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3-Year-olds' comprehension, production, and generalization of Sesotho passives

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ABSTRACT

Researchers have long been puzzled by the challenge English passive constructions present for language learners, with adult-like comprehension and production emerging only around the age of 5. It has therefore been of significant interest that researchers of other languages, including the Bantu language Sesotho, have reported acquisition of the passive by the age of 3 (Demuth, 1989). Such reports have typically been based on spontaneous production data, calling for further investigation. This study carried out a series of experiments with Sesotho-speaking 3-year-olds, testing their ability to comprehend the passive, produce the passive, and generalize novel verbs to passive frames. The results showed that passive comprehension was good, with no effect of actional/non-actional verb type. Elicited production of the passive was also good, with no difference between adversive and non-adversive verbs. Finally, all participants made both active and passive generalizations to novel verbs. These findings provide strong evidence that Sesotho-speaking 3-year-olds have robust, abstract knowledge of passive syntax. The paper concludes with a discussion of the factors that contribute to the early learning of the Sesotho passive, why acquisition of the passive may be delayed in English, and the implications for understanding grammatical development more generally.

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1. Introduction

Researchers of language acquisition have long debated the issue of when and how the passive is learned, with early findings from languages like English indicating full acquisition only by the age of 5. The apparently late acquisition of English passive has therefore been a topic of significant theoretical interest (Borer & Wexler, 1987, 1992; Fox & Grodzinsky, 1998; Gordon & Chafetz, 1990; Horgan, 1978; Maratsos, Fox, Becker, & Chalkley, 1985; Pinker, Lebeaux, & Frost, 1987). This has led many researchers to propose that there is something special about passive syntax that makes these constructions difficult to acquire. Proposals regarding the nature of this problem have evolved along with developments in syntactic theory. Early explanations proposed that passives were derivationally complex (Brown & Hanlon, 1970) or 'non-canonical' (Bever, 1970), therefore taking some time to learn. In contrast, Borer and Wexler (1987, 1992) proposed that the principle governing argument-chain movement (A-chains) matured only around the age of 4 or 5. The A-chain Deficit Hypothesis (ACDH) thus predicted the late acquisition of both syntactic (verbal) passives (1a) and unaccusative verbs (1b), both of which promote objects to subject position (as indicated by the indexed *t*(race)). These are distinguished from lexical (adjectival) passives describing a resultant state (2a), and unergative verbs (2b), neither of which involves movement.

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(1a)	The ball$_i$ was kicked t_i (by John)	Syntactic (verbal) passive
(1b)	The man$_i$ arrived t_i	Unaccusative
(2a)	The lamp was broken	Lexical (adjectival) passive
(2b)	The girl danced	Unergative

Borer and Wexler (1987) proposed that sentences like that in (1a) are interpreted by learners' immature grammars as being 'syntactic homophones' (s-homophones) of the non-movement construction in (2a). That is, verbal passives would be treated as adjectival passives. Support for this proposal was drawn from the observation that children rarely use a *by*-phase, resulting in surface productions that look like (2a) (Horgan, 1978) (see Babyonyshev, Ganger, Pesetsky, and Wexler (2001) for updated proposals along this line). Alternatively, it has been suggested that the lack of *by*-phrases in the passive constructions children hear may hinder their assignment of correct thematic roles (agent, patient) (Fox & Grodzinky, 1998), rendering the passive harder to process, comprehend, and produce.

It has therefore been of significant interest that researchers of southern African Bantu languages and North American Inuit and Mayan languages have found spontaneous use of syntactic passives before the age of 3 (e.g., Zulu – Suzman, 1987, 1990; Sesotho – Demuth 1989, 1990; Inuktitut – Allen & Crago, 1996; Mayan K'iche – Pye, 1988). Demuth (1989) proposed that the earlier acquisition of passives in Sesotho could be attributed to the relatively high use of passives in the input Sesotho-speaking children hear. All the studies reporting early acquisition of passives also report the high frequency of passives in the input. In contrast, those languages reporting late acquisition of passives (e.g., English – 4 to 5 years (Maratsos et al., 1985), German – 5 years (de Villiers, 1984), Hebrew – 8 years (Berman, 1985)) have few passives in the input (cf. Gordon & Chafetz, 1990; Pinker et al., 1987). This suggests that more exposure to the passive might facilitate earlier comprehension and use of this construction in languages where it is typically acquired late. Indeed, recent training and priming studies, where English-speaking children are exposed to a much higher number of passives that is typically found in everyday speech, show that children as young as 3;5 or 4 show an increased ability to comprehend and produce passives (Brooks & Tomasello, 1999; Huttenlocher, Vasilyeva, & Shimpi, 2004; Vasilyeva, Huttenlocher, & Waterfall, 2006). Such findings suggest that learning the passive may not be as constrained by the maturation of grammatical principles as has been proposed (e.g., Borer & Wexler, 1987). Rather, aspects of the input, including construction frequency and morphological transparency (e.g., Slobin, 1985), amongst other issues, may play a much larger role in the course of syntactic development than often assumed.

The goal of this study was therefore to provide a comprehensive experimental study of Sesotho-speaking 3-year-olds' knowledge of the passive. Critically, we wanted to know if children's early reported spontaneous use of the passive in everyday speech would translate into good performance when tested on comprehension and production tasks similar to those used in studies of the English passive. In addition, we wanted to know if young Sesotho speakers could generalize the passive to verbs they had never heard used in this construction. If so, this would provide compelling evidence that certain aspects of the input can enhance not only morphological learning, but the learning of syntactic constructions as well. The structure and use of the Sesotho passive, and the implications for learnability, are first discussed in more detail below.

1.1. Sesotho structure and input

Sesotho (also called Southern Sotho) is a Bantu language spoken in the southern African country of Lesotho and adjacent parts of South Africa. It is one of two official languages of Lesotho, and one of the 11 national languages of South Africa, spoken by 6 million people as a first language and an additional 4 million as a second language. Sesotho is one of approximately 500 Bantu languages that constitute a sub-group within the Niger-Khordofanian language family (Meeussen, 1959; Nurse & Phillipson, 2003). Like Romance or Germanic languages, Bantu languages exhibit grammatical similarities and differences from one language to the next. Thus, Sesotho is closely related to IsiZulu and IsiXhosa (spoken in South Africa), but is more distantly related to Kiswahili (spoken in East Africa).

Like English, and like most other Bantu languages, Sesotho has basic SVO (Subject–Verb–Object) word order and subject–verb agreement (Doke & Mofokeng, 1985). All Bantu nouns belong to specific noun class (typically marked with a noun class prefix), and this is reflected in the form of the subject–verb agreement morpheme. Thus, the Sesotho subject *basadi* 'women' in (3a) and the subject agreement marker on the verb (AGR) are both class 2.[1] Assuming a traditional movement analysis for passive formation (Chomsky, 1981), both English and Sesotho raise the object to subject position, leaving morphological evidence of this process (*-w-* or *-uw-*) on the verb (Machobane, 1987).[2] The verb, which then agrees with the new subject, can be followed by an optional *by*-phrase (e.g., *Mary kicked the balls > The balls were kicked (by Mary)*). In the Sesotho passive sentence in (3b), the class 7 noun *lebone* 'lamp' has raised to subject position, triggering class 7 agreement on the verb. In contrast to English, where the past participle can be used in both the passive and the past participle (*kicked*), the Sesotho passive morpheme *-w-*, infixed near the end of the verb, is unambiguous. The logical subject *basadi* 'women' can now optionally occur as the object of a *by*-phrase (*ke basadi* 'by the women').

