UNIVERSITY OF GOTHENBURG

DEPARTMENT OF PHILOSOPHY,
LINGUISTICS AND THEORY OF SCIENCE

EXPERIMENTING WITH PICTURE-BASED METHODS FOR SEMANTIC FIELDWORK:

A CASE STUDY ON QUANTITY SUPERLATIVES IN PERSIAN

Golsa Nouri-Hosseini

Master's Thesis:	30 credits
Programme:	Master's Programme in Linguistics
Level:	Advanced level
Semester and year:	Spring, 2018
Supervisor	Dr. Elizabeth Coppock
Examiner	Prof. Torbjörn Lager
Report number	
Keywords	picture-based methods, semantic fieldwork, superlatives, Persian

Abstract

This work (a) presents a novel questionnaire for eliciting comparatives and superlatives of quality and quantity; (b) suggests guidelines for creating visual elicitation stimuli, as well as practical implications for semantic fieldworkers; (c) reports on a case study comparing two visual elicitation methods in semantic fieldwork, storyboards and picture-aided translation, showing that picture-aided translation might work better than storyboards for some purposes; (d) reports the results of comparing two different stories (the 'What Matters' story, developed in the project, and the 'Bake-off' story from Totem Field Storyboards) in semantic fieldwork; and (e) presents results of studying the morphosyntactic strategies for expressing superlatives of quantity and quality, comparatives, definiteness, and absolute, relative and proportional readings in Persian.

Storyboards are a series of pictures which tell a story, and the participants are invited to tell the story in their native language, based on the pictures. In picture-aided translation, each picture is accompanied by a text, and participants are asked to give translations based on both the picture and the text. Storyboards are advocated by Burton & Matthewson (2015), in contrast to standard semantic elicitation techniques, since storyboards elicit more natural, spontaneous utterances, minimize the influence of the meta-language, and obviate the need for verbal context description, which minimizes the risk of misunderstanding of the context. However, storyboards pose heavy cognitive burdens on the participants' memory and this can result in discomfort for the participants and failure to elicit the target constructions. Therefore, a systematic comparison of storyboards and picture-aided translation is conducted in this project to see whether the presence of text makes data elicitation better or worse.

In the main stage of this thesis, a comparison of picture-aided translation with storyboards was made by conducting a case study on Persian (with eight Persian speakers); each consultant participated in four tasks, and each data elicitation session took about one hour. The results were then scored along several dimensions, including 'faithfulness', which is a measure of success in eliciting the target construction; a sentence was scored as 1 when the target construction was elicited and 0 otherwise. The results showed that picture-aided translation increases faithfulness: on average (per participant), the percent-

age of sentences faithfully translated increased 20% using picture-aided translation for the 'What Matters' story, and 10% for the 'Bake-off' story. Feedback received after each data elicitation session indicated that participants generally felt more comfortable when text was present. In addition, participants reported that both picture-aided translation and storyboard tasks felt equally fun.

More faithful translations were received for the 'Bake-off' story than the 'What Matters' story. This is possibly due to the length of story and sentences, and level of difficulty. It suggests that storyboards should be kept short and simple. More practical implications and tips for the fieldworkers who intend to use translation elicitation materials (including picture-based methods) in their fieldwork are presented at the end of the thesis.

English uses the superlative from of MANY/MUCH for both a relative and a proportional reading. In Persian, a superlative from (*biš-tar-in* 'much-CMPR-SPRL') is used for a relative reading too. However, unlike English, *bis-tar-e* 'much-CMPR-EZ' which is the comparative form of *biš* 'much' plus *Ezafe* is used for a proportional reading. Finally, The results from this study shows that for quality adverbials, the morphological strategy [M] cannot be used, while for quality absolutes only the morphological strategy [M] was observed and it is probably the dominant way to make quality absolutes in Persian.

