in both the pants condition, $t(17) = 11.086$, $p < .0001$, and the skirt condition, $t(17) = 6.74$, $p < .0001$.

Condition	Selection of Target Objects		
	None	1	2
Pants	0	4	14
Skirt	2	1	15

Table 12. The distribution of scores in the early comprehension test of Study 4

6.2.4.3 Delayed Comprehension Test: Similar to the elicited production and the early comprehension tests, an independent samples t-test showed that children's delayed comprehension test performance was not affected by condition (M = 1.56, SD = .78 for the pants condition; M = 1.17, SD = .92 for the skirt condition; $t(34) = 1.36$, p =.18. The fisher's exact test did not reveal a systematic difference in the distribution of scores across two conditions, p = .50 (2-tailed) (see Table 13).

	Selection of Target Objects		
Condition	None	1	2
Pants	3	2	13
Skirt	6	3	9

Table 13. The distribution of scores in the delayed comprehension test of Study 4

It was clear that children's learning of facts in the skirt condition of Study 3 was much stronger than their learning of words in the skirt condition of Study 1. Indeed, and in contrast to the pattern shown in Study 1, when children's performance in the skirt and pants condition of Study 4 was compared with chance (μ = .33), there was evidence of systematic learning in both the pants condition, $t(17) = 6.65$ p = .0001, and the skirt condition, $t(17) = 3.84$, p = .0006. These findings suggest that children's bias for selective learning may not have been as strong for facts as it was for words.

6.2.4.4 Comparison between early comprehension scores and delayed comprehension scores

To compare children's performance in the early and delayed comprehension tests, we ran a mixed-design 2 (condition: skirt versus pants) X 2 (test type: early comprehension versus delayed comprehension) ANOVA with test as a within-subjects factor. The analyses revealed no test type main effects $F(1, 34) = 2.49$ $p = .124$ or interactions $F(1, 34) = 1.803$, $p = .19$, suggesting that children performed equally well in both early and delayed comprehension tests and their performance did not differ across conditions. Although the analyses revealed no interaction, two paired sample t-tests were run for the skirt condition and the pants condition to test whether the drop between delayed and early comprehension scores was significant ($p < .025$). No significant difference was found between children's early and delayed comprehension scores in the pants condition $t(17) = .19$, $p = .85$ or in the skirt condition, $t(17) = 1.97$, $p = .07$.

6.3 Discussion

The major goal of Study 4 was to investigate whether children would show selective learning of the origins of toys based on the socio-cultural conventionality of the speaker. The results showed no differences in children's production and comprehension scores between the pants and the skirt conditions. These findings suggest that preschool-aged children might use socio-cultural conventionality as a basis for selective learning only when acquiring conventional knowledge: children's bias against learning from an unconventional speaker might not be generalized across multiple knowledge domains.

Also, the comparison of children's performance in the early and delayed comprehension tests revealed no difference. This finding is very intriguing as children in

the skirt condition performed significantly better in early comprehension tests than the delayed comprehension tests both in Study 1 and Study 2 where the unconventional puppet provided them with words. These findings further support that children may treat words differently than they treat objective knowledge. We return to this in the General Discussion.

Chapter 7: General Discussion

Although there is some evidence suggesting that conventionality might impact children's learning, to our knowledge, no study has investigated whether socio-cultural conventionality affects children's selective learning. The primary goal of the present research was to get more direct evidence that children consider speaker's socio-cultural conventionality when learning from others. To do this, we conducted a series of studies and tested preschoolers' learning of words and facts from a speaker who violates a well-known socio-cultural convention in children's community, namely a boy puppet who likes to wear skirts. Study 1 indicated that children showed better learning of novel words from a pants-wearing puppet than a skirt-wearing puppet. Study 2 showed that when the puppets provided the labels slowly, children learned equally well from the skirt-wearing boy puppet and the pants-wearing boy puppet. By using the design of Study 1, Study 3 indicated that children learned new words from a skirt-wearing boy puppet when the boy puppet gave an excuse for wearing the skirt, thereby suggesting that it was the conventional violation and not simply the anomaly of a skirt-wearing boy that affected children's learning in Study 1. Finally, Study 4 showed that the socio-cultural conventionality of the speaker did not affect children's learning of objective facts. Taken together, these results suggested that only under high cognitive load, children might take speaker's socio-cultural conventionality into account and be less likely to acquire conventional knowledge from unconventional speakers.

In the rest of this chapter, I discuss these findings; explain how they contribute to the literature; give some theoretical implications of the current findings and provide some directions for future research.

7.1 Conventionality and Selective Learning: Appreciation of Socio-cultural Conventionality Affects Children's Selective Learning

As noted from the outset of this dissertation, many studies have shown that children selectively learn from knowledgeable versus ignorant speakers (e.g., Sabbagh & Baldwin, 2001; Sabbagh et al. 2003), experts versus novices (e.g., Jaswal & Neely, 2006), reliable versus unreliable informants (e.g., Birch & Bloom, 2002; Koenig & Harris, 2005; Koenig & Woodward, 2010), speakers with a familiar versus a foreign accent (e.g., Kinzler et al., 2011), and live versus televised actors (e.g., Krcmar, Grela, & Lin, 2007; Roseberry, Hirsh-Pasek, Parris-Morris, & Golinkoff, 2009). Our results suggested that in addition to the factors listed above, children also use speaker's socio-conventionality for a basis of selective learning when they are (1) acquiring conventional information and (2) faced with a taxing learning situation.

It is important to note that even though these findings complement other findings that demonstrate children's use of speaker characteristics (e.g., knowledge states) to show selective learning (e.g., Sabbagh & Baldwin, 2001; Sabbagh & Shafman, 2009), the general phenomenon of selective learning remains somewhat surprising. After all, in these cases (as in others) even speakers who are unconventionally dressed provide children with the kinds of pedagogical cues that typically promote strong learning (see e.g., Csibra & Gergely, 2009). Of course, a potential concern about our findings, and any others that purport to demonstrate selective learning on the basis of a higher-level consideration (such as socio-cultural conventionality) is that perhaps these lower-level cues that support learning differ across conditions. On this point, we can point out that many precautions were taken to ensure that such cues were equally present across

conditions in the present group of studies. Indeed, the scripted sections of the events that would give rise to the encoding of the new information (e.g., the names of the novel toy) were identical across all conditions. Care was also taken in developing the procedure to ensure that even the events that surrounded the key encoding events were as similar across conditions as possible. Finally, although procedural requirements made it impossible for the experimenter to be blind to the condition, efforts were taken to ensure that additional factors that might affect children's engagement or learning – such as the experimenter's general excitement, pace, speech prosody, and nonverbal behaviors - were consistent across conditions. A coder who is blind to the hypotheses of the study coded the experimenter's affect, pace, speech prosody and engagement across conditions in all three studies. No significant condition differences were found in the experimenter's affect, pace, prosody or engagement. For these reasons, we believe that the condition effects that we observed, particularly in Study 1, are due to children's consideration of the speaker's violation of a well-established socio-cultural dress convention in one condition, but not the other.