[1] Glosses are as follows: ADJ = adjective, AGR = subject-verb agreement, CP = copula, FV = final vowel (mood marker), NEUT = neuter/stative, OBJ = object marker, PASS = passive, PERF = perfect, PRES = present, REL = relative complementizer, RL = relative marker. Numbers = noun class. A more phonetically transparent version of Lesotho orthography is used.

[2] Sesotho and most other Bantu languages have simple CV syllable structure. Coda consonants and clusters are not allowed. The only case of a complex onset is with the glide /w/ - e.g. *ngwana* 'child'. Children below the age of 3 sometimes have difficulties with this type of complex onset, omitting the /w/. Thus 'child' is produced as *nana* in early speech. For similar reasons, the passive morpheme is sometimes also omitted in early speech (e.g., *bonwa > bona* 'be seen') (Demuth, 1989).

The Sesotho construction that most closely approximates the English adjectival passive in (2a) is the neuter form in (3c). Note, however, that it differs morphologically, syntactically, and semantically from the passive in (3b) (cf. Doke & Mofokeng, 1985, p. 154). First, the neuter morpheme is *-eh-* (or *-ahal-*), and it infixes at the end of the verb stem *before* the perfect *-il-*, rather than after, as in the case of the passive. Second, it cannot occur with a *by*-phrase; this would be ungrammatical. This is consistent with the complete suppression of the external (logical subject) argument (cf. Hale & Keyser, 1993). Third, the neuter differs semantically from the passive in having an English *–able* interpretation (e.g., *rata* 'love', *ratwa* 'be loved', *rateha* 'be lovable'). It is therefore unlikely that these two constructions would be confused by the Sesotho learner, or used interchangeably. Adjective formation in Sesotho also differs from that of active and passive verbs, taking a distinctive form of double adjectival agreement (3d). Thus, unlike English, where there is potential ambiguity between a verbal passive (1a) and an adjectival passive (2a), Sesotho verbal and adjectival constructions are also morphologically and syntactically distinct. This means that passives with no *by*-phrase in Sesotho are never ambiguous with respect to their syntactic status; an agent is always implied. Kline and Demuth (2008) suggest that the lack of such ambiguity in Sesotho may make the syntax and semantics of passives more transparent, facilitating earlier acquisition.

(3a)	Ba-sadi ba-chwatl-il-e le-bone 2-women 2AGR-break-PERF-FV 7-lamp 'The women broke the lamp'	Active
(3b)	Le-bone$_i$ le-chwatl-il-w-e t_i (ke ba-sadi) 7-lamp 7AGR-break-PERF-PASS-FV (by 2-women) 'The lamp was broken (by the women)'	Passive
(3c)	Le-bone le-chwatl-eh-il-e (*ke ba-na) 7-lamp 7AGR-break-NEUT-PERF-FV 'The lamp is (in a state of being) broken (*by the children)	Neuter/stative
(3d)	Le-bone le-le-tala le-fihl-il-e 7-lamp 7ADJ-7ADJ-green 7AGR-arrive-PERF-FV 'The new lamp arrived'	Adjective

The original study that investigated the amount of passive input Sesotho-speaking children hear examined only a small sample of 4 h of child-directed speech (Demuth, 1989). Kline and Demuth (2008) therefore conducted a comprehensive study of all 98 h of the Sesotho Corpus (Demuth, 1992; cf. CHILDES database (MacWhinney, 2000)), providing a more realistic estimate of passive frequency in Sesotho child-directed speech. They found that Sesotho caregivers used passives in 2.7% of their utterances, 10 times more frequently than reported for English child-directed speech (Gordon & Chafetz, 1990). Furthermore, 60% of the passive constructions Sesotho-speaking children heard contained a *by*-phrase, compared with only 4% for English (Gordon & Chafetz, 1990). This difference in the use of a *by*-phrase is partly due to the fact that, although Sesotho permits questioning objects in situ, questioning subjects in situ is ungrammatical (except as an clarification/echo question) (4a). This is due to topicality constraints on subjects (see Bresnan and Mchombo (1987) for further discussion). As a result, logical subjects can only be questioned from the *by*-phrase of a passive (4b), or as part of a cleft/relative construction (4c).

(4a)	*Mang o-pheh-a di-jo? 1who 1AGR-cook-FV 8-food 'Who is cooking (the) food?'	*In situ subject question
(4b)	Di-jo di-pheh-w-a ke mang? 8-food 8AGR-cook-PASS-FV by who 'The food is being cooked by whom?'	Passive question
(4c)	Ke mang ea-pheh-a-ng di-jo? CP 1who 1REL/AGR-cook-FV-RL 8-food 'It is who that is cooking (the) food?'	Cleft/relative question

Although both forms are used to question subjects, the passive is the unmarked form, whereas the cleft/relative is used in cases of contrastive focus. Much of child-directed speech involves (subject) questions. As a result, the majority of the passives Sesotho-speaking children hear contain a *by*-phrase, providing ample evidence for assigning appropriate thematic roles.

English-speaking children tend to produce short (truncated) passives with no *by*-phrase. This led researchers to suggest that English-speaking children's short passives are really adjectival passives like that in (2a) (e.g., Horgan, 1978). Although young Sesotho-speaking children do not produce as many questions or *by*-phrases as their caregivers, corpus analysis found that they use *by*-phrases in 21% of their passives – much more than the 4% reported for English-speaking *adults* (Kline & Demuth, 2008). Nonetheless, the majority of these children's passives are produced in truncated form (5a) rather than full form with a *by*-phrase (5b). However, even in the short form the meaning is still that of a verbal passive. Thus, the Sesotho sentence in (5a) is unambiguously verbal, and cannot be confused with a stative/completive event. This is shown, in part, by the use of the present tense in (5a), as well as the fact that the morphology is unambiguously that of a passive verb (3b)

(5a)	Mo-shanyana o-a-met-w-a 1-boy 1AGR-PRES-kiss-PASS-FV 'The boy is being kissed'	Short/truncated passive
(5b)	Mo-shanyana o-met-w-a ke ngwanana 1-boy 1AGR-kiss-PASS-FV by 1girl 'The boy is being kissed by the girl'	Long/full passive

[3] In the short form of the passive (5a) the focus is on the verb, which is final in the verb phrase. Note that the present tense marker 'a' appears in this context (Doke & Mofokeng, 1985). The same occurs in the short form of the active in (b) below:

(a)	Mo-shanyana o-a-mo-met-a 1-boy 1AGR-PRES-OBJ-kiss-FV 'The boy is kissing her'	Short active
(b)	Mo-shanyana o-met-a ngwanana 1-boy 1AGR-kiss-FV 1girl 'The boy is kissing the girl'	Long/full active

This is part of a more general phenomenon found in many Bantu languages, often referred to as a conjoint/disjoint distinction (cf. Buell, 2009; Creissels, 1996; Meeussen, 1959).