Acknowledgements

First and foremost, I would like to express my sincere gratitude to my wonderful supervisor Dr. Elizabeth Coppock, who motivated and inspired me to conduct this work by her encouragement and full support. Liz, thank you so much for your creative ideas and the fantastic solutions you provided for every problem I encountered. Thank you for teaching me so many things, including how to think and write like a professional linguist, how to use Latex, how to gloss and analyse the data, and lots of more useful things which I am sure I will use throughout my career. Liz, thank you very much for being such an amazing supervisor and for always being there when I needed help! This work would not have been done without all your support, advice and inspiration.

I would also like to thank my co-supervisor Dr. Elizabeth Bogal-Allbritten for her very helpful comments, for her guidance, and for her time to read through my thesis. I would also like to thank Dr. Charalambos (Haris) Themistocleous for helping me with analysing my research data in R. I would also like to extend my thanks to Professor Torbjörn Lager who read through my thesis and motivated me further by his wonderful feedback.

I would also like to take this opportunity to thank the audience at the TripleA conference in Gotheburg (June 2017) and the audience at the conference on Elicitation Tools for Linguistic Description and Typology, in Paris (Nov 2017) for their excellent comments and feedback. I'm also grateful to the University of Gothenburg for the generous scholarship "Adlerbertska Stipendiestiftelsen för resa" which provided me with the fund to present this work at the conference in Paris (Nov 2017).

I would also like to extend my warmest gratitude to all the native speakers (Persian, Swedish, Spanish, Arabic, Swahili, and Portuguese speakers) who kindly devoted their time and enthusiastically participated in the tests during different stages of this study and provided me with very useful comments, judgements and feedback.

I'm also deeply grateful to all my family members in Sweden and Iran for their love, positivity, continued support, care and encouragement.

Finally, I would like to express my love and gratitude to my dear husband Soroush, the love of my life, for his unconditional love and support and for always being there for me.

Contents

1 Introduction

The primary goal of this thesis is to compare picture-based methods for conducting semantic fieldwork. Two different data elicitation methods are compared: **Storyboards** (retelling a story based on pictures without help text) and **Picture-aided Translation** (translating a story where pictures are accompanied by text). Each of these methods has its own advantages and disadvantages, but I conclude that picture-aided translation works better for some purposes.

This thesis also presents the process and the challenges of developing materials for semantic fieldwork by conducting a case study on quantity superlatives in Persian. Materials are developed and improved step-by-step over different stages based on the results of tests, scores, and feedback of native speakers. Words, sentences, and pictures are changed many times in order to decrease the risk of misinterpretation. Visual materials for eliciting quantity and quality superlatives and comparatives are developed within this thesis and the final version is presented in Appendix A. This work contributes to semantic fieldwork and presents tips and practical implicature to the field linguists.

Chapter 6 is dedicated to Persian and includes results and discussion on the superlatives (of quantity and quality) and comparatives in Persian. It further includes follow up and more studies on Persian including discussion on definiteness in Persian.

1.1 Standard semantic elicitation techniques

According to Burton & Matthewson (2015), standard semantic elicitation techniques include three main types of tasks; translation tasks, judgement tasks, and elicited production tasks. In all these three techniques, the researcher provides some sort of stimulus or discourse context to the consultant. Below is a brief description of each of these techniques.

1.1.1 Translation task

In translation tasks, consultants are asked to translate sentences from the contact language to their native language, or vice versa. Even in this method, some sort of context is provided to the consultant, since a semantic fieldworker rarely asks for a translation of a sentence given in isolation (Burton & Matthewson, 2015, 137). However, Matthewson (2004, 389)

shows that some kinds of semantic information are impossible or difficult to elicit from translations and that "translations should always be treated as a clue rather than a result".

We employed this method in the *Most and more* project on quantity superlatives.[1] An on-line[2] translation questionnaire was developed by Elizabeth Coppock, and was used in this project (see Appendix D). This text-based translation questionnaire is a story originally with 17 sentences (later updated to 20 sentences), designed to collect data on quantity superlatives from a typologically broad set of languages. Written context is also provided for some of the sentences in order to help elicit the intended construction. About 300 native speakers from all over the world translated the sentences into their native languages and we got data from about 100 languages. Employing this translation task had the following **advantages** in our experience:

1. The translation questionnaire was easily improved
2. The translation questionnaire was convenient to employ and use for both the linguists and the consultants.
3. The translation questionnaire was fast.
4. The translation questionnaire was cost-efficient.
5. Target constructions were elicited in many cases, since the participants tried to give literal translations.