Before moving to the discussion of possible explanations for children's selective learning from an unconventional speaker, one more finding from the current set of studies should be noted: we found no gender effect in any of the studies. This null gender effect might be somewhat surprising given that past research suggested that boys are more likely to have robust gender stereotypes than girls (e.g., Heyman, 2001; Ruble, Martin, & Berenbaum, 2006). It is possible that the lack of gender effect in the studies is due to our small sample size. Future research with a larger sample size should explore whether boys would be less likely to learn from an unconventional male speaker than girls.

There are several possible explanations for why children do not learn from a speaker who violates a well-established convention. Below, I will discuss some possible explanations that may account for children's selective learning from an unconventional informant in Study 1.

7.2 Why Avoid Learning New Words from Unconventional Speakers?

There are three related reasons that someone might prefer to engage in a non-conventional behavior. I will describe and assess each of these in some detail in what follows.

7.2.1 Ignorance Account

One reason someone might engage in a non-conventional behavior is that they are ignorant of the more conventional behavior. In the present context, children might have assumed that the skirt-wearing boy puppet wore a skirt because he was ignorant of the conventional prescription that boys wear pants. Children might assume that the speaker lacks the relevant conventional knowledge as the result of some unspecified but fundamental cognitive limitation (see e.g., Sperber et al., 2010). This judgment of generalized ignorance can provide a basis for selective learning. Specifically, children might assume that if a speaker does not know about conventions that are well-known by others, then he might be ignorant in other knowledge domains as well. A recent study by Koenig and Jaswal (2011) found some evidence to suggest that children generalize ignorance across unrelated domains. In their study, Koenig and Jaswal showed that children judged a speaker who was shown to be ignorant about dogs to also be untrustworthy in unrelated domains. It is possible that children in the present study assumed that the speaker was ignorant of the relevant socio-cultural dress convention.

Based upon this assumption, children might then have avoided learning new words from that person either because they hypothesized that the speaker's ignorance sprung had some unspecified cognitive deficit, or that the speaker was not a member of their own socio-cultural community. Although possible, there are noteworthy differences between our study and others that have more directly examined children's sensitivities to speaker ignorance and its implications. For example, no aspect of our experimental paradigm was designed to either prime or reinforce the notion that the speaker was ignorant. For a "generalized ignorance" account to work here, it would have to be based upon an inference generated by children upon seeing the speaker do only one thing "incorrectly." We know of no evidence that speaks to whether children in fact make such generalized inferences based on just one token of a particular behavior (though, see Fitneva & Dunfield, 2010, for evidence suggesting that they make at least within-domain inferences based upon one instance). Nonetheless, further work is necessary to more directly examine the extent to which children infer that an informant who violates a well-known socio-cultural convention also has some characteristic (either some sort of unspecified cognitive deficit or some global circumstance) that makes them ignorant across other domains.

7.2.2 Socio-cultural group membership

Upon seeing someone violate a well-established socio-cultural convention, children might infer that the person is not a part of their socio-cultural community. This judgment, too, might provide a basis for selective learning. For instance, Kinzler and her colleagues (2011) have interpreted their findings involving children's preference for learning from (and attention to) speakers with native rather than foreign accents along

these lines. In the present context, one could argue that children might consider the skirt-wearing puppet as an out group member here and this might be the underlying reason for their poor learning from him.

It is worth noting, however, that our experiment was designed to minimize the extent to which children viewed the skirt-wearing puppet as an out-group member. First, at the beginning of the experiment, children can see that the skirt-wearing puppet is an fluent English speaker, and children explicitly told that the skirt-wearing boy is from the children's own geographical region (e.g., he comes from the same city as them-Kingston) where he has many friends. Of course, these considerations do not guarantee an inference of in-group membership, and it is difficult to assess how these cues would be weighed by children relative to the blatant socio-cultural violation (being a boy and wearing a skirt) if they were making an in-group/out-group judgment. Thus, despite our efforts to convey the sense that the skirt-wearing boy puppet was an in-group member, children may have assumed he was a member of an out-group who was thus not privy to the conventional knowledge of the child's group.

7.2.3 Conventionality Account

A final account is one that concerns conventionality, per se. Children in our study might assume that if a speaker willfully violates a well-known social convention in their socio-cultural community, he may be more willing to violate other conventions as well. This possibility has its basis in socio-cultural approaches to cognitive development (e.g., Rogoff, 2003). Within this framework, a number of researchers have noted that children's task of knowledge acquisition can be thought of as developing a base of knowledge about socio-cultural conventions (e.g., Diesendruck & Markson, 2011; Kalish & Sabbagh,

2007; Sabbagh & Henderson, 2007; 2013; Tomasello, 2008). These socio-cultural conventions are practices of thought and speech that are expected to be both shared by other members of the community, and "relevant" to one's interactions with others (see Sperber & Wilson, 1986). The goal of acquiring new information that is shared and relevant provides a mechanism for children's selective learning. Specifically, if children have a reason to doubt that any speaker will provide information that is shared and relevant within children's socio-cultural communities, they might block learning from that speaker. In the present context, being confronted by a speaker who clearly violated a socio-cultural convention might have caused children to assume that these speakers are at risk to provide other types of 'conventional' information that has some probability of not being shared or relevant within children's own socio-cultural community (see e.g., Diesendruck & Markson, 2011; Sabbagh & Henderson, 2007; 2013).

It is important to note that, at least at first blush, the conventionality account is not completely orthogonal to the accounts detailed above. For example, some researchers have suggested that one of the reasons children monitor the knowledge or ignorance of their informants is to maximize the probability that the information that they learn will be consistent with socio-cultural conventions (i.e., will be shared and relevant within their community) (e.g., Diesendruck, 2005; Henderson, Sabbagh, & Woodward, 2013; Sabbagh & Henderson, 2007; 2013). And, as described above, violation of a socio-cultural convention can be evidence of an informant's ignorance of that socio-cultural convention. What differs between the two accounts, then, concerns their speculations about the ultimate explanation for selectivity. Whereas an account in terms of ignorance would prioritize only epistemic credentials, a conventionality account would suggest that

children are especially tuned to acquire knowledge that is likely to be relevant and shared within a community, and that a speaker's epistemic credentials are only one (albeit potentially powerful) piece of information that can inform that decision.

There may be a few reasons to favor the conventionality account. First, our results indicated that children are more likely to accept facts, but not words, from a speaker who violates a well-known socio-cultural convention. One might argue that children are more likely to learn facts because perhaps, learning facts is just less taxing than learning words. Yet, we are aware of no empirical studies suggesting that children learn facts easier than they learn words. Evidence indeed suggests that acquisition of facts and words rely upon similar learning processes (Markson & Bloom, 1997). It is possible that children were biased against learning words from a convention-violating speaker in Study 1 because children's acquisition of word meanings seemingly constitutes a special case in which selective learning might be particularly tuned to socio-cultural conventionality. Perhaps, children in our Study 1 assume that if a speaker shows no regard for one well-established socio-cultural convention, then they may also show poor regard for the socio-linguistic conventions that are necessary to establish word meaning.