Thus, Sesotho-speaking children have ample, morphologically unambiguous exposure to full verbal passives from an early age. This led Kline and Demuth (2008) to suggest that learning the passive in a language like Sesotho might be facilitated by structural priming (Bock, 1986). For example, results from the syntactic processing literature show that adults have a tendency to use the same syntactic constructions (including passives) they have previously heard in the discourse (Bock & Loebell, 1990). If so, one would predict that Sesotho-speaking 3-year-olds, who hear many more passives than their English-speaking peers, and show evidence of syntactic knowledge of the passive in their spontaneous speech, should perform well on passive comprehension and production tasks, and easily generalize the passive to novel verbs.

1.2. Goals and predictions

The goal of this study was to test Sesotho-speaking children's knowledge of the passive. To this end we conducted a series of experiments using different methods: a comprehension/picture identification task (Experiment 1), an elicited production/picture description task (Experiment 2), and a novel verb generalization/syntactic priming task involving the active/passive alternation (Experiment 3). Since previous studies had reported that children spontaneously produced passives by around 2;8 (Demuth, 1989), the target population for these experimental studies was 3. We predicted that, by this age, Sesotho-speaking children would show robust comprehension and production of the passive across a range of verb types, and be able to easily generalize the passive to novel verbs that they have been familiarized with only in the active. Such findings would provide strong evidence that children learning this language have robust early knowledge of passive syntax, and that these representations are sufficiently abstract to apply to verbs they have never heard before.

2. Method

All the experiments were run with 3-year-olds drawn from 13 monolingual pre-schools/day-care centers in Lesotho, in southern Africa. These were located in and around the lowland towns of Maseru and Roma. Upper class families tend to place their children in bilingual and/or English medium pre-schools. Most of the subjects who participated in this study therefore came from lower to lower/middle class monolingual Sesotho-speaking homes, and had little experience with looking at picture books. As a result, many children were unable to sit still and attend to some of the tasks. Testing was carried out by a native speaker of Sesotho (the second or third author and assistants) with one child at a time in a quiet room on the school premises. Audio/video recordings were then downloaded onto a computer for later coding and reliability checks. Each child was rewarded with an orange at the end of the testing session. Upon completion of the experiments each school was given three pre-school books to share with the class.

2.1. Experiment 1: comprehension/picture identification task

Previous studies have found that young English-speaking children encounter particular difficulty comprehending non-actional verbs in passive constructions (Gordon & Chafetz, 1990; Hirsch & Wexler, 2006; Maratsos et al., 1985). That is, concrete picturable actions like *hug* or *hit* are easier to comprehend in the passive than are non-actional verbs such as *see* or *know*. This difficulty has been presented as one source of evidence that 4-year-old English-speaking children do not yet have adult-like passive representations (Fox & Grodzinsky, 1998; Maratsos et al., 1985). However, O'Brien, Grolla, and Lillo-Martin (2006) suggested that these findings were an artifact of the task. They showed that 3;6-year-old English-speaking children perform well on comprehension tasks with non-actional passives when there is a choice of agent *by*-phrase (i.e. multiple possible agents in the scene). Thus, when the experimental paradigm is felicitous, even English-speaking children comprehend non-actional passives. This suggests that, under appropriate experimental conditions, 3-year-old Sesotho-speaking children should show comprehension of non-actional passives. However, non-actional passives account for only 4–5% of passive input in both English and Sesotho (Kline & Demuth, 2008). Furthermore, non-actional passives are more difficult to represent and comprehend in a static picture. Thus, we might expect Sesotho-speaking children's performance on non-actional passives to be somewhat lower than that on actional passives.

The primary goal of Experiment 1 was to investigate 3-year-old Sesotho-speaking children's comprehension of active and passive verbs using a picture identification task. Since active verbs are much more frequent than passive verbs in the input that children hear, we expected comprehension performance on active sentences to be higher than on passive sentences. Given the reported difficulties of comprehending non-actional passives in English, the second goal of this study was to investigate children's comprehension of actional vs. non-actional passives. Here again we anticipated that children's performance might be lower on non-actional verbs in Sesotho, due either to the lower frequency of occurrence of these verbs in the passive and/or lower grammatical competence with non-actional verbs. However, given Sesotho-speaking children's reported knowledge of the passive we also expected performance on non-actional passives to be above chance. Finally, we compared the children's performance with that of adults. We expected adults to be at ceiling on all conditions given their higher level of syntactic knowledge and their greater ability to attend to the task. If, however, they showed a difference in performance between actional and non-actional verbs, this would provide support for the position that lower child performance on these verbs might be due to non-linguistic factors.

2.1.1. Participants

The child participants included 16 Sesotho-speaking children (eight girls, eight boys) between the ages of 2;11 and 3;5 (mean = 3;1). Subjects were recruited from six pre-schools/day-care facilities. An additional 11 children

were excluded from the study due to a lack of ability to sit still, listen, and reliably point to the correct participant (boy, girl, mother) during the warm-up for the picture identification task. A further four children who passed the initial screening were excluded from the final analysis since they were at chance on the control condition (active actional verbs) (e.g., *Point to the picture where the boy is carrying the girl*).

Adults (10 participants) were also tested in this experiment (five female, five male) aged 25–60 (mean age 41). Participants were monolingual Sesotho-speaking cleaning and gardening staff at the National University of Lesotho, some of whom were not literate. This provided an appropriate adult counterpart to the children who were not accustomed to looking at picture books.

2.1.2. Stimuli

The picture stimuli included 12 sets of two pictures, each containing a boy, a girl, and a mother. The pictures involved reversible scenes between two human participants. The stimuli were constructed to avoid any obvious semantic biases (e.g., *Point to the picture where the boy is fastening the mother* vs. *Point to the picture where the boy is being fastened by the mother* – see Appendix A). Half of the verb stimuli were actional verbs (6), and half were non-actional verbs (6), for a total of 24 stimulus items (12 verbs, each heard twice, once in the active and once in the passive). All were familiar verbs, as determined by examining adult and child verb use in the Sesotho Corpus (Demuth, 1992; Kline & Demuth, 2008). The stimulus verbs used are listed in (6).

(6) Verb stimuli used in Experiment 1

Actional		Non-actional	
fasa	'fasten/tie'	*bona*	'see'
kuta	'cut hair'	*batla*	'look for'
hlakola	'wipe'	*leleka*	'expel'
loma	'bite'	*rata*	'like'
pepa	'carry on back'	*siya*	'leave behind'
ruta	'teach'	*thusa*	'help'

2.1.3. Procedure

Participants were invited into a quiet room to look at a picture book with the experimenter. During the warm-up task, participants were first asked to point to the boy, point to the girl, and point to the mother. If they could successfully pass this part of the warm-up, they were then asked to point to the picture where the boy was carrying the girl (or vice versa). If they were wrong, they were told to look carefully again, listen carefully to what was said, and then point to the correct picture. The warm-up task included two sets of picture trials, with questions asked in both the passive and the active. The warm-up took up to 10 min for the children and much less for the adults. Those participants who were able to pass the warm-up task then proceeded to the test session. Each of the 12 stimulus verb/picture sets was presented twice, once with an active prompt, and once with a passive prompt (e.g., 'Point to the picture where the boy is carrying the girl'; 'Point to the picture where the girl is being carried by the boy'). All stimulus items were presented in the present tense to avoid any possible construal as a completed state. Item presentation was also blocked, with all verbs being tested in one condition (active or passive) in the first block, then in the other condition in the second block. Verb types and passive/active conditions were pseudo-randomized and counter-balanced across subjects and blocks, as was side of presentation. Participants were praised each time they pointed to a picture, regardless of whether they were correct.

