Cross-linguistic differences in talking about scenes

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ABSTRACT

Speakers of English and Tamil differ widely in which relational roles they overtly express with a verb. This study provides new information about how speakers of these languages differ in their descriptions of the same scenes and how explicit mention of roles and other scene elements vary with the properties of the scenes themselves. Specifically, we find that English speakers, who in normal speech rely more on explicit mention of verb arguments, in fact appear to be *more* affected by the pragmatic manipulations used in this study than Tamil speakers. Additionally, although the mention of scene items increases with development in both languages, Tamil-speaking children mention fewer items than do English-speaking children, showing that the children know the structure of the language to which they are exposed.

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1. Introduction

Verbs refer to relations, and as such, connect together elements such as actors, objects, and locations. How and whether these elements and roles that are associated with the verb are explicitly mentioned varies from language to language. English, for example, is a language that overtly labels many relational roles (e.g., in *I gave the book to John*, the actor, the object, and the recipient are all explicitly mentioned). Other languages allow omission of different roles, including omission of the subject (e.g., Spanish) and omission of both subject and object (e.g., Inuktitut– Allen, 2000; Allen and Schroder, 2003; Clancy, 1993, 1997). Tamil, a language of particular interest in the present paper, allows overt subject omission, but almost always mentions the actor by a marker on the verb, and often permits omission of other relational roles. For example, translational equivalents of I gave, I gave him, I gave the book, and I gave him the book are all perfectly acceptable in Tamil in contexts for which speakers of English would only produce the final example (*give* and the three mentioned roles).

Competence-based accounts suggest that universal and innate principles determine which relational roles must be mentioned and which may be omitted. These accounts explain such cross-linguistic phenomena through mechanisms such as variable settings of a parameter, which children set as they learn their specific language. Relevant to these issues, young children, regardless of the language they are learning, often omit the subject. Thus, it has been proposed that all children begin with the assumption that their language has a null subject. Children whose target language includes overt subjects are seen as having initially "mis-set" this parameter (e.g., Hyams, 1992; Hyams and Wexler, 1993; Jaeggli and Hyams, 1987). Alternatively, of course, under a different type of competence-based account, children's parameters could be properly set but

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some arguments of the verb could be omitted due to processing or performance limitations (Bloom, 1970, 1990, 1993; Gerken, 1991; Pinker, 1984; Valian, 1991; Valian and Eisenberg, 1996).

A second class of explanations for what sorts of arguments adults and children typically mention or omit are those called discourse-pragmatics accounts (see Guerriero, 2005, for an excellent review; Guerriero et al., 2006). Although there are various pragmatic accounts that differ in their own right, pragmatic accounts all attempt to explain what relational roles are mentioned or omitted in discourse via principles of pragmatics, and thus inherently include performance factors. A common theme to these explanations is that information that was previously mentioned, accessible from observation, salient, and/or predictable is less "costly" to process, remember, and keep "active" than other types of "new", "unknown", or "uncertain" information. In these accounts, the exchange of information between speaker and listener is a dynamic process, with previously known information more likely to be omitted than new and/or unexpected information (e.g., Chafe, 1994; Prince, 1981; Clark and Haviland, 1977).

Discourse-pragmatic theories propose constraints in terms of both syntactic form and pragmatic use. New information tends to occur lexically rather than pronominally (Allen, 2000; Campbell et al., 2000), either as subjects of intransitive verbs or objects of transitive verbs, but rarely as subjects of transitive verbs (DuBois, 1987). In addition, clauses tend to contain zero or one new argument, but rarely two new arguments (DuBois, 1987; Chafe, 1996). Children seem to be sensitive to these pragmatic principles of discourse, some as early as the one-word stage (Baker and Greenfield, 1988; Greenfield and Smith, 1976; Greenfield and Zukow, 1978). From this perspective, cross-linguistic differences in the explicit mention of the roles of a verb may reflect different rules of discourse about what is typical, what is available from context, and what is new.

Thus one critical question for the pragmatic and situated view of language use by speakers of different languages is not what *can* be said but what actually *is* said, and how that varies with the referential context, namely, the scene and the events about which the speaker is speaking (DuBois, 1987). For example, there is more that might be construed as pragmatically relevant in an eating scene with two kinds of food on the table versus an eating scene with just one kind of food. Likewise, there is more that is pragmatically relevant and worthy of mention when the item being eaten is a tree rather than an apple. The present experiment specifically examines the effect of manipulating these two factors—the number of items in the scene and the unexpectedness of objects— on the descriptions of scenes provided by speakers of two languages, English and Tamil, that differ in their overt expression of verbal arguments. The study does not examine the argument structure of specific utterances, per se, but rather how *explicit mention of roles and other scene elements vary with the properties of the scenes themselves* (leaving the issue of the speakers' understanding of the relevant knowledge of the listener to another study).

Adult speakers and young three- and four-year-old learners of the two languages were asked to describe scenes of action events inspired by verbs common to child language in both languages. The scenes were designed to include the same types of items typically mentioned with these verbs in both languages; that is, the same types of roles typically mentioned in English with these verbs could also be mentioned in Tamil with these verbs, although they could also be left unspecified in Tamil.

All participants were asked to describe two types of scenes, Base scenes and Altered scenes. Base scenes were common, everyday scenes in which the roles and elements were standard or typical. Altered scenes were modifications of the Base scenes which have elements added (e.g., a person running vs. a person running holding a pan) or typical elements replaced with atypical ones (e.g., sitting on a chair vs. sitting on a stuffed bear). That is, in the Altered scenes, we manipulated the components of an event in one of two ways to make them less ordinary or canonical events, and thus, perhaps, to have more pragmatically relevant components worthy of mention by speakers of both languages.

The experiment was specifically designed to address two questions. The first question is whether speakers of different languages (with very different options about what argument elements *must* be explicitly expressed) talk about scene elements in the same way, and whether they are affected in the same way by the manipulations of adding elements to the scene and replacing typical elements with atypical ones. By Hypothesis 1, languages with more mandatory expression of arguments have greater sensitivity to variations in scene elements when talking about those scenes. By this hypothesis, English speakers, who represent these events using obligatory argument expression, may be more attentive to them. Viewed from the perspective of a language like Tamil, which does not require explicit mention of argument structure, Hypothesis 1 suggests that the often non-expression of arguments means that Tamil speakers simply care less about the objects in a scene (that is, see them as less important than the verb-described relation). Alternatively, by Hypothesis 2, choice in the use of argument structure may lead to greater pragmatic sensitivity to scene elements. By this hypothesis, English speakers, because they nearly always express argument structure already, may not use changes in the explicit mention of scene elements as a pragmatic device. Tamil speakers, on the other hand, choose when and which arguments to express, and so on this hypothesis would be highly sensitive to scene elements and to variations.

The second question addressed by this paper concerns the development of these possible cross-language differences. Again, there are two competing alternatives: On competence-based accounts, context would play little to no role on what scene elements are mentioned, since argument structure is argued to be determined by universal and innate principles (Lidz et al., 2003); English- and Tamil-speaking children would therefore explicitly mention similar proportions of scene elements. Alternatively, on discourse-pragmatics accounts, languages that differ in structure may also emphasize different rules of discourse that children learn. If so, then English- and Tamil-speaking children might show language-specific patterns that resemble the adult speakers of their language.

2. Method

2.1. Participants

Ten adults and eight children (3;3 to 4;9) participated from each language group. The English-speaking participants were tested in a small Midwestern town and were all monolingual. The Tamil-speaking participants were tested in Chennai, Tamil Nadu, India, and were not strictly monolingual. Because India is a multilingual country, with over 20 recognized national languages, many speakers of Tamil also speak one or more additional languages, including English, the official language. In order to minimize exposure to English and other languages, Tamil participants included only those who spoke Tamil at home and were educated primarily in Tamil-medium schools, or were children of such adults. The participants in both countries were broadly sampled from the population and included adults from working and middle-class families with some college education, and children from these families.