However, using the translation questionnaire had the following **disadvantages**:

1. There were high risk of misinterpretation due to the unfamiliarity of the speakers with the meta-language.
2. Writing out translations were cumbersome for some participants.
3. It was sometimes difficult (for the linguist) to describe the intended scene.

[1] *Most and more: Quantity superlatives across languages*, funded by the Swedish Research Council, awarded to PI Elizabeth Coppock at the University of Gothenburg. See `http://flov.gu.se/english/research/research-programs/most-and-more`.

[2] The translation questionnaire is available on-line at `https://docs.google.com/forms/d/e/1FAIpQLSe9Xxt2p2C53syxFQYhOOLiY5c_Nkz-n-7S4Em-zSa-GbZoxA/viewform`.

4. In some languages there were differences between the spoken/colloquial and written/standard forms of the language (ex: Arabic, Persian) and the consultants preferred to know which form the linguist is looking for.

1.1.2 Judgement tasks

In this method, consultants are asked to judge if a sentence is acceptable or true in a specific discourse context (Burton & Matthewson, 2015). Matthewson (2004) considers judgements as something that native speakers are qualified to give due to their native language knowledge and competencies. She distinguishes between a native speaker's comments and judgements, and writes that while a judgement has to be accepted by the linguist (because it is part of the native speaker's competence), the reliability of the comments depend on the speaker and the phenomenon Matthewson (2004, 399). She opposes Labov's (1972, 106) list[3] of judgements that is used within a generative grammar framework. Referring to Labov's (1972, 106) list, she argues that excluding the grammatically judgements, all the other information that the native speaker provides should not be categorized as a judgement. Matthewson (2004, 399) proposes three types of judgement tasks: 1) Grammatically judgements, 2) Truth value judgements, and 3) Felicity judgements.

Although the collection of judgements of these types has some advantages and is especially beneficial when determining if a sentence in the object language has more than one reading, it has some drawbacks. These drawbacks are mainly related to the question of how to best elicit and interpret the judgements obtained (Matthewson, 2004). One problem concerns the issue of multiple readings. The consultants usually think that the fieldworker wants to know the best way to say something in the object language. Therefore, the consultants often only discuss that preferred reading and may reject dispreferred readings. These rejections are troublesome to interpret. Matthewson (2004) argues that using a discourse context is crucial for judgement tasks and is even more fundamental to

[3]Labov's (1972, 106) list of judgements:

1. The original judgement of grammatically (well-formedness)
2. judgements of ambiguity
3. judgements of correct paraphrase
4. judgements of sameness or difference of sentence type
5. intuitions about immediate constituents

judgement tasks than to translation tasks. Discourse contexts are necessary because they establish a background against which the truth and felicity conditions of a sentence can be distinguished. The linguist should not ask for a felicity or truth value judgement without providing a discourse context, by only giving a sentence in isolation. Besides the issues of eliciting and interpreting judgements, she mentions that distinguishing falsity from infelicity is tricky, and that the fieldworker should record and make use of the consultant's comments properly as they are valuable clues to meaning and to why the native speaker rejects or accepts a sentence.

1.1.3 Verbal context elicitation

Burton & Matthewson (2015) further introduce *verbal context elicitation*. Verbal context elicitation is a type of *elicited production task*. In *elicited production tasks*, the linguist provides some stimulus and the consultants are asked to produce an utterance in response to the stimulus. Within this category, Burton & Matthewson (2015) refer to verbal context elicitation, and write that it works well with many consultants, though it has some drawbacks. In verbal context elicitation, the linguist provides the context to consultants verbally. In this method, linguists make use of a meta-language (a language known by both linguist and consultant that is not the object language), (Matthewson, 2004). Matthewson (2004) claims that using a meta-language is normally the best option to provide a discourse context and that the speakers are unlikely to be influenced by a meta-language. However, in verbal context elicitation, the issue of what meta-language works best arises. Burton & Matthewson (2015) identify the following **drawbacks** for verbal context elicitation:

1. The reading that the researcher tries to get may not exist for the English sentence (English as the meta-language). Burton & Matthewson (2015, 138) present an example from a study on the Gitskan language. In this study a context is given in English (as the meta-language). The epistemic modal *imaa* is produced by the Gitskan speaker which suggests that *imaa* allows past temporal perspective. The problem is that it is controversial if past-temporal perspectives for epistemic modals like *might* are allowed in English or not.