This was a challenging task for the children; they had to listen carefully to what was said, hold this in memory, look at both pictures, and then finally determine the best match between what they had heard and what they saw. This took a long time for these 3-year-olds not used to looking at picture books and processing what they heard at the same time. Listening and pointing to 12 stimulus items (half of the experiment) took about 10 min. Thus, completing the warm-up task plus half of the stimuli took about 20 min for some children. In such cases the session was terminated and resumed the next day. The adults completed warm-up and test in approximately 10 min. All child sessions were recorded both online and video/audio-taped with a Sony Ecm-ms907 microphone and a Canon HDV HV20 video camera for later coding. Twelve percent of the data (two participants) was recoded by a second transcriber, for a reliability of 100%. Adult sessions were coded online by two observers, with a reliability of 99%.

2.1.4. Results

A two-way repeated-measures ANOVA was used to evaluate whether children's comprehension ability on active/passive prompts interacted with the actional/non-actional status of the verb. The dependent variable was percent correct picture choice. The within-subject factors were two levels of prompts (active, passive), and two levels of verb type (actional, non-actional). To equalize the variance, percent correct production was transformed to arcsine values (Studebaker, 1985) before this and all following statistical analysis. As expected, children were significantly better at comprehending pictures of active verbs (82%) compared to passive verbs (73%), $F(1, 15) = 17.344$, $p = .001$. The effect of verb type was also marginally significant, with better performance on actional verbs (82%) compared to non-actional verbs (73%), $F(1, 15) = 4.009$, $p = .064$. However, the interaction between active/passive and verb type was not significant, $F(1, 15) = .044$, $p = .836$.

Additional analysis using paired *t*-tests showed that, although children's performance was higher on comprehending actional (77%) compared to non-actional (69%) *passives*, this difference was not significant, $t(15) = -1.23$, $p = .238$. Furthermore, a one-sample *t*-test showed that children's comprehension of non-actional passives was significantly above chance, $t(15) = 3.913$, $p < .001$. The child results therefore confirmed our expectation that Sesotho-speaking 3-year-olds can comprehend both actional and non-actional passives.

There were, however, some item effects. As indicated by the lower overall performance on non-actional verbs, chil-

dren appeared to have difficulty determining from these static pictures who was doing what to whom. The non-actional verb *thusa* 'help' (59% accuracy) was particularly problematic as it was not entirely clear to the children if the mother was helping the boy or vice versa. Thus, some of children's lower performance on the non-actional verbs may have been due to the problematic depiction of non-actional verbs. If so, we might expect to see a similar effect with adults.

A two-way repeated-measures ANOVA was used to examine the effects of active/passive prompts and the actional/non-actional status of the verb on adults' comprehension ability. The dependent variable was percent correct production. The within-subject factors were two levels of prompts (active, passive), and two levels of verb type (actional, non-actional). The results showed no difference on adult performance between active (94%) and passive (94%) conditions, $F(1, 9) = 0$, $p = 1.000$. Interestingly, however, comprehension was significantly better on actional (99%) compared to non-actional (89%) verbs, $F(1, 9) = 10.326$, $p = .011$, with no active/passive × actional/non-actional interaction, $F(1, 9) = .574$, $p = .468$. Adult performance therefore also confirmed that the pictures for some of the non-actional verbs were not as clear as those for the actional verbs. Especially problematic were *thusa* 'help' and *bona* 'see', constituting 10 of the 14 adult comprehension errors.

Fig. 1 provides a comparison of child and adult performance. Correct picture choice is plotted on the *y*-axis, and condition (active, passive) is plotted on the *x*-axis, with error bars indicating standard error. Unpaired *t*-tests showed that the 3-year-olds performed at a lower overall level than the adults on both actives and passives (actives: $t(24) = -3.561$, $p = .002$, passives: $t(24) = -6.198$, $p < .001$). Recall also that each of the repeated-measures ANOVA for children and adults demonstrated that both groups showed lower performance on the non-actional verbs compared to actional verbs. We suspect that some of the lower performance on non-actional verbs often reported in the acquisition literature may therefore be due to experimental artifact (less than ideal depiction) rather than due to incomplete syntactic competence (cf. Messenger, Branigan, McLean, and Sorace (2009) for discussion of similar effects with English-speaking 4-year-olds).

In summary, children's comprehension of full actives and passives was not as good as that of adults in this experiment. Unlike the adults, the children tended to quickly encode the first argument they heard (e.g., the boy) as the agent, not waiting until they heard the verb (which might contain passive morphology) or the object vs. *by*-phrase (where thematic roles are clarified). This is consistent with findings that, by 21 months, children typically encode subjects as agents (Gertner, Fisher, & Eisengart, 2006), and tend to map information in the visual scene onto the speech stream as soon as it becomes available (cf. Knoeferle, Crocker, Pickering, & Scheepers, 2005; McRae, Spivey-Knowlton, & Tanenhaus, 1998; Trueswell & Gleitman, 2007). The experimenter typically had to tell the children to wait until they heard the entire sentence, then look at both pictures, then listen again and point to the right one. Both children's processing and memory loads were being taxed, especially since the majority of these children had little experience looking at picture books, either at home or at school. Finally, given that the probability of hearing an active sentence is much higher than that of hearing a passive sentence, even in Sesotho, the tendency to quickly map subjects to agents is understandable. Interestingly, however, adults showed a similar pattern of verb errors as those for children, performing worse on non-actional compared to actional verbs. This suggests that static pictures are not the best means for testing children's understanding of non-actional verbs, be they in the passive or active.

2.1.5. Discussion

The goal of Experiment 1 was to investigate Sesotho-speaking children's ability to comprehend actional and non-actional passives. Previous reports have shown that 3–4-year-old English-speaking children perform poorly on non-actional full passives (Hirsch & Wexler, 2006; O'Brien, Grolla, & Lillo-Martin, 2006). However, the latter study also showed that when felicitous conditions for including a *by*-phrase were present in the form of a 3rd participant, 3;6-year-olds' performance was much improved. This suggests that even 3;6-year-old English-speaking children have some comprehension of non-actional passives.

As mentioned earlier, this was a challenging task for these 3-year-olds: they had to look at both pictures, listen carefully to what was said, look at the pictures again, and then point to the one that matched what they heard. Recall that O'Brien et al. (2006) suggested that children's comprehension of passives in English was enhanced when there were several possible agents in the scene. However, children in the present task did not appear to use the third character in determining which picture to point to. This was probably due to the fact that, given a particular scene, the third character was observing in both pictures, and never a participant (see Experiment 3 for further discussion on this issue). Importantly, however, participants were above chance on the comprehension of both actional and non-actional passives. These results therefore confirm that Sesotho-speaking 3-year-olds can comprehend full passives, even with non-actional verbs. The next experiment explored these issues further, examining children's ability to produce full passives in appropriate discourse contexts.