2.2. Stimuli

Thirty-four target verbs were selected that were direct translation (by dictionary definition) in the two languages. Movies of approximately 2 s in duration were made based on these 34 target verbs, depicting actions common to both cultures, performed by actors dressed in ways that would look suitable to both Midwestern children and Indian children. All scenes occurred in the same location—a small studio room with off-white walls and flooring.

Thirty-four Base scenes were made which depicted an actor in the room. Depending upon the meaning of the verb, some scenes also included additional scene elements typically involved in contexts describable by that verb and appropriate to the common argument structure(s) of that verb. For example, when the target verb was *give*, in addition to the actor, there was also an object being transferred and an additional person receiving the object; when the target verb was *clap*, there was only the actor who clapped his hands and no additional objects or persons.

The 34 Base scenes were modified in one of two ways, namely Addition or Replacement, to create the 34 Altered scenes. Approximately two-thirds of the Altered scenes were made by adding additional persons or objects to the originating Base scene for that target verb (e.g., Base scene: a man blowing bubbles; Altered scene: a man blowing bubbles toward a woman); the remainder of the Altered scenes were created by replacing typical persons or objects in the Base scene with less typical ones (Base scene: a man sitting on a chair; Altered scene: a man sitting on a toy panda bear). Whereas the base scenes are ordinary and simple presentations of the basic event, the additions and alterations make these events somewhat out of the ordinary, more complex, and perhaps thus more worthy of being talked about. The additional and replaced scene elements were designed to be describable in many ways, as direct objects, indirect objects, locations, adjuncts, etc. Participants were free to describe the videos in any manner they chose. Example stills from Base and their corresponding Altered scenes are shown in Fig. 1. A brief description of the 68 Base and Altered scenes and their corresponding target verbs is provided in Appendix A.

2.3. Procedure

2.3.1. Adults
Adult participants were shown all 68 movies in one of two random, counterbalanced orders, and were asked to orally describe what happened in each video. Participants were told that the purpose of the task was to make a training video for
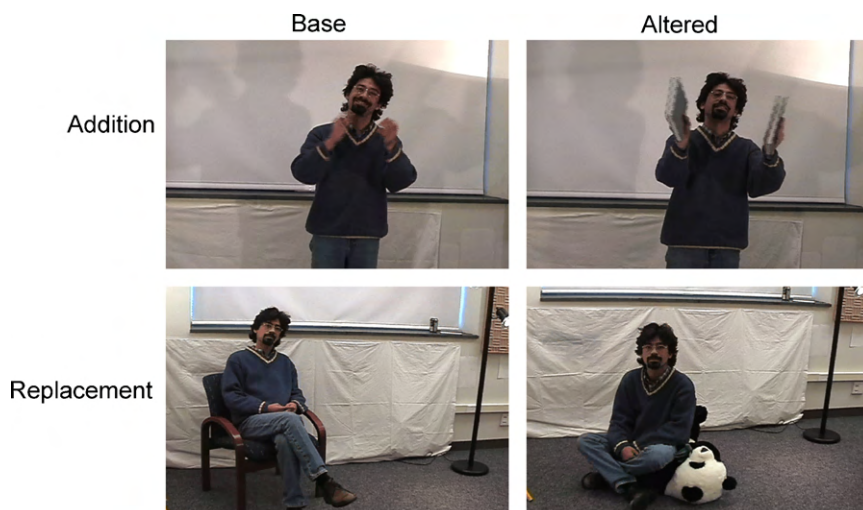

Fig. 1. Example movie stills, showing corresponding Base and Altered scene pairs for each of the two types of alterations – Addition and Replacement.

Table 1
Example trials provided to participants prior to test trials.

	Scene	Description given in English	Description given in Tamil
1	A man sitting at a table drinking an orange drink	The man is drinking a soda	soDa kuDikkaran 'soda he drinks'
2	A man holding a shirt up and a woman nodding	The man is showing her a shirt	avalakku shokkaa kaamikkaran 'to her shirt he shows'
3	Two people talking while sitting at a table	They're talking to each other	ava peesindirukka 'they are talking'

visitors from other countries to learn basic English or Tamil phrases, a context which should, if anything, encourage explicit mention of common arguments and minimize cross-linguistic differences. Participants' responses were audio taped and transcribed and coded afterwards by three coders.

Three pretest movies were shown and described by the experimenter, using descriptions appropriate to the basic structures of each language, to familiarize participants with the task, as listed in Table 1. These familiarization descriptions were intended to span a variety of linguistic structures (i.e., NP, NP NP, PP) and a variety of nouns and pronouns referring to the subject in English (e.g., "the man", "her", "they") and a variety of suffixes on the verb and separate pronouns referring to the subject in Tamil (e.g., 'VERB-he'; 'to her' + 'VERB-he'; 'they' + 'VERB-they'). Because of the different methods of expressing the (linguistic) subject in the two languages, mentions of subjects in participants' descriptions were not included in the counts of scene elements.

2.3.2. Children

The procedure for children was identical to that used with adults, with the exception that children were not shown the four *pushing* and *hitting* scenes, which might be interpreted as displaying inappropriate behavior. Adults saw 68 videos and children saw 64 videos in total.

2.4. Coding

Appendix A gives a description of each video clip. Participants in the study were free to describe the videos in any manner they chose. As with all complex scenes, a number of different verbs (e.g., *read*, *look*, *sit*, *listen*, *hold*, *think*), a number of different relational roles (e.g., actor, thing acted upon, thing transferred, source, goal, etc.), and a number of different syntactic relations (e.g., subject, direct object, indirect object, adjunct) could be offered to describe the same scene in both languages. The key empirical question is what speakers choose to talk about and not the syntactic properties of their utterances. Thus, two specific issues were examined across the variety of responses obtained: the (main) verb used and the number of scene items mentioned.

2.4.1. Coding of verbs

The main verbs used by Tamil and English speakers to describe each video were compared against the target verb used in stimuli creation for that scene in order to examine how speakers of the two languages understood the scenes. The critical question was whether speakers in both languages use verbs that are synonyms or closely related to the target verbs from which these scenes were created. Their doing so, of course, does not mean that they construed the events in the same way, but if the speakers of the two languages used verbs with wildly different meanings then it would raise doubts about the stimuli and their construction with respect to the two cultures. For this analysis, copulas, auxiliary verbs, modals, and the "modal-like" verbs *try to*, *pretend to*, *pretend like*, *supposed to*, *going to*, *seems to be*, *looked like*, *made* were not counted as main verbs. The main verbs used in the descriptions were put into one of three categories: "Target Verb match", "Scene match", and "Other". Target Verb matches consisted of exact matches or synonyms (e.g., Target Verb matches for "walk": *walk*, *go*, *run*) and equivalent dictionary translations of the Target Verb in Tamil. Scene matches consisted of either verbs with different meanings from the target verb which effectively convey the same meaning (e.g., for target verb "sweep", response *A man taking a broom to the covering on the window*) or focus on some other aspect of the scene (e.g., for target verb "sleep", response *He lay down*). The Other category consisted of the remaining verbs (e.g., for target verb "fold" and scene: a man folding a shirt at a table, response *that guy is reading*).

2.4.2. Coding of object mentions

The main analysis examined the number of scene items mentioned in the speakers' responses. Appendix A describes the complexity of each scene in terms of the number of physical objects present, not including the actor and the physical structure of the room (floor, walls, etc.)—scenes contained 0, 1, or 2 physical objects. Participants were free to describe these scenes in any manner they chose. Parts of descriptions that counted as mentions of scene elements included all names, body part terms, utterances consisting of a noun used by itself (e.g., *the lady*, *bear*), labels of physical items present in the scene, and labels of concrete actions that may also be commonly thought of as items in the scene (e.g., *a smile*, *a hug*, *a kiss*, *a touch*, *a punch*, *a word*).