Second, as noted before, previous studies with a similar design to the current research have shown that when children think that informants are plainly ignorant, they strongly block semantic learning (e.g., Sabbagh & Baldwin, 2001; Sabbagh et al., 2003; Sabbagh & Shafman, 2009). If children were assuming that the skirt-wearing boy puppet was ignorant, we might have expected to see the same pattern of results in the present studies. However, even in Study 1 where the condition effects were most clear, we saw some evidence for at least temporary learning from the unconventional informant: when

presented with the unconventional speaker, children performed well in the early comprehension tests. When we kept the labeling episode longer in Study 2, the condition effect disappeared and children learned from the pants-wearing puppet and the skirt-wearing puppet equally well. The difference between this pattern and the more typical pattern of learning that children show from ignorant speakers leads us to question whether the ignorance account provides as good an explanation for our findings as the conventionality account.

Finally, our findings from Study 3 indicated that children showed better word learning from the skirt-wearing boy puppet, even when the word-object pairs presented fast, if the puppet had a 'physical reason' to wear a skirt. This pattern of findings suggests that it is not simply deviation from the majority or unusual physical appearance that matters for children's selective learning, but children's recognition of a non-conventional preference.

Considering all these, we believe the conventionality account provides a better explanation for our findings than the ignorance or the socio-cultural group membership accounts. Perhaps, children in our Study 1 assume that if a speaker bluntly flouts one well-established socio-cultural convention, then they may also flout the socio-linguistic conventions that are necessary to establish word meaning.

7.3 Study 2: Mechanisms Behind Children's Selective Learning

The major aim of Study 2 was to investigate the mechanisms behind children's learning from an unconventional speaker. As discussed before, there are at least two possibilities for how children might avoid learning from unconventional speakers. One possibility is that children explicitly do not pay attention to the words provided by the

unconventional speakers because they recognize that these words are unlikely to be conventional. A second possibility is that children are implicitly biased against learning from unconventional speaker. Our findings from Study 2 provided support for the later. Recall that Study 2 showed that when the puppets presented the words slowly, children did not show any difference in their learning rates across skirt-wearing versus pants-wearing conditions, suggesting that it is only under high cognitive load, they show poor learning from the unconventional speaker.

This pattern of finding is indeed in line with some of the existing research in the literature. Previous research suggested that when their processing capacities are overburdened, children might adopt certain learning strategies to reduce their burden. For instance, existing studies on word learning showed that only when faced with complex word learning situations where they needed to learn multiple labels for the multiple objects, children used certain biases. One of these biases is '*mutual exclusivity bias*' (Liittschaweger & Markman, 1994). The mutual exclusivity bias assumes that every object has a single category name (Au & Glusman, 1990; Markman, 1987, 1989, 1992; Merriman & Bowman, 1989; Merriman & Schuster, 1991; Woodward & Markman, 1991). In one study, Liittschaweger and Markman (1994) demonstrated that when asked to learn second labels for multiple objects, young children used the mutual exclusivity bias as a filtering strategy and only learned the first labels they were presented with. However, when they were presented with only one object with multiple labels, children could overcome the mutual exclusivity bias and learn the second labels as well. Based on the findings from Study 1 and Study 2, it is possible that certain speaker characteristics

(in this case speaker's socio-cultural conventionality) may also serve as one of the filtering strategies children use when they are in challenging word learning environments.

Another possibility is that when faced with an unconventional speaker, children have trouble controlling implicit biases and associations under high cognitive load and this, in turn, affects their learning. This possibility has its roots in the social psychology literature on biases and attitudes. There is a rich social psychology literature on biases and attitudes towards marginalized members. Existing studies indicated that when interacting with racially or physically marginalized members of their community, adults are likely to display certain biases, but only under high cognitive load. For instance, Gilbert and Hixon (1991) showed that under high cognitive load (i.e., when they were given a visual search task and a word completion task at the same time), adult participants were more likely to use stereotypical words (e.g., rice, shy, short) in the word completion task when interacting with Asian American experimenter. Similarly, Devine (1989) showed that when under cognitive load, White adult participants have difficulty at consciously monitoring their behavior and show more racial bias when interacting with racially marginalized members. Moreover, Richeson, Baird, Gordon, Heatherton, Wyland, Trawalter and Shelton (2003) reported that when high-prejudice individuals interacted with minority group members, they made more processing errors in a subsequent cognitive task after the interaction, suggesting that interacting with marginalized members might require more conscious effort and exhaust cognitive resources. Along these lines, Mendes and Koslov (2012) recently showed that adult participants who were paired with a racially marginalized partner showed more positive affect (i.e., smiled more, laughed more or showed more positive behavior) during their interaction than those who

were paired with same-race partners. This effect is called *overcorrection*. To test whether overcorrection is effortful, the experimenters introduced a cognitive load to the interaction by assigning two simultaneous tasks to the participants. The results showed that overcorrection was fragile and easily disrupted under cognitive load. Taken together, existing studies suggest that while interacting with a marginalized member in their community, adults have trouble inhibiting implicit biases and associations especially when their cognitive resources are taxed. Although the studies with adults did not investigate 'learning' from the marginalized people, we think that they still might have important implications for the present findings. Based on the findings from social psychology literature, it could be argued that children under high cognitive load (i.e., in Study 1) have difficulty controlling their implicit biases when faced with a marginalized member of their community (namely a boy wearing a skirt), and that, in turn, might affect their learning. Exploring this possibility more fully might be an important direction for future research.

Also, one pattern of findings should be noted: although there was no condition effects in Study 2, children's performance in the final comprehension task was poorer than their performance in the early comprehension task especially when they heard the labels from the unconventional speaker. This finding suggests that although children in the skirt condition create a conventional semantic representation of the words, their representation might not be as strong as those in the pants condition (see Sabbagh & Shafman, 2009 for a similar discussion for ignorant speakers). If this is the case, then we could expect a poorer performance in the skirt condition when the final comprehension test is further delayed. Exploring this possibility remains a target for future research.

The pattern of findings in Study 2 also leads to a further intriguing speculation that there may be many causes for selective learning in children, and that each may be implemented differently. For instance, when gating learning from ignorant speakers, children may thoroughly block semantic encoding, as other studies have shown (e.g., Sabbagh & Baldwin, 2001; Sabbagh et al., 2003) or they may form a very weak representation of the labeling episode (Sabbagh & Shafman, 2009). When Sabbagh and Shafman (2009) tested 4-year-olds' word learning from ignorant speakers using two different comprehension test questions, they found that children were able to remember the link when they were asked a question about the labeling episode (e.g., *which one did I say is the blicket*?) but not when they were asked the standard comprehension question (e.g., *which one is the blicket*). These findings suggested that children encode their experiences with ignorant speakers, but do not form semantic representations on the basis of those experiences. Our findings might add on those patterns in selective learning: the results from the present studies suggested that when selectively learning from speakers who violate socio-cultural conventions, preschoolers might form a weak, temporary semantic representation that decays quickly. Speculations about why children might take these different approaches to selective learning by situation are beyond the scope of this discussion, but we believe they merit further investigation.