2. Consultants may misunderstand the intended discourse context.

3. Though data produced via direct elicitation are spontaneous and mostly grammatical, there is a risk of non-naturalness: Mosel (2012) argues that a risk that the created examples sound *unnatural* exists. Mosel (2012, 84) writes that in contrast to natural speech which occurs in the context of a particular speech situation, elicitation only contributes instances of decontextualized isolated sentences.

4. The context description can be complex and lengthy.

5. The consultants must imagine themselves in contexts they are not in, and imagine what they would say if they were in different contexts.

As standard semantic elicitation techniques have the above mentioned drawbacks, Burton & Matthewson (2015) propose and advocate storyboards. Storyboards are introduced as follows.

1.2 Storyboards (SB)

Burton & Matthewson (2015, 135) define **storyboards** as "pictorial representations of stories which consultants are expected to tell in their own words". **Targeted construction storyboards** are designed in a way to include at least one targeted context in order to test hypotheses about the relation between linguistic forms and that context. Using a targeted construction storyboard and accompanying it by follow-up questions, the linguist is able to elicit positive and negative data from the speaker about permissible forms in that context.

1.2.1 Advantages

Burton & Matthewson (2015) write that storyboards provide the following advantages:

1. Storyboards provide spontaneous, natural utterances with minimal meta-language influence or translation interference.

2. Storyboards allow the linguist to test hypotheses about particular linguistic elements or constructions, and further combined with follow up questions, the linguist can elicit negative data.

3. Using storyboards minimizes misunderstanding of the context, since in this method the discourse context is given via pictures rather than verbally (although this method-

ology involves some discussion of the context in the contact-language to ensure understanding).

4. Storyboards have the potential for replicability; Burton & Matthewson (2015, 142) write that using storyboard methodology allows 'entirely consistent contexts to be presented to different speakers, even in different languages and by different researchers'. However, they further mention that the issue of drawing culturally-neutral pictures still remains, and researchers may be forced to alter the story to adapt to local traditions, but still the plot and some aspects can be preserved.

5. Storyboards are fun for the consultants.

1.2.2 Disdvantages

In the *Most and more* project, we tried the storyboard methodology and tested it on Swahili, Persian, Arabic, and Swedish speakers. In our experience, storyboards proved to be difficult to use; the consultants forgot what the pictures were about and what they were expected to tell, the target constructions were not elicited, and further using this method was rather time-consuming. Also, it was sometimes difficult to draw proper representation of some sentences and constructions that we wished to elicit. Below is the list of disadvantages of storyboards in our experience:

1. It was difficult to draw illustrative pictures and proper representation of some sentences or constructions the linguist wishes to elicit.

2. Storyboards were time-consuming.

3. It was sometimes difficult to elicit the target constructions or required information due to the consultants' forgetfulness.

Therefore, having tested the storyboards, and the translation tasks, we decided to try a method to eliminate the disadvantages of storyboards and translation tasks and bring together their advantages. This led us to develop and test a method which we refer to as *Picture-aided translation task*.

1.3 Picture-aided Translation Task (PT)

Picture-aided translation is a term given to the methodology developed and used in this thesis. In picture-aided translation, a story (a series of slides) including both pictures and text is presented to the consultants. In this method, each picture is accompanied by text and therefore the stimuli are not fully non-linguistic. The consultants are asked to tell the story in their native languages based on the pictures and the sentences below them. This methodology has the potential to unify the advantages of storyboards with more traditional methods, as well as to eliminate their disadvantages. Presenting a picture with a text containing the target construction within the context of a story is expected to have the following advantages:

1. Minimizes the risk of misinterpretation; if there is any ambiguity in the context, having two sources to look at (picture and text) helps the consultants better understand the context. One stimulus may help resolve the ambiguity in the other one.