The specific linguistic form in which scene elements are used (direct object, clausal complement, etc.) is not considered in the following analyses for several reasons. First, the main theoretical question is what speakers choose to talk about. Second,

even within the same language, there is much disagreement about how to syntactically parse utterances, including disagreement about whether there is a distinction between an "argument" and an "adjunct" (e.g., see Koenig et al., 2003). These problems are multiplied many times over in cross-linguistic studies. Third, as previously mentioned, participants in the study were not constrained in any way in their descriptions of the scenes, which resulted in syntactic forms that were not always easily comparable across the two languages, for example, Tamil: *shake hand kuDukkaran* 'shake hand give-3p.masc. sing.', literally "he's giving a shake hand", and English: "he's offering to shake hands". Rather than attempt to match specific linguistic structures across languages, the measure used in this study—a simple count of how many items (persons, objects) in the stimuli scenes the speakers chose to mention—straightforwardly addresses the central question.

At a minimum, participants might choose to mention only the main action occurring in the scene (e.g., *crawling, kicking*, which would count as a description with 0 scene objects.) At a maximum, participants could choose to mention every physical object in the scene, as well as the floor, walls, ceiling, lighting, concrete actions with body parts (e.g., *a smile, a hug*), and many body parts of the actor (e.g., *hand, head, leg*, etc.); each of these mentions would be counted as a scene object (e.g., *He crawled on the floor on his hands using his feet*—3 scene objects). Coding responses in this manner provides a measure of complexity that can then be used to compare responses across the two languages with their very different structures.

The (linguistic) subject of the descriptions was not included in the counts of scene elements because subjects to a large extent were always mentioned in both languages (most typically as a suffix on the verb in Tamil, and as a pronoun in English). In both languages, the use of pronouns such as *this [idu]* were counted as mention of a scene item, both when they were used to directly refer to an object in the scene, and also in cases where the use of *this [idu]* is ambiguous and could be argued to be part of the action (e.g., English *doing this* and Tamil *he is doing this [idu panran]*). We used this counting rule for the ambiguous case of *this* because it diminishes languages differences in the number of scene elements mentioned.

Tamil verbs were coded with two additional rules based on the structure of the Tamil language, namely, (1) uses of a borrowed English verb plus a Tamil light verb (e.g., *drive pannu* 'drive', *jog pannu* 'jog') were counted as one verb, because both parts of this construction are necessary to refer to the same action; and (2), uses of the converbial construction, a participial form of a verb followed by a main verb (e.g., *having laid down, (he) sleeps [parittiNDu tuungaran]*) were counted as two verbs, because this construction can be thought of as referring to two separate actions.

In cases of reformulations, e.g., "*He is clapping, clapping hands*", the utterance was scored in terms of the formulation that had more mentions of scene elements (e.g., in this example, 1 verb: *clap*, 1 scene item: *hands*). Extraneous descriptions were omitted (e.g., in *He is holding a book* and thought he was kinda *talking to this woman, I don't know if he was reading*, the "main content" was judged to be the underlined parts of the response and coded as: 2 verbs—*hold*, *talk*; 2 scene items—*book*, *woman*). Additional examples of coded responses are given in Table 2.

3. Results

3.1. Verbs

The main verbs used in the speakers' descriptions were examined as a stimulus check to ensure that the speakers understood the scenes in similar ways. Although participants were completely free to offer descriptions in any manner of their choice, both age and language groups almost always included a verb in their descriptions of all the scenes (Base scenes – adults: English—100%, Tamil—98%; children: English—87%, Tamil—89%; Altered scenes – adults: English—100%, Tamil—98%; children: English—84%, Tamil—87%).

Although potentially numerous verbs could be used to describe each scene, overall, the four language-by-age groups described unique scenes using only 1–9 different verb types per scene (English speakers' average number of verb types = 2.5, standard deviation = 1.3; Tamil speakers' average number of verb types = 3.4, standard deviation = 1.6). The average number

Table 2
Examples of coded responses.

Description of scene	Coded verbs and scene items
He's folding the shirt that the woman is holding	Verbs: fold, hold Items: shirt
He gave her an apple and she gave him money	Verbs: give, give Items: her, apple, him, money
He gave her an apple and he gave her a book	Verbs: give Items: her, apple, book
Clapped hands	Verbs: clap Items: hands
He said yes	Verbs: say 0 Items
book-A taTTraappala, dust-A taTTindaappala '(He's) hitting books, (he's) hitting dust'	Verbs: taTTu (hit) Items: book, dust
eDittu vekkaran 'having taken, (he) puts'	Verbs: eDu 'take', vai 'put' 0 Items
parittiNDu tuungara 'having laid down, (he) sleeps'	Verbs: paDu 'lay', tuungu 'sleep' 0 Items

Table 3

Percentage of descriptions by English- and Tamil-speaking adults and children that contained 0, 1, 2, or 3 verbs per scene.

	English-speaking adults	Tamil-speaking adults	English-speaking children	Tamil-speaking children
0 verbs	.3	.2	4	2
1 verb	92	82	94	86.5
2 verbs	7.5	17.2	2	11.5
3 verbs	.2	.6	–	–

of verbs per scene used by the four groups was very close to 1. Table 3 shows the distribution of scenes with 0, 1, 2, or 3 verbs across the four groups.

The main analysis concerns the number of objects mentioned by speakers. We examined the average number of objects mentioned per verb for the four language-by-age groups, a measure that corrects for possible differences in some speakers just talking more rather than talking more about objects. (Sentences containing no verb, 7% of the total utterances, were omitted to avoid fractions with 0 in the denominator.) Adult English speakers mentioned more objects per verb (average number of object mentions per verb = 1.3, standard deviation = .78) than adult Tamil speakers (average number of object mentions per verb = .85, standard deviation = .70); this pattern was mimicked in the children's data (English-speaking children's average number of object mentions per verb = .85 verbs/utterance, standard deviation = .66; Tamil-speaking children's average number of object mentions per verb = .45, standard deviation = .55). The key question concerns how these tendencies may depend on the properties of the scenes.

3.1.1. Base scenes

Appendix B gives a complete list of all verbs used by the participants in describing each scene, labeled by its target verb. In response to the Base scenes, adult speakers of both languages overwhelmingly produced Target Verb matches (English—89%, Tamil—73%), Scene matches (verbs that effectively convey the same meaning as the Target Verb or accurately describe the Scene) in almost all the other cases (English—10%, Tamil—25%), and very rarely produced descriptions in the Other category (English—1%, Tamil—2%). Descriptions given by the child speakers of both languages followed a similar pattern (Target Verb matches: English—81%, Tamil—66%; Scene matches: English—15%, Tamil—33%; Other: English—4%, Tamil—1%). Although Tamil speakers produced the Target Verb less frequently in response to the videos than the English speakers, they did overwhelmingly produce either the target or a verb with a clearly related meaning (Target and Scene matches). These results suggest that speakers of both languages and age groups understood and conceptualized these events as intended.

3.1.2. Altered scenes

The verbs used by the adult participants in their descriptions of Altered scenes were also overwhelmingly Target Verb matches (English—92%, Tamil—67%), Scene matches in almost all the other cases (English—7%, Tamil—33%), and very rarely in the Other category (English—1%, Tamil—1%). As with the Base scenes, a similar pattern was observed in the verb used in descriptions of Altered scenes by child speakers of both languages (Target Verb matches: English—71%, Tamil—57%; Scene Verb matches: English—29%, Tamil—38%; Other: English—0%, Tamil—5%). Once again, although Tamil speakers had a smaller proportion of Target Verb matches than the English speakers, they still predominantly produced Target Verb matches and 95% of the verbs were target matches and scene matches.

3.2. Pragmatic context

3.2.1. Scene type: Base vs. Altered

A 2 Language (English, Tamil) × 2 Age (Adult, Child) × 2 Scene Type (Base, Altered) repeated-measures analysis of variance yields main effects of Language, $F(1, 32) = 32.73$, $p < .001$, Age, $F(1, 32) = 61.74$, $p < .001$, and Scene Type, $F(1, 32) = 173.20$, $p < .001$. English speakers mention more items than Tamil speakers and adults mention more items than children. In addition, all speakers mention more items for Altered scenes than for Base scenes. In addition, the interactions between Scene Type and Language, $F(1, 32) = 17.89$, $p < .001$, and Scene Type and Age, $F(1, 32) = 32.73$, $p < .001$ were also significant.