2.2. Experiment 2: elicited production task

The primary purpose of Experiment 2 was to determine if 3-year-old Sesotho-speaking children could produce (full) passives given the picture of an actional verb with a patient-focused prompt (e.g., *What's happening to the boy?).* If so, this would provide further support for the position that they have the grammatical knowledge needed to form the passive. We also wanted to examine the possible influence of the type of action on the patient. Some researchers have suggested that passives that negatively affect the patient in Japanese (e.g., adversity passives such as *hit*) do not involve movement

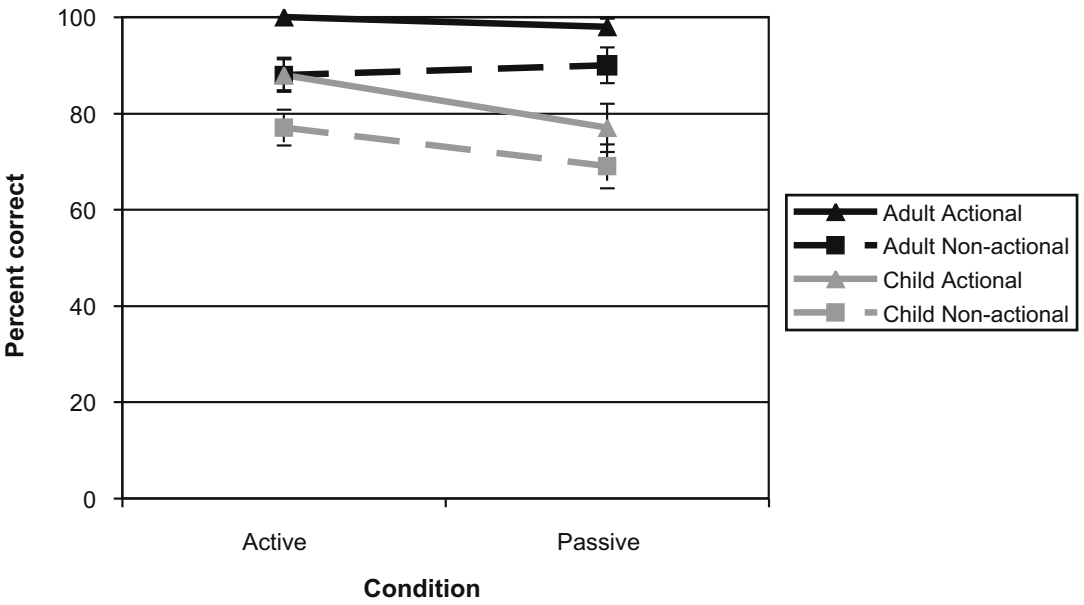

Fig. 1. Child and adult percent correct picture selection (and SE) on the active/passive comprehension task with actional and non-actional verbs (chance = 50%).

(Miyagawa, 1989), leading to earlier acquisition (Sugisaki, 1999). Although, Sesotho exhibits no morphological or syntactic distinction between neutrally and negatively affected patient passives, we nonetheless constructed the stimuli so that half had a neutrally affected patient and half had a negatively affected patient. If the 'adversely affected' patients were more likely to be passivized, this might provide some support for the position that such passives have a privileged status in children's grammars. Finally, we wanted to know if these children could produce full passives in this task. Since there is no ambiguity between truncated passive verbs and adjectives in Sesotho, the inclusion of the *by*-phrase is not critical for evaluating that a construction is a passive. However, inclusion of the *by*-phrase, at least as often as found in spontaneous speech (21%), would provide additional evidence that Sesotho-speaking 3-year-olds can use such constructions, even if they do not do so all the time.

2.2.1. Participants

The participants for this experiment included 16 monolingual Sesotho-speaking children (10 girls, 6 boys) between the ages of 2;11 and 3;5 (mean age 3;2). Subjects were recruited from eight pre-schools/day-care facilities in and around the greater Maseru and Roma area. An additional 14 children were not included in the experiment due to an inability to sit still and attend to the task. This was determined by an inconsistent ability to identify the boy, the girl and the mother in the picture, a refusal to speak, or an inability to appropriately answer an active focus question ('What's the girl doing?') during the 2-item warm-up task.

2.2.2. Stimuli

The stimuli included 12 actional verbs. Each verb was depicted with all three participants (boy, girl, mother) (see Appendix B), and tested with both an agent- and patient-focused question to elicit active and passive answers respectively. Half of the stimulus verbs entailed a neutrally affected patient, and half entailed a negatively affected patient, as shown in (7). Since the passive of these verbs is syntactically and morphologically identical, we anticipated no difference in performance across these two verb types. Finally, as in Experiment 1, all stimulus questions were spoken in the present tense, thereby avoiding possible construal as completed states.

(7) Verb stimuli used in Experiment 2

Neutral affect		Negative affect	
bitsa	'call'	*hlaba*	'stab'
fasa	'fasten/tie'	*loma*	'bite'
kuta	'cut hair'	*ngwapa*	'scratch'
meta	'kiss'	*raha*	'kick'
ruta	'teach'	*shapa*	'lash'
tshwara	'take'	*tsipa*	'pinch'

2.2.3. Procedure and scoring

Participants were invited into a quiet room on the school premises to look at a picture book with the experimenter. During the warm-up task, they were first asked to point to the boy, point to the girl, and point to the mother. They were then told what the picture showed (e.g., *Moo ke ho-meta* 'This is kissing'), and asked a question about either the agent or patient. For example, in a picture of the girl kissing the boy with the mother watching, participants

would be asked an agent-focused question (*Ngwanana o-etsa-ng?* 'What's the girl doing?') or the patient-focused question (*Ho-etsahalang ho moshanyana?* 'What's happening to the boy'). If the participant answered with the correctly focused response, it was counted as correct. If, for example, they answered the patient-focused question with an agentive 'The girl is hitting him', this was counted as an error. Interestingly, children never omitted the passive morpheme in this task. This was probably due to the fact that these were high-frequency familiar verbs, and that most of the children were at least 3 years of age and no longer had problems with complex syllable structures.

If participants answered the agent-focused question with a pronominal object (short form) (*Ngwanana o-a-mo-meta* 'The girl is kissing him') they were encouraged to 'Say it all', thereby including the lexical object (full form) (*Ngwanana o-meta moshanyana* 'The girl is kissing the boy'). Likewise, if children answered the patient-focused question with a short (truncated) passive (*Moshanyana o-a-metwa* 'The boy's being kissed'), they were encouraged to use the full passive with the *by*-phrase (*Moshanyana o-metwa ke ngwanana* 'The boy's being kissed by the girl'). Since Sesotho is a null subject language, such a production was accepted as a well-formed answer (e.g., *O-metwa ke ngwanana* 'He's being kissed by the girl'). To encourage felicitous production of the full active and passive, the child was instructed to tell a second experimenter, who could not see the book, what was going on in the picture.