Taken together, our findings from Study 2 showed that when presented with the words slowly, children learned well from the unconventional speaker. As noted before, existing research in the literature has indicated that children also use other speaker characteristics (e.g., speaker's knowledge states, accent etc.) and show selective learning from certain speakers. Another interesting direction for future research might be to

investigate whether children still use these characteristics and avoid learning from ignorant, incorrect or foreign-accented speakers when the processing demands were reduced in these studies.

7.4 Study 4: Why Learn Objective Facts from the Unconventional Speaker?

The results from Study 4 indicated that children did not differ their learning rates of objective facts across the pants and the skirt conditions. Combined with the findings from Study 1, these findings suggest that children might be particularly sensitive to the speaker's conventionality when learning words from others. Why do young children consider speaker's conventionality when learning words only?

Considering past research, children's sensitivity to the information about conventionality when learning words is actually not very surprising. As reviewed in Chapter 2 of the present dissertation, many studies have demonstrated that children are sensitive to the conventional nature of language very early in development (e.g., Buresh & Woodward, 2007; Clark, 1993, 2007; Graham, Stock, & Henderson, 2006; Henderson & Graham, 2005; Henderson & Woodward, 2012; Koenig & Echols, 2003). Even within the first year of life, infants know that language is conventional and expect the members of their linguistic community to share word meanings (Henderson & Woodward, 2012). Then, the question is whether there is any evidence in the literature suggesting that children treat words differently than they treat factual knowledge.

There is indeed some evidence in the literature indicating that children may treat certain types of knowledge differently (e.g., Cimpian, Brandon, & Gelman, 2010; Cimpian & Markman, 2011; Cimpian & Scott, 2012). For instance, in a recent study, Cimpian and Scott (2012) showed that 4-to 7-year-olds expect generic knowledge to be

more widely shared than non-generic knowledge. In their study, Campian and Scott presented children with novel facts in either generic (e.g., *Hedgehogs eat hexapods*) or non-generic (e.g., *This hedgehog eats hexapods*) format and then asked whether children think that other people (e.g., their moms, their teachers and other grown-ups) knew these facts as well (i.e., whether these facts are shared within their community). The results showed that although the effect is stronger for older children, children of all ages were more likely to say that others knew the generic facts than the non-generic facts. Based on these findings, Campian and Scott (2012) argued that children might treat generic facts as they treat 'words': they expect generic facts to be shared between the other members of their community.

Based on these findings, it is possible that children in our Study 4 learn better from the unconventional speaker because they were presented with a non-generic fact (i.e., *that* toy comes from China/France). It would be interesting to test whether children would be less likely to accept generic facts from an unconventional speaker, as children might be more likely to treat generic facts as 'conventional knowledge' (Campian & Scott, 2012). Future research might focus on how children group different types of knowledge and explore the factors affecting children's generic and non-generic knowledge acquisition.

7.5 Limitations and More Future Directions

There are several limitations of the studies presented in this dissertation. The first limitation concerns the null effects observed in the studies. As noted before, only the findings from Study 1 indicated a significant difference in children's learning rates between the pants condition and the skirt condition. We failed to replicate this effect in

Study 2 where the labeling episodes were kept longer than Study 1 or in Study 4 where the children were presented with objective facts about the toys. There are several possible explanations for the null effects observed in Study 2 and Study 4 (see sections 7.3 and 7.4 of this dissertation for discussion on this; see also Kim, 2009 and Koenig & Woodward, 2010 for similar findings with inaccurate speakers). To support the conclusions drawn from the current set of studies, it is extremely important to replicate the findings from Study 1. Future research should focus on replicating and extending the findings from Study 1.

A second limitation concerns the age group used in the present studies. Only one age group (i.e., 4-year-olds) was tested in all of the studies because the pilot test with younger age group (i.e., 3-year-olds) suggested that the word-learning task used in Study 1 might be too taxing of 3-year-olds' cognitive resources. Three-year-olds who were tested using the design of Study 1 failed to show learning from the puppets in both skirt and pants conditions (see Henderson, 2007 for similar results). An interesting direction for future research might be to investigate how 3-year-olds perform in a less taxing word-learning task, such as the one used in Study 2. Also, the majority of existing studies on selective learning focused on preschool children. Not much is known whether/how older children and adults show selectivity when learning from other people. Exploring how older age groups perceive an unconventional speaker and whether they show bias against learning from this speaker might be another possible avenue for future research.

A third limitation concerns the socio-cultural background of the participants. The entire study is conducted in Kingston, Ontario. Kingston is a medium-sized North American city located in Eastern Ontario. According to the recent census, 91% of the

Kingston population consists of Canadians from European descent (Statistics Canada, 2006). Thus, the majority of the participants tested in the current studies were from Caucasian families. It is possible that socio-cultural non-diversity of the sample affected the results of the present research. Recent research on children's appreciation of conventionality suggested that children living in multi-cultural environment might be more tuned to information relevant to conventionality (Cohen & Haun, 2013). Future studies could examine how diversity of children's cultural environment impacts their selective learning from unconventional speakers.

7.6 Potential Implications for Practice

The present dissertation has several practical implications for education professionals working with young children. In general, our findings suggest that teachers and other professionals working in education settings should be sensitive to children's socio-cultural conventionality. For instance, results from Study 1 indicated that when they are under high cognitive load, young children are more likely to learn conventional knowledge from a speaker who seems to be following the socio-cultural conventions of children's community than a speaker who bluntly violates these conventions. These findings suggest that children are sensitive to information relevant to socio-cultural conventionality and take speaker's socio-cultural conventionality into account when learning from other people. To enhance children's learning especially in cognitively taxing learning contexts, teachers and other education professionals may consider showing sensitivity to the socio-cultural conventions of children's community.

Based on the results from Study 1, one might wonder what these results imply for multicultural classrooms, particularly where teachers do not belong to the same socio-

cultural groups and consequently do not follow the same cultural conventions as their students. As noted several times throughout this chapter, the findings from Study 1 should be interpreted together with the rest of the findings in this dissertation. Although Study 1 suggested that children might avoid learning from unconventional speakers in certain learning contexts, it does not mean that children always block all information coming from unconventional sources. Recall that the findings from our Study 3 indicated that when the unconventional speaker provides 'explanation' for their unconventional behavior, children did learn conventional information from this speaker even under high cognitive load. These findings might have important implications particularly for multicultural classrooms. Consistent with the existing literature (e.g., Konan, Chatard, Selimbegovic, & Mugny, 2010; Shulman & Mesa-Bains, 1993), the findings from the current research suggest that explaining multiculturalism and supporting cultural diversity in classrooms may be crucial in promoting children's learning.