As can be seen in Fig. 2, all language and age groups show an increase in number of object mentioned in the Altered scenes compared with the Base scenes, except for the Tamil children, who rarely mention objects for either type of scene. This leads to an overall effect such that English speakers increase mention of objects in the Altered scenes more than do the Tamil speakers.

The fact that English speakers mention more scene elements than do Tamil speakers overall suggests a base rate difference in the mentioning of objects that may be inextricably linked to language. We first examine the rate of object mentions in the Base scenes. A 2 Language (English, Tamil) × 2 Age (Adult, Child) analysis of variance yields main effects of Language, $F(1, 32) = 22.20$, $p < .0001$ and Age, $F(1,32) = 51.47$, $p < .0001$, suggesting that the base rate of mentioning objects is, in fact, inextricably linked to the language spoken. This overall difference in mentioning scene elements was confirmed by an analysis on total number of object mentions; the 2 Language (English, Tamil) × 2 Age (Adult, Child) analysis of variance yields main effects of Language, $F(1, 32) = 22.20$, $p < .0001$ and Age, $F(1,32) = 51.47$, $p < .0001$, indicating an overall difference in the base rate of mentioning objects that is linked to the language spoken. This tight relation is expected under
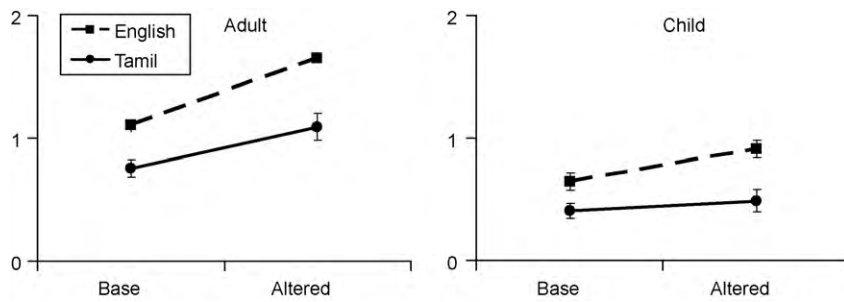
Fig. 2. Mean number of scene items mentioned by English- and Tamil-speaking adults and children in response to Base scenes versus Altered scenes.

the hypothesis that English speakers, because of the mandatory mention of the verb's arguments, might be more sensitive to scene elements than Tamil speakers.

3.2.2. Addition vs. Replacement

The results of the previous analysis are considered further to examine the effect of each type of alteration on the speakers' descriptions more closely. A 2 Language (English, Tamil) × 2 Age (Adult, Child) × 2 Scene Type (Base, Altered) × 2 Alteration Type (Addition, Replacement) repeated-measures analysis of variance was conducted to examine the number of mentions of scene items for each type of Altered scene against their *corresponding* Base scenes. This analysis yielded main effects of Language, $F(1, 32) = 636.442$, $p < .001$, Age, $F(1, 32) = 28.502$, $p < .001$, Scene Type, $F(1, 32) = 128.683$, $p < .001$, and Alteration Type, $F(1,32) = 84.711$, $p < .001$. The analysis also yielded reliable interactions between Scene Type and Language, $F(1, 32) = 12.702$, $p < .001$, Scene Type and Age, $F(1, 32) = 24.356$, $p < .001$, and Scene Type and Alteration Type, $F(1, 32) = 73.664$, $p < .001$. Additionally, the three-way interactions of Scene Type, Alteration Type, and Language, $F(1, 32) = 10.442$, $p < .01$, and Scene Type, Alteration Type, and Age, $F(1, 32) = 8.280$, $p < .01$ were significant. These seemingly complex patterns of statistical significance are due to three more easily understood patterns that can be seen in Fig. 3. English speakers mention more objects than Tamil speakers; adults mention more objects than children; and the number of objects in a scene has the biggest effect relative to replacement on the number of objects mentioned. The importance of the number of objects in a scene is evident in the comparison of the addition and replacement conditions. Overall, more objects are mentioned in the replacement condition than in the addition condition for both the Base scenes and the Altered scenes. That
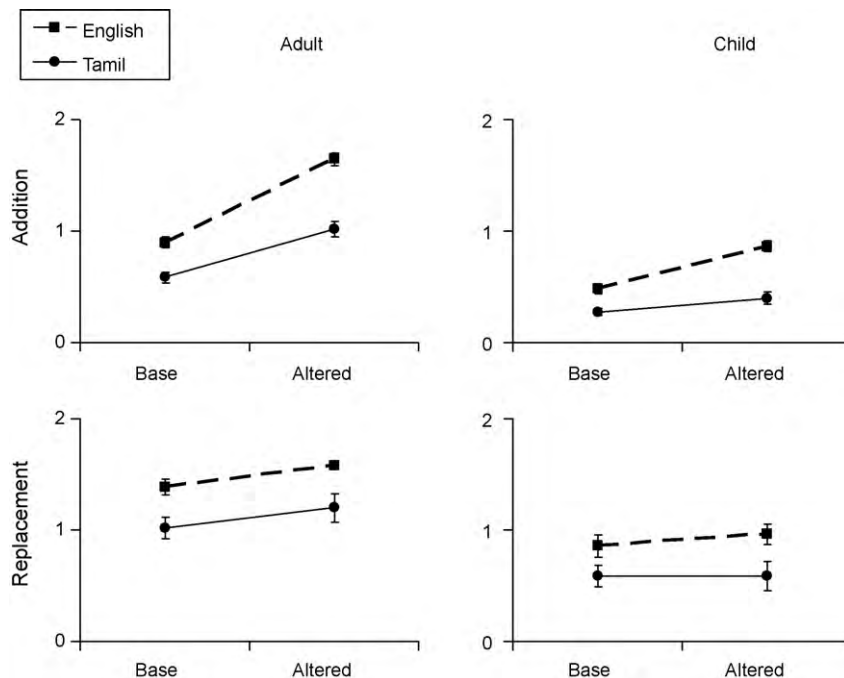

Fig. 3. Mean number of scene items mentioned by English- and Tamil-speaking adults and children in response to corresponding Base–Altered scene pairs for each of the two types of Alterations–Base scenes versus Addition scenes and Base scenes versus Replacement scenes.

is because the Base scenes in the replacement condition contained more objects prior to alteration than the addition scenes. The bigger effect of adding objects than replacing them is also seen in the larger effects of addition relative to base mentions of objects in the addition condition than in the replacement condition, which did not add any objects but merely took away a typical one and added a more atypical one. The main finding is the same as in the previous analysis. English speakers mention more scene objects *and they are more sensitive to manipulations of the number of objects in the scene.*

3.2.3. Number of Items Present in the scene

The previous analyses suggest that adding elements is a particularly relevant factor for how English speakers refer to scenes, but less so for Tamil speakers. Accordingly, we conducted a third analysis specifically examining, across scene types, the effect of the number of objects in a scene on the number of objects mentioned. That is, this analysis collapses across all scene types—Base, Altered by Replacement, and Altered by Addition—forming new stimulus categories according to the number of scene elements. For this analysis, the number of mentioned scene elements was submitted to a 2 Language (English, Tamil) $\times$ 2 Age (Adult, Child) $\times$ 4 Number of Items Present (0, 1, 2, 3) repeated-measures analysis of variance. This analysis yielded main effects of Language, $F(1, 32) = 45.60$, $p < .001$, Age, $F(1, 32) = 91.09$, $p < .001$, and Number of Items Present, $F(2, 64) = 145.54$, $p < .001$. Interactions between Number of Items Present and Language, $F(2, 64) = 30.56$, $p < .001$, Number of Items Present and Age, $F(2, 64) = 44.75$, $p < .001$, and the three-way interaction between Number of Items Present, Language, and Age, $F(2, 64) = 4.31$, $p < .01$ were also significant. The same effects seen in the previous analyses are also evident here: speakers of English mentioned more items than speakers of Tamil; and adults mentioned more items than children. The new result as shown in Fig. 4 is that all language and age groups except Tamil-speaking children mentioned increasingly more objects when there were more objects in the scene.