2. It should be faster than storyboards, because the consultants do not need to only rely on their memory (and the pictures) to remember what they should tell.

3. More target constructions should be elicited in this method in comparison to the storyboard methodology. When seeing the target construction presented in the text, the consultants will be reminded to try to use that construction when telling the story in their native languages.

4. Sometimes it is difficult to draw illustrative pictures and include the target constructions in them. Having a text that includes the target construction present below the picture, makes it easier for the linguist to elicit the information s/he wishes.

A picture-aided translation task, named the **What Matters (WM)** story (see section 3.1.2 for introduction), was developed in this project. A version of the What Matters story that was used in the *Main Study* (see section 3 to read about the main study) of this project, is presented at Appendix A. This picture-aided translation task includes a series of pictures that are accompanied by a total of 31 sentences. The pictures are designed to be as illustrative as possible, and to eliminate ambiguity and any risk of misinterpretations.

The developed picture-aided translation methodology in this project is presented to the consultants and is systematically compared to the storyboard methodology.

1.4 Research Questions

The aim of this thesis is to contribute to the ongoing discussions and research in semantic fieldwork methodology, by:

1. Conducting a systematic comparison of *picture-aided translation* and *storyboards*
    - Does the presence of the text make data elicitation better or worse (in terms of sentences faithfully translated)?
2. Evaluating different stories: Do different stories give different results? In particular, the following two stories are compared:
    - What Matters (WM) – see section 3.1.2 for more details.
    - Bake-off (BK) – see section 3.1.1 for more details.

    Although it is not a primary focus, the effect of presentation order (the order in which the tasks were presented to the consultants) is also addressed in this study.
3. Presenting guidelines and tips on how to create stimuli
    - What practices work best in creating stimuli for semantic fieldwork?
    - How to create stimuli in particular for superlatives of quantity and quality and comparatives.
4. Investigating the superlatives in Persian
    - Which morphosyntactic strategies are used in Persian for expressing absolute, relative, and proportional readings?

Before reading about the methodology employed in this project to approach the research questions, a brief background on the comparison strategies, superlatives, and different readings is presented in the next section.

2 Background

In this thesis, developing and testing materials for semantic fieldwork is conducted by a case study on quantity superlatives in Persian. Therefore, this thesis includes background and discussion on comparison strategies (section 2.1), superlatives (section 2.2), different readings (sections 2.3 and 2.4) and backgound on the Persian language (section 6.1).

2.1 Categorization of comparison strategies

There has been an increasing interest in the typology of comparatives and superlatives (see Stassen 1985, Andersen 1983, Heine 1997, Beck et al. 2010 Bobaljik 2012, Gorshenin 2012, Coppock et al. 2017). Stassen (1985, 15) defines comparative constructions as follows.

> *A construction counts as a comparative if that construction has the semantic function of assigning a graded (i.e. non identical) position on a predicative scale to two (possibly complex) objects.*

Stassen (1985) classifies comparative strategies under the following four categories:

1. Adverbial: Adverbial Comparatives are be divided into three subtypes; Separative (ablative), Allative, Locative (i.e. X is big FROM/TO/ON Y).

2. Exceed: Comparison is expressed by a verb usually glossed as 'to exceed, to surpass'.

3. Conjoined: Comparison is usually expressed via the conjunction of two clauses which contains, for example, antonymous adjectives, or adjectives representing differing degrees; a) 'X is big, Y is small', and b) 'X is big, Y is not (big)'.

4. Particle: This comparative construction includes a specific comparative particle which accompanies the standard NP, (e.g. the English than-comparative, the comparative particle *que* 'than' in French, and the comparative particle *mint* 'than, like' in Hungarian.