7.7 Contributions to the Current Literature

The findings reported in this dissertation are intriguing for many reasons. First, to our knowledge, the present study is the first study demonstrating that children take into account violation of conventionality in an unrelated domain (i.e., socio-cultural domain) and use it to guide their acquisition of conventional knowledge in a different domain (i.e., word learning). As noted before, existing research has mostly investigated how knowledge states of the speaker (e.g., ignorance or past accuracy) affect children's learning. The current study, on the other hand, manipulated a domain that is orthogonal to knowledge state of the speaker and provided a more direct evidence for whether the conventionality of the speaker affects children's learning. Second, the findings revealed

that children might treat conventional and objective knowledge differently and tailor their learning from an unconventional speaker depending on the type of knowledge they are presented with. As discussed above, these findings dovetail nicely with the recent findings on children's understanding of different types of knowledge. Finally, our results indicated that children might learn from an unconventional speaker when the words were presented slowly. This finding suggests that only in a challenging learning situation, children use socio-cultural conventionality of an informant as a filtering strategy and selectively learn from the informant who does not violate a well-known social convention in their socio-cultural community.

Findings from the present dissertation contribute to the current theoretical debate on children's word learning. For over past three decades, researchers have proposed different approaches to explain the mechanisms behind early word learning (see Akhtar & Tomasello, 2000; P. Bloom, 2000; Hirsh-Pasek, Golinkoff, & Hollich, 2000; Woodward & Markham, 1998 for reviews). One of these approaches is the socio-pragmatic approach. The socio-pragmatic approach emphasizes the importance of social interactions in word learning. According to this approach, language learning is inherently social and children's interaction with other members of their linguistic community is viewed as the foundation of word learning (Akhtar & Tomasello, 2000). The current findings supports this approach to word learning. The present research shows that children are sensitive to the social nature of language: when they think that a speaker willingly flouts a well-established socio-cultural convention, children avoid learning words, but not facts, from the speaker. This pattern of results suggests that children avoid learning words from the unconventional speaker probably because children think that

when a speaker blatantly violates a well-known socio-cultural convention, they may also show poor regard for the socio-linguistic conventions that are necessary to establish word meaning.

7.8 Conclusion

In four studies I investigated children's learning from an unconventional speaker. The findings indicated that children use socio-cultural conventionality of a speaker as a basis for selective learning, but only when learning conventional knowledge. There are several possible explanations for why children do not learn from a speaker who violates a well-established convention, including possible judgments about the speakers' ignorance, their membership in a socio-cultural group, or their simple willingness to provide conventional information. Our findings favored conventionality accounts over others. Future research will be necessary to make stronger conclusions about the bases of children's selective learning in these circumstances.

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Appendix A

Script Used in the Pants Condition of Study 1 and Study 2

E = The experimenter, P = The puppet, Italics = Unspoken actions

E: OK /child's name/.
Are you ready for the game?
This game is fun!
You know what?
I have a friend called Dave.
Dave is from Kingston, just like you!
Would you like to meet Dave?
/*after child responds*/
Here he comes!

Label Introduction: MODI

P: Hi! Oh, Hi!
I am Dave.
Nice to meet you!
Oh, Jenna I have something for you here!
/gives the bag to the experimenter/
Here are some toys for you.
My friend made the 3 toys that are in this bag.
One of the toys is a modi.
You can play with them.
I'd love to stay and play with you but I need to go change my shoes.
These shoes are too small.
I will be right back to get the toys.

/*Dave disappears*/

E: /*turns to the child*/
Oh! Dave said there is a modi in this bag.
Can you say modi? */pause, waiting child to say modi/*
Yeah! He said that modi is a toy.
Hmm, I don't know what a modi is.
Let me see.
There are three toys here.
I guess one of them is a modi.

/*the experimenter places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let's find out what they do

/*the experimenter 'discovers' what the toys do and lets child play with them one by one*/

/After experimenter and child play with each toy, experimenter will place the toys on the table and Dave will come back to pick up the toys/

Label Training for MODI:

P: Hi again,
I am back!
See? I couldn't change my shoes
All my shoes are dirty.

Anyways, oh, I see you played with the toys.
I've got to pack them up to take them home.
Jenna, can you help me pack them?

E: /*Says nothing- just smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one.
You got the modi
you got that one
I will take the toys home now!
see you later!
Bye!

Elicited Production Test for MODI:

E: OK, now we will play a picture book game.
I will show you some pictures and you will tell me what their names are, OK?
Some of the pictures may be hard,
so if you don't know the answer, you can say 'I don't know'
OK?

/*then shows the pictures one by one and asks* 'what is this' – *does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the ***second*** *presentation, if children say* ***'I don't know'*** *or provides a label* ***other*** *than the one that is involved in training, the experimenter asks two follow up questions:*

‘What does this do when you play with it?’

‘Is it called anything special?’

These questions are not asked if the child provides the target label for any of the pictures, We skip the question even if the target is incorrect.

Early Comprehension Test for MODI:

After the elicited production task is over (put picture book away):

E: Look, here are Dave's toys again,
Can you show me which one of these is a modi?

After the comprehension task is over, puppet Dave appears again.

Label Introduction for TOMA:

E: Oh, here comes Dave again!
P: Oh, hi again.
Did you enjoy playing with those toys?
Great!
I brought you some other toys.
My friend made these toys.
One of the toys is a toma.
Would you like to play with them?
/gives the bag to the experimenter/
I think I will go shopping to get new shoes.
I will be right back to pick up the toys /*let the child answer the questions*/

E: /*turns to the child*/
Dave said there is a toma this bag.
Can you say toma? /*waits for child to repeat the word toma*/
Yeah! He said that toma is a toy.
Hmm, I don’t know what a toma is.
/Looks inside the bag/ Let me see, there are three toys here.
I guess one of them is a toma.

/*then experimenter randomly places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let’s find out what they do’

/*then, the experimenter ‘discovers’ what the toys do and lets child play with them one by one*/.

Label Training for TOMA:

P: Hi, I'm back!
Oh, I see you played with the toys.
I've got to pack them up to take them home now.
Jenna, can you help me pack them?

E: /*Smiles and nods/ /grabs the toys and puts them in the bag one by one*/

P: oh, you got that one,
You got the toma (according to the counterbalanced order)
you got that one
Ok, I will take the toys home now.
Bye!

Elicited Production Test for TOMA:

E: OK, now we will play a picture book game again.
Remember, I will show you some pictures and you will tell me what their names are?
Some of the questions may be hard so if you don't know the answer, you can say 'I don't know'
OK?

/*then shows the pictures one by one and asks* 'what is this' – *does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know' or provides a label other than the one that is involved in training, the experimenter asks two follow up questions:

'What does this do when you play with it?'

'Is it called anything special?'

These questions are not asked if the child provides the target label for any of the pictures, We skip the question even if the target is incorrect.

Early Comprehension Test for TOMA:

E: Oh look here are Dave's toys again.
Can you show me which one is a modi/toma?

----------UNRELATED TASK IN BETWEEN----------

Final Comprehension Test with both targets:

E: Can you tell me which one is a toma/modi?

Presentation is counterbalanced

Script Used in the Skirt Condition of Study 1 and Study 2

E: OK /child's name/.
Are you comfy over there?
Good!
OK, Now listen carefully. OK?
I am gonna ask you two questions, OK?
Can you tell me who wears skirts, boys or girls?
What if a boy wore a skirt like to the store or something, would his friends think that was normal or strange /*Order Counterbalanced. If the child did not pass these control questions at their first attempt, the experimenter asks one more time*/?
OK,
You know what?
I have a friend called Dave.
Dave is from Kingston, just like you!
He is just like all the other boys except for one thing:
Dave likes to wear skirts.
All his friends wear pants but Dave wears skirts
His friends all think that that is weird
But they still like him.
OK, would you like to meet Dave?
/*waits briefly for child to respond*/
Here he comes!