More specifically, English-speaking adults mention more objects and show an increase as the number of items in the scene increases from 0 to 3 items. Tamil-speaking adults mention more objects in response to more items in the scene, as well, but to a much-lesser extent, and additionally do not show a significant difference in response to 2 items in the scene vs. 3 items in the scene. The pattern observed in the children resembles the adults, in that English-learning children mention more objects overall than Tamil-learning children and show a greater increase for increasing numbers of items in the scene. However, the children show a reduced effect compared to the adults in that the English-speaking children mention similar numbers of objects to 2 and 3 items in the scene and Tamil-speaking children actually appear to mention fewer objects when there are 3 items in the scene vs. 2 items in the scene. The children may be at their limit in trying to describe complex scenes containing 3 items.

Finally, to better understand the way in which the number of objects in a scene interacted with language, we conducted an analysis of linear trend by looking at overall language differences in rate of object mentions per scenes
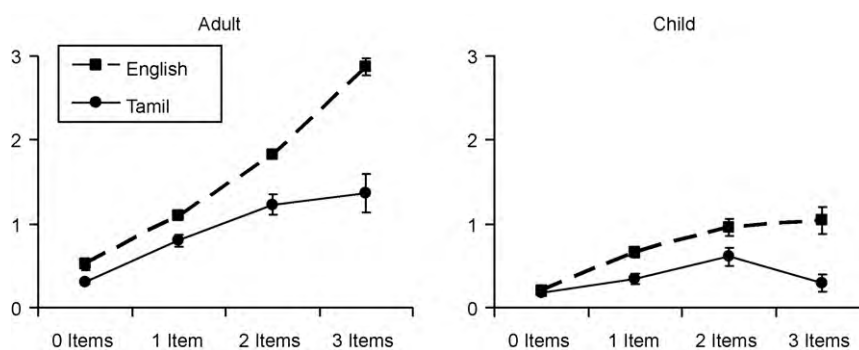

Fig. 4. Mean number of scene items mentioned in response to scenes with 0, 1, 2, or 3 items present.
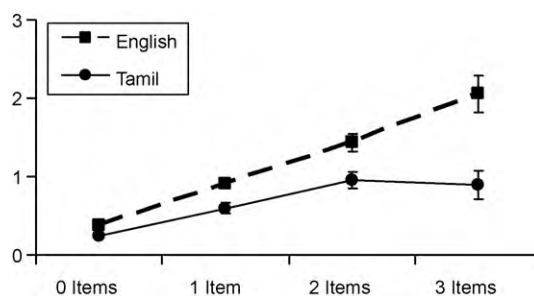

Fig. 5. Mean number of scene items mentioned by English speakers (adults and children) and Tamil speakers (adults and children) in response to scenes with 0, 1, 2, or 3 items present.

with different numbers of items, collapsed across adults and children, as shown in Fig. 5. We conducted a 2 Language × 4 Number of Items Present (0, 1, 2, 3) mixed analysis of variance. This analysis yielded main effects of Language $F(1, 34)$ = 13.18, p = .001 and Number of Items Present $F(3, 102)$ = 69.04, $p < .001$. The interaction between Language and Number of Items Present was also significant, $F(3, 102)$ = 13.75, $p < .001$. Polynomial contrasts indicated that there was a significant linear trend over Number of Items Present, $F(1, 34)$ = 81.33, $p < .001$. Because Fig. 5 suggests that the trend for Tamil may be non-linear, we also conducted a one-way repeated-measures analysis of variance on Number of Items Present (0, 1, 2, 3) over data from the Tamil speakers only. This final analysis yielded a significant main effect of Number of Items Present, $F(3, 51)$ = 18.65, $p < .001$. Polynomial contrasts indicated that, among Tamil speakers, in addition to a significant linear trend over Number of Items Present, $F(1, 17)$ = 18.08, p = .001, there was a significant quadratic trend, $F(1, 17)$ = 24.43, $p < .001$. What these results, and the pattern in Fig. 5 suggest, is that whereas the number of object mentions increases linearly for speakers of English, they affect Tamil speakers in a fundamentally different way. Again, this result suggests that English speakers' productions are more straightforwardly tied to the perceptually present objects in a scene than are Tamil speakers'.

4. Discussion

Does the use of more explicit argument structure by a language imply more or less pragmatic sensitivity to the objects in relational events? The present results strongly suggest that the answer is "more," as English speakers who must overtly express arguments for most verbs showed greater sensitivity to the elements in a relational scene than did speakers of Tamil, a language which allows more choice in the arguments that expressed. Moreover, these differences were evident in young children.

Overall, the results show that English speakers refer to more scene items than do Tamil speakers; adults refer to more items than do children; and more items were mentioned in descriptions of Altered scenes in than in Base scenes. In addition, the presence of more items in the scene resulted in descriptions containing more items, with English speakers being *more* affected by the scene modifications than Tamil speakers. It is important to note that merely switching items in the scene did not appear to matter all that much to either English or Tamil speakers, perhaps because both scenes have effectively the same relational structure—that is, whether an actor is giving a cup or a bowl or even a gorilla, the actor is giving *something*, and both language groups may be describing that relational structure, using their usual means. In contrast, *the number of items in a scene may be thought of as altering the relational structure to some degree*, and English speakers in general appear particularly sensitive to these alterations, by increasing the number of scene elements explicitly mentioned. In brief, the results of these analyses suggest that contextual effects that might be predicted to heighten the pragmatic importance of the explicit mention of items are *more* important to English speakers than to Tamil speakers.

Why would the contextual effects of increasing the number of objects present in the scene have a larger effect on English speakers than on Tamil speakers? One explanation is that Tamil speakers were overall less sensitive to these manipulations because they are not relevant to the pragmatics of communication in Tamil; languages that do not overtly mention as many arguments may simply care more about the central relevant event and not the supporting objects. Alternatively, one might argue that speakers of Tamil are not overall less sensitive to all such scene manipulations but just the ones used here, namely the number and the atypicality of objects; that is, it is these specific factors (and not all aspects of the objects in relational events) that are not very important to the pragmatics of Tamil. Both possibilities suggest fundamental differences—related to language structure—in what speakers of different languages choose to mention when describing a relational scene.

Indeed, the habitual explicit mention of arguments by English speakers may make them more sensitive to variations in the objects in relational scenes than Tamil speakers, who typically explicitly mention fewer arguments. Because English verbs require specification of verbal arguments to a greater extent than Tamil verbs, speakers of English may be particularly sensitive to the *number* of potentially relevant scene elements than are Tamil speakers. If there are additional items in the scene, English speakers will tend to refer to those items by explicit mention (and perhaps even if not required by the verb) because they feel obligated to do so, and they may feel this obligation precisely *because* they rely upon the mentioned objects to convey the relational structure of the scene. Similarly, Tamil speakers, who generally convey the meaning of a scene without mentioning as many components, may continue this pattern even when the scenes are altered, perhaps because the verb *in the context of the scene—without explicit mention of the objects*—is how they typically convey the relational structure (rather than in the context of explicitly mentioned arguments, as is more typical for English).

In sum, the present results are unexpected under the view that languages which allow speakers choices about argument expression lead to the use of explicit expression as a pragmatic means to convey information about different scenes. In contrast, the results fit an alternative idea, that languages that require more explicit mentions of objects have more talking about objects in general and greater sensitivity to the specific objects in a scene. Although further work is required for a more nuanced understanding of the differences between English and Tamil speakers, we offer a bold and new conjecture, which we intend to pursue in future studies: the differences between English and Tamil with respect to the explicit mention of arguments may not be in the usual principles of pragmatics, for what is given or expected versus what is new. Instead, the central difference may be in the *relative* importance of scene elements in different languages—such that in some languages, these elements may or may not be encoded as arguments of the verb.

The second question initially raised by this paper is the children's responses as compared to their older counterparts. Overall, children mention fewer items than adults. This could be because children have greater cognitive and processing limitations than adults, resulting in children having difficulty remembering or talking about as many things as adults, or because they are shyer and less forthcoming in the experimental setting. Either way, the results show early cross-linguistic differences that pattern similarly to adult differences, with both children speaking English and children speaking Tamil appearing to emulate the adult speakers of their language in argument expression. Like their corresponding adult speakers, English-speaking children mention more scene items than Tamil-speaking children in their descriptions of Base scenes, and both sets of children tend to refer to more items when there are more items present. As with the adults, the experimental manipulations used in this study appear to have a stronger effect on the English-speaking children in that they are *more likely* to mention more items in their descriptions than the Tamil-speaking children.