The warm-up task included 2 pictures, for each of which the children were questioned with each prompt. This was repeated once if necessary to ensure that the children understood the task. Those who passed the warm-up task then proceeded to the test. Verb types and agent- vs. patient-focused conditions were pseudo-randomized and counter-balanced across subjects. Participants were praised each time they responded, regardless of whether they were correct or not. The warm-up took approximately 5 min, and the test took 15 min or less. This was still a challenging task, requiring the child to listen to the question and then produce a sentence. However, it involved fewer processing and memory demands than did Experiment 1, since only one picture was involved. All testing was completed in one session. Some children enjoyed this task, giggling at some of the pictures, and occasionally producing a spontaneous passive for a new picture before any question was asked.

All participant responses were audio recorded using an Olympus DM-10 recorder and Sony Ecm-ms907 microphone. The recordings were then downloaded onto a computer and coded for active or passive responses to the question prompts. Any passives that were produced only in the short (truncated) form were also noted. Twelve percent of the data (two participants) was recoded by a second transcriber, for a reliability of 98%. The first author listened to the files again, resolving the few disparities.

2.2.4. Results

Overall, children's performance was at ceiling, with 95% of agent prompts resulting in the production of an active verb, and 98% of patient prompts resulting in the production of a passive verb. A two-way repeated-measures ANOVA, with two levels of prompts (agent-focused, patient-focused) and two levels of verb type (adversive, non-adversive) as the within-subject factors, found that there was no difference in performance on agent prompts vs. patient prompts conditions, $F(1, 15) = 2.402$, $p = .142$. There was also no difference in performance as a function of adversive (97%) and non-adversive (96%) verb type, $F(1, 15) = .477$, $p = .50$, and no interaction, $F(1, 15) = .353$, $p = .561$. Thus, children were equally good at constructing both actives and passives regardless of the verb semantics. This indicates that 3-year-old Sesotho-speaking children have both the syntactic competence needed to produce the passive as well as the discourse competence to know when it is appropriate.

Recall that in spontaneous speech, only 21% of children's passives are produced in the full form with a *by*-phrase (Kline & Demuth, 2008). We therefore anticipated that participants would be more likely to produce full actives than full passives. Paired *t*-tests showed that this was the case, $t(15) = 6.277$, $p < .001$ (full actives: 77%, full passives: 25%). Thus, passive truncation rates in this task were similar to those reported for spontaneous speech. A paired *t*-test confirmed again that there was no effect of verb type on passive truncations, $t(15) = -1.231$, $p = .237$. On the second pass, when children were encouraged to tell all to the experimenter who could not see what was happening in the picture, the production of full forms increased to 91% in the active recasts and 71% in the passives recasts. This improvement is consistent with the fact that there was a significant correlation between the order in which an item was presented in the experiment and the proportion of full forms produced, $r(22) = .572$, $p = .003$. This suggests that as the experiment progressed, children gradually learned that they were expected to produce full forms, and increasingly did so. Alternatively (or in addition), the increase in full forms over the course of the experiment could have been due to the effects of syntactic priming (cf. Bock, 1986; Thothathiri & Snedeker, 2008).

2.2.5. Discussion

The results from this experiment show that Sesotho-speaking 3-year-olds are sensitive to the discourse focus of prompting situations, providing an appropriate active or passive response. Furthermore, their performance was equally good on verbs that neutrally or negatively affected the patient (e.g., *meta* 'kiss' vs. *loma* 'bite'). This confirms that these children have access to passive syntactic structure, regardless of the semantics of the verb. They were also able to produce the passive with a *by*-phrase, either spontaneously, and/or when directed to report the full scene to a non-observer. Thus, the results from both Experiments 1 and 2 indicate that Sesotho-speaking 3-year-olds have good comprehension and production of the passive. However, some might argue that the best test of abstract syntactic knowledge is to examine children's ability to generalize passive structure to novel verbs (Fisher, 2002; Tomasello, 2000). We turn to this in Experiment 3.

2.3. Experiment 3: syntactic generalization with novel verbs

Perhaps the best assessment of children's syntactic knowledge is to demonstrate their ability to use a novel verb in a new syntactic frame. This has typically been taken as evidence that children's grammatical representations are abstract (e.g., Conwell & Demuth, 2007; Fisher, 2002; Naigles, Bavin, & Smith-Leonard, 2005) rather than specific to a certain verb or construction (e.g., Tomasello, 1992). We also wanted to explore the possibility that syntactic priming would facilitate this process. Recall that adults tend to use the same syntactic constructions they have previously heard in the discourse (Bock & Loebell, 1990), and similar reports are emerging from the acquisition literature (e.g., Thothathiri & Snedeker, 2008; Vasilyeva et al., 2006). Note, however, that syntactic priming is only effective if the syntactic competence for a particular construction is already in place; if speakers cannot comprehend a particular construction, they will be unlikely to actually use it in appropriate discourse contexts.

The goal of Experiment 3 was therefore to test Sesotho-speaking children's ability to generalize novel verbs that were familiarized one syntactic frame (active, passive) to the other syntactic frame (passive, active) given an agent-focused active prompt or a patient-focused passive prompt, respectively. Given previous findings from children's spontaneous use of Sesotho passives (Demuth, 1989), we expected that 3-year-olds would have no problem with this task. Such a result would provide further evidence that Sesotho-speaking children's early grammars are abstract enough to generalize across verbs in the active/passive alternation.

2.3.1. Participants

The participants included 16 monolingual Sesotho-speaking children (9 girls, 7 boys) between the ages of 2;11 and 3;5 (mean = 3;2). An additional six children were not included in the experiment due to a refusal to repeat the novel verb, with one child only wanting to play with the toys. Subjects were recruited from six pre-schools/day-care facilities in and around the greater Maseru and Roma area. This was the easiest task employed in this study, with lower overall processing demands than in Experiments 1 and 2, probably due to the fact that this task involved real-world manipulation of objects rather than looking at pictures on a page. It also involved different actors and affected patients, making answers to agent-focused and patient-focused prompt questions both felicitous and natural.

2.3.2. Stimuli

The stimuli included two novel Sesotho verbs (*tana*, *pipa*). Each verb was paired with a novel 'toy' and two bean-bag dolls (a boy and a girl). One toy was a 'see-saw', where the agent sat down on one end, causing the patient on the other end to slide down and/or fall off. The other toy was a 'trap door', where the agent pulled the door open and the patient fell through. Pictures of both toys and dolls are presented in the Appendix C.

2.3.3. Procedure and scoring

Participants were invited into a quiet room on the pre-school premises to play with the toys. The experimenter taught the child the first novel verb (e.g., *Moo ke ho-pipa* 'This is to Verb') and asked the child to repeat it. The experimenter then showed the child how the novel toys worked, modeling each verb eight times in only the target frame. For example, a verb modeled in the active frame would be used in the following way: 'Now look! The boy is Verb-ing the girl. Look, he's Verb-ing the girl again. Now look – this time the girl is Verb-ing the boy. Let's do it again. Look, the girl is Verb-ing the boy. Now I'll do it. Look, I'm Verb-ing the girl. Do you want to do it now? Look, you're Verb-ing the girl!', etc. Once the first novel verb had been modeled eight times in the active frame, that toy was put away and the second novel verb and toy were introduced, and modeled eight times in the passive. In the case of a passive model, the *by*-phrase was always included (e.g., 'Look, now the boy is being Verb-ed by the girl'). All verbs were again modeled in the present tense to avoid a stative interpretation. Familiarization order and pairing of toy and verb were pseudo-randomized across subjects.