Label Introduction for MODI

P: Hi! Oh, Hi!
I am Dave.
Nice to meet you!
Oh, Jenna I have something for you here!
/gives the bag to the experimenter/
Here are some toys for you.
My friend made the 3 toys that are in this bag.
One of the toys is a modi.
You can play with them.
I'd love to stay and play with you but I need to go change my skirt.
This skirt is too small.

I will be right back to get the toys.

/*Dave disappears*/

E: /*turns to the child*/
Oh! Dave said there is a modi in this bag.
Can you say modi? */pause/*
Yeah! He said that modi is a toy.
Hmm, I don't know what a modi is.
Let me see.
There are three toys here.
I guess one of them is a modi.

/*then experimenter places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let's find out what they do

/*then, the experimenter 'discovers' what the toys do and lets child play with them one by one*/

/After experimenter and child play with each toy, experimenter will place the toys on the table and Dave will come back to pick up the toys/

Label Training for MODI:

P: Hi again,
I am back!
see? I couldn't change my skirt
All my skirts are dirty.

Anyways, oh, I see you played with the toys.
I've got to pack them up to take them home.
Jenna, can you help me pack them?

E: /*Says nothing- just smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one.
You got the modi
you got that one
I will take the toys home now!
see you later!
Bye!

Elicited Production Test for MODI:

E: OK, now we will play a picture book game.
I will show you some pictures and you will tell me what their names are, OK?
Some of the pictures may be hard,
so if you don't know the answer, you can say 'I don't know'
OK?

/*then shows the pictures one by one and asks* 'what is this' *– does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know' or provides a label other than the one that is involved in training, the experimenter will ask two follow up questions:

'What does this do when you play with it?'

'Is it called anything special?'

These questions is not be asked if the child provides the target label for any of the pictures, We skip the question even if the usage is incorrect.

After the elicited production task is over (experimenter puts the picture book away):

Early Comprehension Test for MODI:

E: Look here are Dave's toys again,
Can you show me which one of these is a modi?

After the comprehension task is over, puppet Dave appears again.

Label Introduction for TOMA

E: Oh, here comes Dave again!
P: Oh, hi again.
Did you enjoy playing with those toys?
Great!
I brought you some other toys.
My friend made these toys.
One of the toys is a toma.
Would you like to play with them?
/gives the bag to the experimenter/
I think I will go shopping to get new skirt.
I will be right back to pick up the toys /*let the child answer the questions*/

E: /*turns to the child*/
Dave said there is a toma this bag.
Can you say toma?
Yeah! He said that toma is a toy.
Hmm, I don't know what a toma is.
/Looks inside the bag/ Let me see, there are three toys here.
I guess one of them is a toma.
/*then experimenter randomly places the objects on the table and after that she turns to the child and says*/,
You know what I have never played with these toys before.
Let's find out what they do'
/*then, the experimenter 'discovers' what the toys do and lets child play with them one by one*/.

Label Training for TOMA:

P: Hi, I'm back!
Oh, I see you played with the toys.
I've got to pack them up to take them home now.
Jenna, can you help me pack them?

E: /*Smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one,
You got the toma
you got that one
Ok, I will take the toys home now.
Bye!

Elicited Production Test for TOMA:

E: OK, now we will play a picture book game again.
Remember, I will show you some pictures and you will tell me what their names are?
Some of the questions may be hard so if you don't know the answer, you can say 'I don't know'
OK?

Then the experimenter shows the pictures one by one and asks 'what is this?'. *The experimenter does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know or No' or provides a label other than the one that is involved in training, the experimenter will ask two follow up questions:

‘What does this do when you play with it?’

‘Is it called anything special?’

These questions will not be asked if the child produces the label for any of the pictures of novel objects, even if the label is incorrect.

After the elicited production task is over, experimenter puts picture book away and takes the toys out of the bag.

Early Comprehension Test for TOMA:

E: Oh look here are Dave's toys again.
Can you show me which one is a modi/toma?

----------UNRELATED TASK IN BETWEEN----------

Final Comprehension Test with both targets:

E: Can you tell me which one is a toma/modi?

The presentation is counterbalanced

Appendix B

Script Used in Study 3

E = The experimenter, P = The puppet, Italics = Unspoken actions

E: OK /child's name/.
Are you comfy over there?
Good!
OK, Now listen carefully. OK?
I am gonna ask you two questions, OK?
Can you tell me who wears skirts, boys or girls? /*waits for child to answer*/
What if a boy wore a skirt like to the store or something, would his friends think that was normal or strange? /*waits for child to answer*/
OK. You know what?
I have a friend called Dave.
Dave is from Kingston, just like you!
He is just like all the other boys except for one thing:
Dave has to wear skirts.
It hurts him to put on pants because his foot got hurt while playing so he can't wear pants.
All of his friends wear pants but Dave has to wear skirt.
His friends all think that that is weird.
But they still like him.
OK, would you like to meet Dave?
/after child responds/
Here he comes!

Label Introduction MODI:

P: Hi! Oh, Hi!
I am Dave.
Nice to meet you!
Oh, Jenna I have something for you here!
/gives the bag to the experimenter/
Here are some toys for you.
My friend made the 3 toys that are in this bag.
One of the toys is a modi.
You can play with them.
I'd love to stay and play with you but I need to go change my skirt.
This skirt is too small.
I will be right back to get the toys.

/*Dave disappears*/

E: /*turns to the child*/
Oh! Dave said there is a modi in this bag.
Can you say modi? */pause/*
Yeah! He said that modi is a toy.
Hmm, I don't know what a modi is.
Let me see.
There are three toys here.
I guess one of them is a modi.

/*then experimenter randomly places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let's find out what they do

/*then, the experimenter 'discovers' what the toys do and lets child play with them one by one*/

/After experimenter and child play with each toy, experimenter will place the toys on the table and Dave will come back to pick up the toys/

Label Training MODI:

P: Hi again,
I am back!
See? I couldn't change my skirt
All my skirts are dirty.

Anyways, oh, I see you played with the toys.
I've got to pack them up to take them home.
Jenna, can you help me pack them?

E: /*Says nothing- just smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one.
You got the modi
you got that one
I will take the toys home now!
see you later!
Bye!

Elicited Production Test for MODI:

E: OK, now we will play a picture book game.

I will show you some pictures and you will tell me what their names are, OK?
Some of the pictures may be hard,
So if you don't know the answer, you can say 'I don't know'
OK?

Then the experimenter shows the pictures one by one and asks 'what is this?'. *The experimenter does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know or No' or provides a label other than the one that is involved in training, the experimenter will ask two follow up questions:

'What does this do when you play with it?'

'Is it called anything special?'

These questions will not be asked if the child produces the label for any of the pictures of novel objects, even if the label is incorrect.