Two larger questions about the nature of and relationship between verb meaning and argument structure are also raised by this study and merit further consideration in future research. First, what effect do these differences in direct mentions of scene elements have on the acquisition of verb meaning? That is, to what degree is argument structure as a component of verb meaning and/or pragmatics important overall across languages? The information—and the statistical regularities—that learners of English and Tamil have to work with seem quite different. Learners of both languages presumably experience similarly structured events, a giver giving a thing to a receiver, for example. But the words they hear will be correlated differently with the components of those events.

Many theorists of verb learning (e.g., Pinker, 1994) have noted that the *relevant* structure of an event for a particular verb's meaning is not obvious from the event itself. For example, a scene showing a giver giving something to a recipient could be conceptualized in terms of *giving, getting, having, looking,* and so forth. The words that children hear as they view a scene might direct attention to different relational structures. If this is so, languages that overtly mention fewer scene elements may present learners with a different task in that the explicit mention of the arguments would seem to focus the learner on the relevant relational structure and also direct attention to relevant components in the scene.

The extant evidence strongly suggests that overt mentions of scene elements can be exploited by learners of English to discover the meaning of a novel verb, and in fact, English-learning children do use argument structure as a bootstrap to verb meaning (e.g., Gleitman et al., 2005; Naigles et al., 1993). However, the evidence presented here indicates that these clues to verb meaning may not be as available in Tamil, although it is clear that Tamil-learning children do in fact have knowledge of the meanings of these verbs (evident by their production of them to describe the scenes). This difference may profoundly change the verb-learning task in that it could be the case that argument structure is simply not as useful a cue to verb learning in Tamil; rather, it could be the case that argument structure is more important as a developmental bootstrap for verb meanings in some languages than in others.

Lastly, a final issue raised by this paper is the *nature* of the relationship between verb meaning and argument structure. In addition to the idea that argument structure is part of verb meaning, there are other suggestions of how argument structure is represented which may also be relevant to understanding the present pattern of results. Both Goldberg (1995) and Pinker (1994) have suggested that knowledge about argument structure may be represented independently of knowledge of a verb's core meaning. That is, verbs and the argument structures that are commonly used with them are related but are independent of each other, rather than one being a component of the other. Goldberg illustrated this idea in her (1995:11) discussion of *kick*, which can occur with a variety of different argument structures, as shown in Table 4.

In each of the sentences listed in Table 4, the verb *kick* has the same core meaning but is understood differently because of *the independent contribution* of meaning from the argument structure of the sentence. Following this line of reasoning, it may be that verbs in different languages that express argument structure more or less frequently have stronger or weaker associations with particular relational roles, rather than having a necessary and universal relationship. It may also be the case that particular verbs in the same language tend to individually be more at "one extreme" or the other. For example, *get* and *do* in English, which may be used with quite a variety of argument structures, may in fact have weaker associations to particular relational roles; *put* and *give*, on the other hand, which occur with a much more limited number of argument structures, may have much stronger associations to certain relational roles, which may become intrinsic to the meaning of those verbs (see also Goldberg et al., 2004, 2005). This would suggest relational differences that are perhaps deeper than merely higher or lower thresholds for referring to aspects of scenes, and might instead be understood in terms of the number and weight of

Table 4
The verb *kick* used with different argument structures (Goldberg, 1995:11).

Pat kicked the wall.
Pat kicked Bob black and blue.
Pat kicked the football into the stadium.
Pat kicked at the football.
Pat kicked his foot against the chair.
Pat kicked Bob the football.
The horse kicks.
Pat kicked his way out of the operating room.

independent representations of argument structure in the lexicon (consistent with Goldberg, 1995; Pinker, 1994). This is a hypothesis to study in continuing work.

In conclusion, the results presented here document differences in direct reference to items present in the scene by speakers of English and Tamil, which are perhaps the most compelling in that there are no other linguistic indices of these items in either language. Additionally, this study provides new information about how speakers of the two languages differ in response to particular scenes, in that scenes may evoke increased mention of scene items by English speakers but not by Tamil speakers. Finally, the results show that the mention of scene items increases with development in both languages, but Tamil-speaking children mention fewer items than do English-speaking children, showing that the children know the structure of the language to which they are exposed.

Acknowledgements

Appendix A

Description of Base scene	# Objs	Description of Altered scene	Alteration type
H runs across the room	0	H runs around the table	Add
H scratches his arm	0	H scratches the table	Add
H jumps up and down in place	0	H jumps onto chair, back on floor	Add
H looks at the wall	0	H looks at himself in a mirror	Add
H crawls on the floor	0	H crawls under a table	Add
H claps his hands	0	H claps books together	Add
H falls on the floor	0	H falls on the big panda	Add
H smiles	0	H smiles at the panda	Add
H walks across the room	0	H steps over books on floor	Add
H waves his hand	0	H waves book at R, R waves back	Add
H reads a book (by himself)	1	H reads a book to R	Add
H blows bubbles	1	H blows bubbles on R	Add
H hits huge stuffed panda bear	1	H hits R with a pillow	Add
H opens door (with his hand)	1	H opens the door using a ruler	Add
H pushes R	1	H pushes R onto a panda	Add
H sweeps floor with broom	1	H sweeps the wall with a broom	Add
H ties his shoe	1	H ties his shoe to a chair	Add
H touches R	1	H touches R with a huge pencil	Add
H chases R around a table	2	H chases R 'round table with pan	Add
H gives R a book	2	H gives R a pan with a book in it	Add
H moves box on table	2	H moves box on table with a ruler	Add
H sits on a chair	1	H sits on a stuffed panda bear	Replace
H sleeps in a chair	1	H sleeps on a table	Replace
H eats potato chips	1	H eats an unusual item	Replace
H holds a book, standing	1	H holds a stuffed panda bear	Replace
H hugs R	1	H hugs a stuffed panda bear	Replace
H folds a shirt on the table	2	H folds a shirt on R's arms	Replace
H kicks a ball to R	2	H kicks ball at huge pencil	Replace
H deals cards to R and B	2	H deals cards to panda and pencil	Replace
H draws on paper with pencil	2	H draws with a large pencil	Replace
H pours water into a cup	2	H pours necklace from cup to pan	Replace
H puts a book on the table	2	H puts a novel object on the table	Replace
H gives R grapes, R gives H money	2	H gives R novel object, R gives H money	Replace
H sews shirt, sitting at table	2	H sews R's scarf while R wears it	Replace

Add = Addition: Creation of an Altered scene by Addition of actors or scene elements to a Base scene.
Replace = Replacement: Creation of Altered scene by Replacement of an element in a Base scene.