After each novel verb was modeled eight times in its familiarization frame, the experimenter returned to the first toy, reminding the child of the novel verb (*U-a-hopola ke eng moo? Ke ho-pipa* 'Do you remember what this is? It's to Verb'). The child was then encouraged to manipulate the toy using different patients and agents (boy and girl puppet, self) while answering the experimenter's questions. For verbs modeled in the active, the experimenter asked eight patient-focused passive questions (e.g., *Ngwanana o-etsuwang*? 'What is being done to the girl?') in an attempt to elicit a passive answer. If the verb had a passive sentence frame and the passive morpheme on the verb, it was counted as a passive generalization. Only one child appeared to have problems with the passive morpheme, resulting in four forms that looked like an active verb. These were scored as non-generalizations. For verbs modeled in the passive, the experimenter asked eight agent-focused active questions (e.g., *Ngwanana o-etsang*? 'What is the girl doing?') in an attempt to elicit an active answer. This again involved all actors (boy, girl, child, experimental), as in the familiarization phrase. The occasional use of the passive morpheme in this condition was also scored as a non-generalization. Note the subtle difference in the two question prompts, marked only by the presence or absence of the passive morpheme. If participants were not aware of the passive, and the mapping between passive syntax and thematic roles, one would expect poor performance (i.e., active answers) on the patient-focused prompts.

Verb types and patient- vs. agent-focused conditions were randomized and counter-balanced across subjects. Participants were praised each time they responded, regardless of whether their answers included (full) actives/passives or not. In cases where the verb was not generalized to the alternate frame, the experimenter went onto the next question prompt. In cases where the verb was generalized but produced in the short form, the child was given positive feedback and told 'Now say it all', resulting in an average of 17 total prompts per child (272 total trials). Since the dolls participated as both agents and patients throughout the

task, and experimenter and child were also agents, this provided a natural context for including the *by*-phrase for the passive. This was a relatively easy task that placed few processing and memory demands on the child. Training and test each took approximately 10 min, for a total of 20 min, with all testing completed in one session for all subjects.

Participant responses were recorded using an Olympus DM-10 recorder and Sony Ecm-ms907 microphone. The recordings were then downloaded onto the computer and coded for active or passive responses to the question prompts. Twelve percent of the data (two participants) was recoded by a second transcriber, for a reliability of 99%.

2.3.4. Results

The results showed that *all* 16 participants successfully generalized both novel verbs on almost all of the prompt question trials, with 99% generalization from passive familiarization to the active frame, and 95% generalization from the active familiarization to the passive frame. A paired *t*-test showed that there was no difference between generalization to active vs. passive structures, $t(15) = 1.072$, $p = .301$. Of the successful generalizations to active structure, 80% were produced in full form with a lexical object, the remainder being pronominalized (see Footnote 3, example (a)). Of the successful generalizations to passive structure, 65% were produced with a *by*-phrase. This was a much higher rate of *by*-phrase use than that found in Experiment 2. This is likely due to the fact that multiple actors were involved in performing the novel actions, providing a context for the felicitous use of the *by*-phrase (experimenter, child, boy doll, girl doll) (cf. O'Brien et al. (2006)). Thus, all the participants in this study showed the ability to generalize the passive to verbs they had never heard used in this syntactic frame. That is, given a passive patient-focused prompt, all participants easily generalized the novel verb to the passive. The seven errors where an active was produced in response to a patient-focused prompt came from only two participants, aged 3;1 and 3;2. Thus, the majority of the participants in this study had no problem generalizing novel verbs to the passive, and the majority of these generalizations contained a *by*-phrase.

2.3.5. Discussion

In summary, the results from Experiment 3 showed that all 16 subjects were able to generalize novel verbs to both active and passive frames, with generalization occurring in 96% of the total prompts. This is an extremely high rate of generalization, with relatively little training, indicating that the active/passive alternation must be commonly heard and used by these Sesotho-speaking 3-year-olds, and that priming facilitates a similar response. Thus, as expected, these children had little difficulty with this task, manipulating the toys with ease while providing appropriate generalization answers to agent- and patient-focused questions, respectively. Furthermore, all but one child spontaneously included the *by*-phrase in the majority of their eight passive generalizations. This suggests that the nature of the task, with four participants all playing a role in the manipulation of real world toys, provided the discourse context for clarifying who was the agent and patient, thereby leading naturally to a high rate of *by*-phrase use. These results therefore provide a third source of evidence pointing to the fact that Sesotho-speaking 3-year-olds have abstract knowledge of passive syntax, alternating between passive and active constructions even with verbs that they have never heard before.

3. General discussion

Previous studies had reported that Sesotho-speaking children used syntactic passives by the age of 3 in spontaneous speech productions (Demuth, 1980, 1990). This was very interesting given that English-speaking children were reported to perform poorly on comprehension and production tasks involving the passive, even as late as 5 (e.g., Maratsos et al., 1985). Perhaps, then Sesotho-speaking children were only repeating memorized chunks of what they heard in child-directed speech. Alternatively, perhaps other factors facilitated the earlier learning of the passive in Sesotho, and hindered its acquisition in English. This called for further examination of Sesotho-speaking children's knowledge of the passive, using methods like those used in testing English-speaking children. The results of the studies presented here (comprehension, production, generalization to novel verbs) all demonstrate that, by the age of 3, Sesotho-speaking children have robust knowledge of the passive. This raises questions regarding the nature of the underlying mechanisms that have enabled this syntactic competence to develop so early.

Recall that Borer and Wexler (1987) suggest that the late acquisition of passives in English and other languages (around 5 years) was due to the late maturation of the linguistic principles (such as A-chain formation) involved with the syntax of passive formation. Note, however, that a maturational approach would predict similar timing of acquisition of the same types of constructions across languages. Given that the syntactic formation of the Sesotho passive is very similar to that of English, this means either that (1) the Maturational Hypothesis cannot be upheld, and/or that (2) the maturation of the requisite linguistic principles is in place by around the age of 3, and other (language-specific) factors must be considered to account for the later acquisition of the passive in languages like English. We suggest that at least the latter is the case. That is, even if certain maturational prerequisites are required, much of the differences in timing of acquisition of the passive (and other grammatical constructions) across languages will be due to language-specific aspects of the input. Further evidence for this position is discussed below.