After the elicited production task is over, experimenter puts picture book away and takes the toys out of the bag.

Early Comprehension for MODI:

E: Look! Here are Dave's toys again,
Can you show me which one of these is a modi?

After the comprehension task is over, puppet Dave appears again.

The Label Training TOMA:

E: Oh, here comes Dave again!

/*Dave appears*/

P: Oh, hi again.
Did you enjoy playing with those toys?
Great!
I brought you some other toys.
My friend made these toys.
One of the toys is a toma.
Would you like to play with them?
/gives the bag to the experimenter/

I think I will go shopping to get new skirt.
I will be right back to pick up the toys /*let the child answer the questions*/

E: /*turns to the child*/
Dave said there is a toma this bag.
Can you say toma?
Yeah! He said that toma is a toy.
Hmm, I don't know what a toma is.
/Looks inside the bag/ Let me see, there are three toys here.
I guess one of them is a toma.
/*then experimenter randomly places the objects on the table and after that she turns to the child and says*/,
You know what I have never played with these toys before.
Let's find out what they do'

/*then, the experimenter 'discovers' what the toys do and lets child play with them one by one*/.

Label Training TOMA:

P: Hi, I'm back!
Oh, I see you played with the toys.
I've got to pack them up to take them home now.
Jenna, can you help me pack them?

E: /*Smiles and nods/ /grabs the toys and puts them in the bag one by one*/

P: oh, you got that one,
You got the toma /*counterbalanced*/
you got that one.
Ok, I will take the toys home now.
Bye!

Elicited Production for TOMA:

E: OK, now we will play a picture book game again.
Remember, I will show you some pictures and you will tell me what their names are?
Some of the questions may be hard so if you don't know the answer, you can say 'I don't know'
OK?

Then the experimenter shows the pictures one by one and asks 'what is this?'. *The experimenter does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if

children say 'I don't know or No' or provides a label other than the one that is involved in training, the experimenter will ask two follow up questions:

'What does this do when you play with it?'

'Is it called anything special?'

These questions will not be asked if the child produces the label for any of the pictures of novel objects, even if the label is incorrect.

After the elicited production task is over, experimenter puts picture book away and takes the toys out of the bag.

Early Comprehension Test TOMA:

E: Oh look here are Dave's toys again.
Can you show me which one is a modi/toma?

----------UNRELATED TASK IN BETWEEN----------

Final Comprehension Test with Both Targets:

Children participate in a comprehension task in which the experimenter presents children with all six toys used in the play and ask them to show the novel objects one more time

Can you tell me which one is a toma/modi? /*counterbalanced*/

Appendix C

Script Used in the Pants Condition of Study 4

E = The experimenter, P = The puppet, Italics = Unspoken actions

E: OK /child's name/.
Are you ready for the game?
This game is fun!
You know what?
I have a friend called Dave.
Dave is from Kingston, just like you!
Would you like to meet Dave?
/*after child responds*/
Here he comes!

Fact Introduction: CHINA

P: Hi! Oh, Hi!
I am Dave.
Nice to meet you!
Oh, Jenna I have something for you here!
/gives the bag to the experimenter/
Here are some toys for you.
My friend bought the 3 toys that are in this bag.
One of the toys comes from CHINA.
You can play with them.
I'd love to stay and play with you but I need to go change my shoes.
These shoes are too small.
I will be right back to get the toys.

/*Dave disappears*/

E: /*turns to the child*/
Oh! Dave said there is a toy from CHINA in this bag.
Can you say CHINA? */pause, waiting child to say CHINA/*
Yeah! He said only one of the toys in this bag comes from CHINA.
Hmm, I don't know which toy comes from CHINA.
Let me see.
There are three toys here.
I guess one of them comes from CHINA.

/*the experimenter places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let's find out what they do

/*the experimenter 'discovers' what the toys do and lets child play with them one by one*/

/After experimenter and child play with each toy, experimenter will place the toys on the table and Dave will come back to pick up the toys/

Training for CHINA:

P: Hi again,
I am back!
See? I couldn't change my shoes
All my shoes are dirty.

Anyways, oh, I see you played with the toys.
I've got to pack them up to take them home.
Jenna, can you help me pack them?

E: /*Says nothing- just smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one.
That toy comes from CHINA
you got that one
I will take the toys home now!
see you later!
Bye!

Elicited Production Test for CHINA:

E: OK, now we will play a picture book game.
I will show you some pictures and you will tell me where they come from, OK?
Some of the pictures may be hard,
so if you don't know the answer, you can say 'I don't know'
OK?

/*then shows the pictures one by one and asks* 'where does this one come from – *does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

*The pictures of novel toys will be presented twice. For the **second** presentation, if children say **'I don't know'** or provides a label **other** than the one that is involved in training, the experimenter asks two follow up questions:*

'What does this do when you play with it?'

‘Does it come from any place special?’

These questions are not asked if the child provides the target fact for any of the pictures, We skip the question even if the target is incorrect.

Early Comprehension Test for CHINA:

After the elicited production task is over (put picture book away):

E: Look, here are Dave's toys again,
Can you show me which one comes from CHINA?

After the comprehension task is over, puppet Dave appears again.

Fact Introduction for FRANCE:

E: Oh, here comes Dave again!
P: Oh, hi again.
Did you enjoy playing with those toys?
Great!
I brought you some other toys.
My friend bought these toys.
One of the toys comes from FRANCE.
Would you like to play with them?
/gives the bag to the experimenter/
I think I will go shopping to get new shoes.
I will be right back to pick up the toys /*let the child answer the questions*/

E: /*turns to the child*/
Dave said there is a toy from FRANCE in this bag.
Can you say France? /*waits for child to repeat the word France*/
Yeah! He said that only one of the toys in this bag comes from FRANCE.
Hmm, I don’t know which toy comes from France.
/Looks inside the bag/ Let me see, there are three toys here.
I guess one of them comes from France.

/*then experimenter randomly places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let’s find out what they do’

/*then, the experimenter ‘discovers’ what the toys do and lets child play with them one by one*/.

Training for France:

P: Hi, I'm back!
Oh, I see you played with the toys.
I've got to pack them up to take them home now.
Jenna, can you help me pack them?

E: /*Smiles and nods/ /grabs the toys and puts them in the bag one by one*/

P: oh, you got that one,
That toy comes from France (according to the counterbalanced order)
you got that one
Ok, I will take the toys home now.
Bye!

Elicited Production Test for FRANCE:

E: OK, now we will play a picture book game again.
Remember, I will show you some pictures and you will tell me where they come from?
Some of the questions may be hard so if you don't know the answer, you can say 'I don't know'
OK?

/*then shows the pictures one by one and asks* 'where does this one come from?' – *does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know' or provides a label other than the one that is involved in training, the experimenter asks two follow up questions:

'What does this do when you play with it?'

'Does it come from any place special?'

These questions are not asked if the child provides the target label for any of the pictures, We skip the question even if the target is incorrect.

Early Comprehension Test for FRANCE:

E: Oh look here are Dave's toys again.
Can you show me which one comes from France?