Bobaljik (2012, 18) writes that generally, an expression of comparison has three main parts: "a predicate denoting a gradable property, the subject of comparison, and the standard against which it is contrasted". Bobaljik (2012) classifies languages based on the strategy they use to make comparatives and superlatives. In his broad sample in

his book *Universals in Comparative Morphology*, Bobaljik (2012) studies and categorizes 143 languages. He distinguishes three types of strategies to construct comparatives: The *general strategies for forming comparatives* (which he calls **CMPR TYP**) are presented below:

General strategies for forming comparatives (CMPR TYP)

- **Exceed (EX)**: In an Exceed comparative, comparison is expressed by a verb meaning 'exceed, surpass'. (e.g. Yoruba 'Her income exceeds your income'; see (Beck et al., 2010)

- **Conjoined (CNJ)**: In Conjoined comparatives, comparison is expressed via the conjunction of two clauses which contains, for example, antonymous adjectives, or adjectives representing differing degrees. (e.g. Washo 'The man is tall, the woman is not tall'; see Bochnak 2015)

- **Standard (STND)**: In standard comparatives, the standard of comparison is integrated into the clause via a particular morphosyntax, for instance a 'than phrase' (like in English), or an oblique case marking. Most Indo-European languages are classified under this category. An example of this strategy is: English 'Alice is taller than Mary'.

Bobaljik (2012) further categorizes the *type of morphological expression of comparison combined with the adjectives* (which he calls **CMPR**) as presented below:

Type of morphological expression of comparison (CMPR)

- **Morphological (M)**: By 'M' Bobaljik (2012) refers to the Morphological (synthetic) expression of comparison. In this category, there is an affix (or a morphological process) on the adjective that is related with the expression of comparison. An example of this type is 'er' in the English comparatives.

- **Periphrastic (PERIPH)**: Under this categorization, there are no regular synthetic comparatives; instead comparison is expressed analytically. It is with the use of an adverb (or other free elements) that modifies the phrase which is headed by the

adjective. (e.g. Turkish *Mehmet Ali'den* ***daha*** *zengin* 'Mehmet is richer than Ali', lit. 'Mehment Ali-from **more** rich'[4]).

- **Not inflected or marked (ZERO)** Adjectives are not inflected or marked for the comparative construction. There is no difference between a comparative and a positive adjective. Most of exceed-type and conjoined-type comparatives are classified under this category. Japanese is a language with no overt marking of comparison Bobaljik (2012, 225): *Sally-wa Bill-yori kasikoi* 'Sally is smarter than Bill', lit. 'Sally-top Bill-from smart'.

  Furthermore, some languages are categorized as (M) or (PERIPH). These 2 terms are used for languages that can optionally use an affixal or periphrastic expression.

The majority of literature on the typology of comparison strategies has been devoted to comparative construction, but there has been an increasing interest to study superlatives of quality and quantity in different languages (Bobaljik 2012, Gorshenin 2012, Coppock et al. 2017).

Gorshenin (2012, 59) defines superlatives as follows:

> *A superlative construction is a natural language construction that assigns a graded position on a predicative scale to a group of normally more than two (possibly complex) objects and indicates one object in relation to which all the others are placed on the same side of the scale.*

For superlatives (**SPRL**), I present a categorization scheme proposed by Coppock et al. (2017) which combines the work of Bobaljik (2012) and Gorshenin (2012) and are as follows:

M: Refers to Morphological (synthetic) superlative marker (e.g. English *high-**est***).

PERIPH: In this category, superlatives are expressed by a Periphrastic superlative marker, that is in some cases optional (e.g. Turkish ***en*** *leziz* '**most** delicious').

CMPR+DEF: In this category superlatives are indicated via definiteness alone (e.g. French ***la*** *plus belle* '**the** more beautiful').

[4] `http://www.turkishlanguage.co.uk/adjcomparison.htm`

CMPR: There is no formal distinction between comparatives and superlatives. Irish is likely a language of this kind (Bobaljik, 2012).

CMPR+ALL: In this category, superlatives indicated with 'of/than all' (e.g. Russian *vyš-e* ***vse-x*** 'tall-er **all-of**').