Demuth (1989) suggested that the higher overall frequency of passive verbs in the input Sesotho-speaking children hear may aid the acquisition process. In addition, Sesotho-speaking caregivers use many more *by*-phrases with their passives than do English-speaking parents. This may help learners more easily map arguments onto appropriate thematic roles (Fox & Grodzinsky, 1998),

thereby facilitating the processing and acquisition of these structures. Finally, Sesotho does not have the syntactic homophony between adjectival and verbal passives that characterizes English (e.g., *The lamp was broken*). Thus, the syntax, semantics, *and* morphology of Sesotho passives are transparent, providing an ideal situation for learning the mapping between meaning and form. It is therefore not surprising that learning the passive in a language like Sesotho should be easier and occur earlier than in a language like English. This suggests that, all else being equal, we should expect the early acquisition of passives in other languages that have morphologically unambiguous passive formation processes and sufficient passive and *by*-phrase input. Evidence from the acquisition of the closely related Bantu language IsiZulu indicates that this is the case (Suzman, 1987, 1990). This is consistent with findings that young children easily learn regular, unambiguous morphology, such as the passive morpheme in Turkish (e.g., Aksu-Koç & Slobin, 1985; Slobin, 1973, 1985). What is different between Sesotho and Turkish, however, is that passive formation in Sesotho is a syntactic process involving changes in word order, similar to that of English. In contrast, the Turkish passive involves a lexical operation, maintaining the same word order.

Given the nature of the Sesotho passive input, with the high frequency of both passives and the *by*-phrase, Kline and Demuth (2008) propose that learning the passive in this language is further facilitated by structural priming effects that help strengthen developing syntactic representations, making it possible for learners to formulate abstract patterns from the individual exemplars they hear. For example, several studies have shown that both adults and children are sensitive to syntactic (structural) priming, where speakers tend to reuse syntactic constructions that have been previously heard in the discourse (Bock, 1986; Bock & Griffin, 2000; Ferreira & Bock, 2006; Huttenlocher et al., 2004; Pickering & Branigan, 1998; Thothathiri & Snedeker, 2008; Vasilyeva et al., 2006). For passive constructions in particular, de Villiers (1984) found that 3- and 4-year-olds were more likely to use both actional and non-actional passives when describing events if they had previously repeated these verbs in a passive syntactic frame, and Messenger et al. (2009) showed that this priming effect holds for both actives and passives. Brooks and Tomasello (1999) also showed that English-speaking 3;5-year-olds can generalize passive syntax to novel verbs after extensive exposure to that construction. This suggests that the late acquisition of passives in English and other languages may be due to children's lack of exposure to these constructions rather than due to deep syntactic/maturational constraints (e.g., Vasilyeva et al., 2006).

The findings presented in this study therefore hold important implications for understanding the nature of syntax acquisition more generally. Researchers of early phonological acquisition have demonstrated that the frequency with which certain segmental, syllabic, and word structures occur in the ambient language has large effects on the rate at which these are acquired (Anderson, Morgan, & White, 2003; Levelt, Schiller, & Levelt, 2000; Munson, Edwards, & Beckman, 2005). To address this issue, such studies require an examination of the input learners actually hear. With the increasing availability of online corpora of child-directed speech, it is now possible to pursue this type of research in the area of syntax as well. Supplied with a more detailed understanding of the frequency and distribution of different constructions in the input children hear, it should be possible to propose more focused theoretical questions about the nature of the learning process itself, including how much of what types of structured input are needed to construct a grammar. This in turn can be used to design experiments to examine the constraints on learning at different points in development, using real or artificial data (cf. Wonnacott, Newport, & Tanenhaus, 2008). The present study provides an illustration of how such findings can shed light on why a given syntactic structure may take longer to learn in one language than another. We suggest that there may be many other examples of crosslinguistic differences in the course of syntax acquisition that can be explained using similar techniques (e.g., recent work on crosslinguistic difference in the acquisition of articles – Demuth, Patrolia, Song, & Masapollo, in press).

4. Conclusion

This study provides converging evidence from multiple methods that 3-year-old Sesotho-speaking children have the syntactic knowledge needed to comprehend passive structure, produce passives in appropriate discourse contexts, and generalize passive syntax to novel verbs. This is consistent with previous reports that, by this age or before, Sesotho-speaking children use passives in appropriate discourse contexts in spontaneous speech (Demuth, 1989, 1990). We suspect that Sesotho-speaking children achieve early competence with passive syntax due to the relatively high use of the passive in child-directed speech, often accompanied with a *by*-phrase. This, plus the lack of morphological ambiguity with other structures, provides an ideal context for early learning of the passive. Recent studies have begun to show that, given sufficient exposure, even English-speaking 3;5–4-year-olds demonstrate abilities in the comprehension and production of passives. This suggests that, under appropriate conditions, the learning of syntactic structures can be enhanced. This in turn holds important implications for informing future models of language development.

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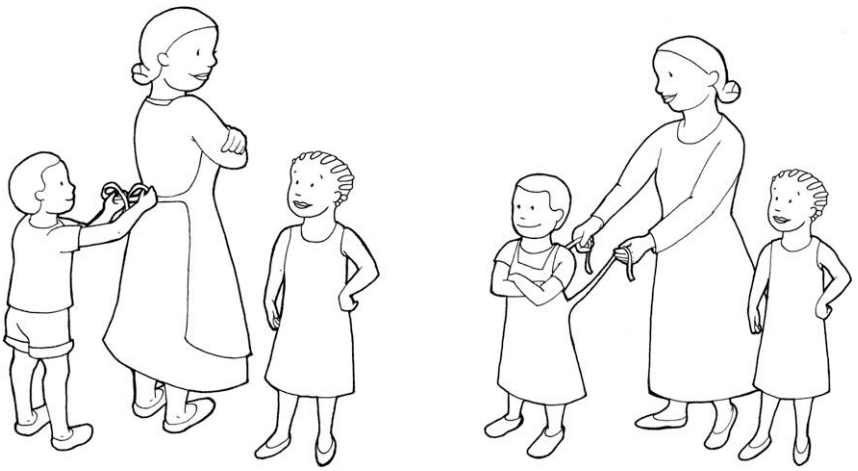
Appendix A

Sample of Pictures used in Experiment 1 (Comprehension).

Fasten/Tie



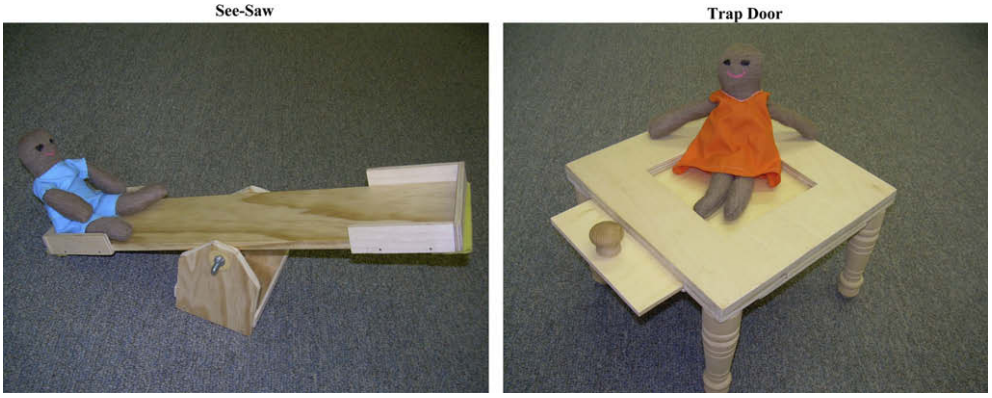
Appendix B

Sample of Pictures used in Experiment 2 (Elicited Production).

Kiss

Appendix C

Novel Toys used in Experiment 3 (Syntactic Productivity with Novel Verbs).



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