----------UNRELATED TASK IN BETWEEN----------

Final Comprehension Test with both targets:

E: Can you tell me which one comes from FRANCE/CHINA?

Presentation is counterbalanced

Script Used in the Skirt Condition of Study 4

E: OK /child's name/.
Are you comfy over there?
Good!
OK, Now listen carefully. OK?
I am gonna ask you two questions, OK?
Can you tell me who wears skirts, boys or girls?
What if a boy wore a skirt like to the store or something, would his friends think that was normal or strange /*Order Counterbalanced. If the child did not pass these control questions at their first attempt, the experimenter asks one more time*/?
OK,
You know what?
I have a friend called Dave.
Dave is from Kingston, just like you!
He is just like all the other boys except for one thing:
Dave likes to wear skirts.
All his friends wear pants but Dave wears skirts
His friends all think that that is weird
But they still like him.
OK, would you like to meet Dave?
/waits briefly for child to respond/
Here he comes!

Introduction for CHINA

P: Hi! Oh, Hi!
I am Dave.
Nice to meet you!
Oh, Jenna I have something for you here!
/gives the bag to the experimenter/
Here are some toys for you.
My friend bought the 3 toys that are in this bag.
One of the toys comes from CHINA.
You can play with them.
I'd love to stay and play with you but I need to go change my skirt.
This skirt is too small.

I will be right back to get the toys.

/*Dave disappears*/

E: /*turns to the child*/
Oh! Dave said there is a toy from CHINA in this bag.
Can you say CHINA? */pause/*
Yeah! He said that only one of the toys in this bag comes from CHINA.
Hmm, I don't know which toy comes from CHINA.
Let me see.
There are three toys here.
I guess one of them comes from CHINA.

/*then experimenter places the objects on the table and after that she turns to the child and says*/,

You know what I have never played with these toys before.
Let's find out what they do

/*then, the experimenter 'discovers' what the toys do and lets child play with them one by one*/

/After experimenter and child play with each toy, experimenter will place the toys on the table and Dave will come back to pick up the toys/

Label Training for CHINA:

P: Hi again,
I am back!
see? I couldn't change my skirt
All my skirts are dirty.

Anyways, oh, I see you played with the toys.
I've got to pack them up to take them home.
Jenna, can you help me pack them?

E: /*Says nothing- just smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one.
That toy comes from CHINA
you got that one
I will take the toys home now!
see you later!
Bye!

Elicited Production Test for CHINA:

E: OK, now we will play a picture book game.
I will show you some pictures and you will tell me where they come from, OK?
Some of the pictures may be hard,
so if you don't know the answer, you can say 'I don't know'
OK?

/*then shows the pictures one by one and asks* 'where does this one come from' – *does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know' or provides a label other than the one that is involved in training, the experimenter will ask two follow up questions:

'What does this do when you play with it?'

'Does it come from any place special?'

These questions is not be asked if the child provides the target label for any of the pictures, We skip the question even if the usage is incorrect.

After the elicited production task is over (experimenter puts the picture book away):

Early Comprehension Test for CHINA:

E: Look here are Dave's toys again,
Can you show me which one of these comes from CHINA?

After the comprehension task is over, puppet Dave appears again.

Label Introduction for FRANCE

E: Oh, here comes Dave again!
P: Oh, hi again.
Did you enjoy playing with those toys?
Great!
I brought you some other toys.
My friend made these toys.
One of the toys comes from FRANCE.
Would you like to play with them?
/gives the bag to the experimenter/
I think I will go shopping to get new skirt.
I will be right back to pick up the toys /*let the child answer the questions*/

E: /*turns to the child*/
Dave said there is a toy from France in this bag.
Can you say FRANCE?
Yeah! He said that only one of the toys in this bag comes from FRANCE.
Hmm, I don't know which toy comes from FRANCE.
/Looks inside the bag/ Let me see, there are three toys here.
I guess one of them comes from FRANCE.
/*then experimenter randomly places the objects on the table and after that she turns to the child and says*/,
You know what I have never played with these toys before.
Let's find out what they do'
/*then, the experimenter 'discovers' what the toys do and lets child play with them one by one*/.

Training for FRANCE:

P: Hi, I'm back!
Oh, I see you played with the toys.
I've got to pack them up to take them home now.
Jenna, can you help me pack them?

E: /*Smiles and nods/* /*grabs the toys and puts them in the bag one by one*/

P: oh, you got that one,
That toy comes from FRANCE (*this order is counterbalanced across participants*)
you got that one
Ok, I will take the toys home now.
Bye!

Elicited Production Test for FRANCE:

E: OK, now we will play a picture book game again.
Remember, I will show you some pictures and you will tell me where they come from, OK?
Some of the questions may be hard so if you don't know the answer, you can say 'I don't know'
OK?

Then the experimenter shows the pictures one by one and asks 'where does this one come from?'. *The experimenter does not reply to child's answer, whether correct or incorrect - there are 7 familiar pictures and two pictures of the novel objects*/.

The pictures of novel toys will be presented twice. For the second presentation, if children say 'I don't know or No' or provides a label other than the one that is involved in training, the experimenter will ask two follow up questions:

‘What does this do when you play with it?’

‘Is it from any place special?’

These questions will not be asked if the child produces the label for any of the pictures of novel objects, even if the information is incorrect.

After the elicited production task is over, experimenter puts picture book away and takes the toys out of the bag.

Early Comprehension Test for FRANCE:

E: Oh look here are Dave's toys again.
Can you show me which one comes from FRANCE?

----------UNRELATED TASK IN BETWEEN----------

Final Comprehension Test with both targets:

E: Can you tell me which one comes from FRANCE/CHINA?

The presentation is counterbalanced

End Notes:

[i] Sample size for the studies was based on counterbalancing.

[ii] An undergraduate research assistant was trained to run the experiment since the author's native language is not English. The same research assistant acted as the experimenter in all of the studies.

[iii] The order for 'Strange/Normal' was also counterbalanced across participants.

[iv] Participant across all studies participated in the same unrelated task. The unrelated task was a short experiment that is not related to the procedures of the present studies (see Sabbagh & Baldwin, 2001 for a similar design).

[v] We had children leave the room and got a second experimenter to rearrange the objects before the delayed comprehension test as the pilot tests showed that children tend to grab the toys and play with them while waiting the experimenter to arrange the array.

[vi] The significance value was adjusted to take into account the multiple comparisons

[vii] The main objective of Study 2 was to test whether children still show a difference when the labeling episode was less taxing than Study 1. After testing twenty-six children, our results showed that children in the skirt condition learned equally well from the unconventional speaker. Therefore, we stopped testing at twenty-six children. Control analyses showed no main effects or interactions involving toy-pairs (i.e., counterbalancing).

[viii] A one-sample t-test was run for comparing the early comprehension scores and the delayed comprehension scores in skirt condition since there was no variability in the early comprehension scores (i.e., children performed at ceiling).

[ix] One child in the current data set was very concerned about whether wearing pants might hurt Dave's foot. When the experimenter reassured her that wearing pants would not hurt Dave after his foot fully healed, the child agreed that Dave would wear pants.