Appendix B

BLOW	**ENGLISH–TM**: <u>blow</u>
	TAMIL–TM: '<u>blow</u>' [wuudu], '<u>blow bubbles</u>' [bubbles-wuDu]/**SM**: '<u>do</u>' [pannu], '<u>play</u>' [vaLayaaDu], '<u>see</u>' [paaru]
CHASE	**ENGLISH–TM**: <u>chase</u>/**SM**: <u>run</u>, <u>hit</u>/**O**: <u>watch</u>
	TAMIL–TM: '<u>catch</u>' [piDi]/**SM**: '<u>run</u>' [woDu], '<u>play</u>' [vaLayaaDu], '<u>come</u>' [vaa], '<u>hit</u>' [aDi], '<u>move in a circle</u>' [suttu]
CLAP	**ENGLISH–TM**: <u>clap</u>, <u>hit</u>, <u>bang</u>, <u>slam</u>, <u>knock</u>/**SM**: <u>go</u>, <u>use</u>
	TAMIL–TM: '<u>clap</u>', '<u>hit</u>' [taTTu], '<u>clap hands</u>' [kay-taTTu], '<u>clap</u>' [clap-pannu]/**SM**: '<u>hit</u>' [aDi], '<u>do</u>' [pannu], '<u>smile</u>, <u>laugh</u>' [siri]/**O**: '<u>show</u>' [kaami]
CRAWL	**ENGLISH–TM**: <u>crawl</u>, <u>go</u>/**SM**: <u>knock</u>
	TAMIL–TM: '<u>go</u>' [poo], '<u>walk</u>' [naDa], '<u>come</u>' [vaa], '<u>go into tight space</u>', [norai]/**SM**: '<u>search</u>' [teeDu], '<u>play</u>' [vaLayaaDu], '<u>see</u>' [paaru], '<u>do</u>' [pannu], '<u>hide</u>' [uLLu], '<u>fall</u>' [wuRu]
DEAL	**ENGLISH–TM**: <u>give</u>, <u>deal</u>, <u>play</u>, <u>pass</u>, <u>hand</u>/**SM**: <u>play</u>, <u>set</u>, <u>put</u>
	TAMIL–TM: '<u>deal</u>' [deal-pannu]/**SM**: '<u>play</u>' [vaLayaaDu], '<u>put</u>' [pooDu], '<u>take</u>' [eDi], '<u>hit</u>' [aDi], '<u>do</u>' [pannu], '<u>sit</u>' [wuDkaaru], '<u>count</u>' [eNNu], '<u>show</u>' [kaami]
DRAW	**ENGLISH–TM**: <u>draw</u>, <u>write</u>, <u>doodle</u>, <u>color</u>/**SM**: <u>sit</u>, <u>get</u>/**O**: <u>give</u>
	TAMIL–TM: '<u>write</u>' yeRidu, '<u>draw</u>' varai, '<u>draw</u>' draw-pannu/**SM**: '<u>give</u>' kuDu, '<u>come</u>' vaa
EAT	**ENGLISH–TM**: <u>eat</u>, <u>bite</u>, <u>chew</u>/**SM**: <u>hold</u>
	TAMIL–TM: '<u>eat</u>' [saappiDu], '<u>munch</u>, <u>snack</u>' [tinnu], '<u>bite</u>, <u>bite into</u>' [kaDi]/**O**: '<u>give</u>' [kuDu]
FALL	**ENGLISH–TM**: <u>fall</u>/**SM**: <u>stand</u>
	TAMIL–TM: '<u>fall</u>' [wuRu]/**SM**: '<u>lean</u>' [saayu], '<u>jump</u>' [gudi]
FOLD	**ENGLISH–TM**: <u>fold</u>/**SM**: <u>tie</u>, <u>put</u>, <u>give</u>/**O**: <u>show</u>, <u>read</u>, <u>run</u>
	TAMIL–TM: '<u>fold</u>' [maDi]/**SM**: '<u>put</u>' [vai], '<u>give</u>' [kuDu], '<u>put</u>' [pooDu], '<u>write</u>' [yeRidu], '<u>read</u>' [paDi],'<u>play</u>' [vaLayaaDu], '<u>fall</u>' [wuRu], '<u>cover</u>' [muuDu], '<u>do</u>' [pannu]/**O**: '<u>hit</u>' [aDi]
GIVE	**ENGLISH–TM**: <u>give</u>, <u>hand</u>, <u>pay</u>, <u>get</u>/**O**: <u>run</u>
	TAMIL–TM: '<u>give</u>' [kudu], '<u>give</u>' [taa], '<u>buy</u>' [vaangu], '<u>take</u>' [vaangu], '<u>share</u>' [share-pannu]/**SM**: '<u>do</u>' [pannu], '<u>talk</u>' [peesu]
HIT	**ENGLISH–TM**: <u>hit</u>/**SM**: <u>hold</u>, <u>play</u>, <u>engage</u>
	TAMIL–TM: '<u>hit</u>' [aDi]/**SM**: '<u>play</u>' [vaLayaaDu], '<u>give</u>' [kuDu], '<u>have</u>' [vai], '<u>play</u>' [play-pannu]
HOLD	**ENGLISH–TM**: <u>hold</u>/**SM**: <u>stand</u>, <u>read</u>, <u>hug</u>/**O**: <u>make</u>
	TAMIL–TM: '<u>have</u>' [vai], '<u>hold</u>' [piDi]/**SM**: '<u>stand</u>' [nillu], '<u>pose</u>' [pose-kuDu], '<u>show</u>' [kaami], '<u>have</u>' [vai], '<u>drop</u>' [wuDu], '<u>see</u>' [paaru], '<u>take</u>' [eDi], '<u>give</u>' [kuDu], '<u>put</u>' [vai], '<u>read</u>' [paDi], '<u>put</u>' [pooDu], '<u>do</u>' [pannu]/**O**: '<u>give</u>' [kuDu], '<u>fall</u>' [wuRu]
HUG	**ENGLISH–TM**: <u>hug</u>, <u>embrace</u>, <u>give a hug</u>/**SM**: <u>get</u>
	TAMIL–TM: '<u>hug</u>' [kaTTi-piDi], '<u>hug</u>' [kaTTikko], '<u>hug</u>' [hug-pannu], '<u>cuddle</u>' [konji], '<u>kiss</u>' [kiss-pannu], '<u>give a kiss</u>' [muttam kudu], '<u>hug</u>' [kaTTi-kuDu]/**SM**: '<u>play</u>' [vaLayaaDu]/**O**: '<u>wake up</u>' [erindiru]
JUMP	**ENGLISH–TM**: <u>jump</u>, <u>bounce</u>/**SM**: <u>step</u>, <u>stand</u>/**O**: <u>tie</u>
	TAMIL–TM: '<u>jump</u>' [gudi], '<u>jump</u>' [jump-pannu], '<u>pounce</u>' [yeguru], '<u>climb up</u>' [eeru], '<u>stand</u>' [nillu], '<u>tie</u>' [kaTTu],
KICK	**ENGLISH–TM**: <u>kick</u>, <u>roll</u>/**SM**: <u>roll</u>
	TAMIL–TM: '<u>kick</u>' [wodai], '<u>kick</u>' [kick-pannu], '<u>clap</u>, <u>hit</u>' [taTTu]/**SM**: '<u>play</u>' [vaLayaaDu], '<u>play</u>' [aaDu], '<u>push</u>' [taLLu], '<u>hit</u>' [aDi], '<u>clap</u>, <u>hit</u>' [taTTu], '<u>fall</u>' [wuRu], '<u>talk</u>' [peesu], '<u>remove</u>' [kayTTu]
LOOK	**ENGLISH–TM**: <u>stare</u>, <u>look</u>, <u>see</u>/**SM**: <u>stand</u>
	TAMIL–TM: '<u>see</u>' [paaru], '<u>watch</u>' [watch-pannu]/**SM**: '<u>stand</u>' [nillu], '<u>talk</u>' [peesu], '<u>put</u>' [pooDu]/**O**: '<u>read</u>' [paDi]
MOVE	**ENGLISH–TM**: <u>push</u>, <u>move</u>, <u>slide</u>, <u>pass</u>, <u>scoot</u>/**SM**: <u>sit</u>, <u>put</u>, <u>go</u>, <u>have</u>
	TAMIL–TM: '<u>push</u>' [taLLu]/**SM**: '<u>put</u>' [vai], '<u>sew</u>' [taiyu], '<u>wipe</u>' [toDai]/**O**: '<u>drive</u>' [woTTu]
OPEN	**ENGLISH–TM**: <u>open</u>/**SM**: <u>push</u>, <u>paint</u>, <u>poke</u>
	TAMIL–TM: '<u>open</u>' [tara], '<u>open</u>' [open-pannu], '<u>push</u>' [taLLu], '<u>see</u>' [paaru], '<u>go</u>' [poo]/**O**: '<u>put</u>' [pooDu], '<u>change</u>, <u>switch</u>' [mattu]
POUR	**ENGLISH–TM**: <u>pour</u>, <u>spill</u>/**SM**: <u>make</u>/**O**: <u>get</u>
	TAMIL–TM: '<u>pour</u>' [uuttu], '<u>pour</u>' [koTTu], '<u>cool by pouring</u>' [aattu]/**SM**: '<u>drink</u>' [kuDi], '<u>put</u>' [pooDu], '<u>make</u>' [make-pannu]/**O**: '<u>drink</u>' [kuDi]
PUSH	**ENGLISH–TM**: <u>push</u>
	TAMIL–TM: '<u>push</u>' [taLLu]
PUT	**ENGLISH–TM**: <u>place</u>, <u>set</u>, <u>put</u>, <u>lay</u>/**SM**: <u>get</u>
	TAMIL–TM: '<u>put</u>' [vai]/**SM**: '<u>stand</u>' [nillu], '<u>touch</u>' [toDu]
READ	**ENGLISH–TM**: <u>read</u>/**SM**: <u>sit</u>, <u>hold</u>, <u>talk</u>
	TAMIL–TM: '<u>read</u>' [paDi]/**SM**: '<u>say</u>' [sollu], '<u>show</u>' [kaami], '<u>show</u>' [kaaTTu], '<u>discuss</u>' [discuss-pannu], '<u>write</u>' [yeRidu], '<u>talk</u>' [peesu], '<u>teach</u>' [solli-taa], '<u>sit</u>' [wuDkaaru]
RUN	**ENGLISH–TM**: <u>run</u>, <u>jog</u>, <u>waddle</u>
	TAMIL–TM: '<u>jog</u>' [jog-pannu], '<u>run</u>' [woDu], '<u>go</u>' [poo], '<u>move in a circle</u>' [suttu], '<u>walk</u>' [walk-pannu]/**SM**: '<u>play</u>' [vaLayaaDu], '<u>come</u>' [vaa]
SCRATCH	**ENGLISH–TM**: <u>scratch</u>, <u>itch</u>, <u>scrub</u>, <u>rub</u>/**SM**: <u>adjust</u>, <u>draw</u>, <u>erase</u>, <u>clean</u>, <u>scrub</u>, <u>wash</u>, <u>color</u>/**O**: <u>put</u>
	TAMIL–TM: '<u>scratch</u>' [sori], '<u>scratch</u>' [scratch-pannu], '<u>scrape</u>' [scrape-pannu], '<u>rub</u>' [rub-pannu], '<u>scratch</u>, <u>scribble</u>' [kirikku]/**SM**: '<u>do</u>' [pannu], '<u>fold</u>' [maDi], '<u>scribble</u>' [kirikku], '<u>sharp</u>' [sharp-pannu], '<u>write</u>' [yeRidu], '<u>sew</u>' [taiyu], '<u>wipe</u>' [toDai], '<u>put</u>' [pooDu], '<u>talk</u>' [peesu], '<u>hit</u>' [aDi]
SELL	**ENGLISH–TM**: <u>buy</u>, <u>give</u>, <u>exchange</u>, <u>pay</u>, <u>sell</u>, <u>trade</u>/**SM**: <u>smile</u>
	TAMIL–TM: '<u>give</u>' [kudu], '<u>buy</u>' [vaangu], '<u>give</u>' [taa], '<u>take</u>' [vaangu]/**SM**: '<u>smile</u>, <u>laugh</u>' [siri]/**O**: '<u>sleep</u>' [tuungu]
SEW	**ENGLISH–TM**: <u>sew</u>, <u>tie</u>, <u>knit</u>, <u>button</u>, <u>pin</u>/ **SM**: <u>sit</u>, <u>fix</u>, <u>examine</u>, <u>help</u>, <u>hold</u>, <u>put</u>, <u>touch</u> /**O**: <u>fool</u>
	TAMIL–TM: '<u>sew</u>' [taiyu], '<u>sew</u>' [stitch-pannu/**SM**: '<u>fold</u>' [maDi], '<u>put</u>' [pooDu], '<u>do</u>' [pannu], '<u>see</u>' [paaru], '<u>sit</u>' [wuDkaaru]
SIT	**ENGLISH–TM**: <u>sit</u>/**O**: <u>blow</u>
	TAMIL–TM: '<u>sit</u>' [wuDkaaru]/**SM**: '<u>think</u>' [yoosi], '<u>think</u>' [sindu], '<u>pose</u>' [pose-kuDu], '<u>see</u>' [paaru], '<u>sleep</u>' [tuungu], '<u>talk</u>' [peesu]/**O**: '<u>talk</u>' [peesu]
SLEEP	**ENGLISH–TM**: <u>sleep</u>, <u>fall-asleep</u> /**SM**: <u>sit</u>, <u>slouch</u>, <u>cuddle</u>, <u>lay</u>, <u>stay</u>
	TAMIL–TM: '<u>sleep</u>' [tuungu]/**SM**: '<u>sit</u>' [wuDkaaru], '<u>pose</u>' [pose-kuDu], '<u>think</u>' [yoosi], '<u>think</u>' [think-pannu], '<u>lie down</u>' [paDu]/**O**: '<u>watch</u>' [watch-pannu], '<u>see</u>' [paaru]
SMILE	**ENGLISH–TM**: <u>smile</u>, <u>laugh</u>/**SM**: <u>make</u>, <u>look</u>, <u>hold</u>, <u>hug</u>, <u>have</u>/**O**: <u>jump</u>
	TAMIL–TM: '<u>smile</u>, <u>laugh</u>' [siri]/**SM**: '<u>hug</u>' [kaTTikko], '<u>hug</u>' [kaTTi-piDi], '<u>show</u>' [kaaTTu], '<u>see</u>' [paaru], '<u>hold</u>' [piDi], '<u>do</u>' [pannu], '<u>play</u>' [vaLayaaDu], '<u>select</u>' [select-pannu], '<u>stand</u>' [nillu], '<u>put</u>' [pooDu], '<u>touch</u>' [toDu], '<u>play</u>' [aaDu]/**O**: '<u>give</u>' [kuDu], '<u>exercise</u>' [exercise-pannu], '<u>push</u>' [taLLu], '<u>munch</u>, <u>snack</u>' [tinnu]
SWEEP	**ENGLISH–TM**: <u>sweep</u>, <u>clean</u>, <u>mop</u>, <u>broom</u>/**SM**: <u>paint</u>, <u>clean</u>/**O**: <u>take</u>

Appendix B (Continued)

	TAMIL–TM: 'sweep' [perikku], 'wipe' [toDai], 'dust' [dust-pannu], 'clean' [clean-pannu], 'dust cobwebs' [woTTra-aDi], 'dust' [dust-aDi]/SM: 'clean' [clean-pannu], 'clap' [clap-pannu], 'paint' [paint-aDi]/o: 'clap' [clap-pannu]
TIE	ENGLISH–TM: tie, fix/SM: write
	TAMIL–TM: 'tie' [kaTTu], 'tie' [tie-pannu/SM: 'put' [pooDu], 'scratch' [kirikku], 'do' [pannu], 'hang, put on' [maaTTu], 'fix' [fix-pannu], 'put' [vai], 'push' [taLLu], 'take' [eDi]/o: 'empty' [gaali-pannu]
TOUCH	ENGLISH–TM: touch, tap/SM: talk, console, nod, grab, set, knight, hold, hug, say, hurt, draw, get, show, give /o: give
	TAMIL–TM: 'touch' [toDu], 'touch' [touch-pannu], 'hit' [aDi], 'hit' [hit-pannu/SM: 'say' [sollu], 'talk' [peesu], 'push' [taLLu], 'put' [vai], 'see' [paaru], 'do' [pannu], 'play' [vaLayaaDu], 'hit' [aDi], 'show' [kaami]
WALK	ENGLISH–TM: walk, step, tiptoe/SM: take
	TAMIL–TM: 'walk' [naDa], 'walk' [walk-pannu], 'go' [poo], 'come' [vaa], 'step over' [taaNDu], 'climb up' [eeru]/SM: 'see' [paaru], 'put' [pooDu]
WAVE	ENGLISH–TM: wave/SM: say
	TAMIL–TM: 'wave' [wave-pannu], 'signal' [signal-pannu], 'shake' [aaTTu], 'say' [sollu], 'show' [kaaTTu], 'talk' [peesu], 'show' [kaami], 'write' [yeRidu]
TM = Target match	
SM = Scene match	
o = Other	

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