CMPR+ANY: In this category, superlatives are indicated with 'of/than some/any' (e.g. Khmer *klang* ***ciang kee*** 'strong **exceed someone**'.

VERY: In this category, superlatives are translated using an intensifier (e.g. Maori *teitei* ***rawa*** *atu* 'tall **indeed** away').

ABS: Refers to when there is only an 'absolute' (i.e. 'elative') superlative (see Bobaljik 2012).

OTHER: In this category, either no superlative is reported, or some other strategy is used (e.g. Vietnamese: the superlative is reportedly indicated aspectually).

NONE: Refers to languages in which *no* superlative is reported.

2.2 Quantity and Quality Superlatives

As in this thesis, developing and testing materials for semantic fieldwork is conducted by a case study on quantity superlatives in Persian, this section briefly presents a definition of both quantity and quality superlatives.

Coppock et al. (submitted) use the term *quantity superlatives* for the superlative forms of quantity words such as *many*, *much*, *little* and *few*, and *quality superlatives* for the superlatives of ordinary gradable adjectives like *tallest*. Coppock et al. (submitted) further define a quantity superlative as a construction which its relation to the positive (bare form) adjectives MANY/MUCH is similar to the relation a quality superlative has to its positive (bare) form. For instance, if a language uses a morphological strategy [M] to make quality superlatives (i.e. the the positive adjective plus a superlative marker), it uses the same strategy to make a quantity superlative. Different comparison (comparative and superlative) strategies are presented in section 2.1.

Quality and quantity superlatives can have different readings. Section 2.3 and section 2.4,below, briefly introduce relative, absolute, and proportional readings.

2.3 Relative and Absolute Reading

The fourth main research question in this thesis is concerning the superlatives in Persian. One of the goal of this work is to investigate the morphosyntactic strategies used in Persian for expressing absolute, relative, and proportional readings. These terms are introduced in this section and section 2.4.

A quality superlative such as *tallest* is composed of two morphemes; the adjective stem *tall* and the superlative suffix *-est* (Heim, 1999). Quality superlatives can have two different readings: absolute reading and relative reading. Farkas & É. Kiss (2000) and Sharvit & Stateva (2002) claim that the superlative morpheme *-est* is DP-internal and the distinction between an absolute and a relative reading is made based on the context. In contrast, Szabolcsi (1986) and (Heim, 1999) argue that the difference between these two readings is based on the movement and the structural scope of the superlative morpheme *-est* in LF. Therefore, *-est* moves and it can be DP-internal (relative reading), or DP-external (absolute reading).

In an absolute reading of the sentence *John climbed* ***the highest*** *mountain*, the comparison class is all the relevant mountains, and it can be interpreted as the Mount Everest. In a relative reading the comparison class is all the relevant climbers and it is John who has climbed a higher mountain than the other climbers.

2.4 Proportional Reading

Hackl (2009) proposes that quantity superlatives, similarly to quality superlatives have relative readings, but instead of absolute readings, they have proportional readings. Hackl (2009) argues that the proportional quantifier *most* is not a lexical item (in contrast with (Barwise & Cooper, 1981). *Most* (the superlative form of *many* or *much*) is composed of *many* and the degree quantifier *-est*.

(1) John climbed most mountains. [PROPORTIONAL]

(2) John climbed the most mountains. [RELATIVE]

Sentence (1) has a proportional reading and it is interpreted as 'John climbed more mountains than he didn't climb'. Sentence (2) that has a relative reading is interpreted as

'John climbed more mountains than anyone else did'. Hackl illustrates that the construction *many+est* is used for both the proportional and the relative readings in both German and English.

A brief background on the comparison strategies, superlatives, and different readings was presented in this chapter. In the nest chapter, the methodology and materials by which the research questions were approached are presented.

3 Method

This work was conducted in three main stages: 1) The first attempts, 2) The pilot test, and 3) The main study. What was done in these stages is written in detail, below. In addition, a summary of these three stages is presented in Figure 1. Furthermore, an example of the changes and modifications before and after the pilot test is shown in Figure 2.

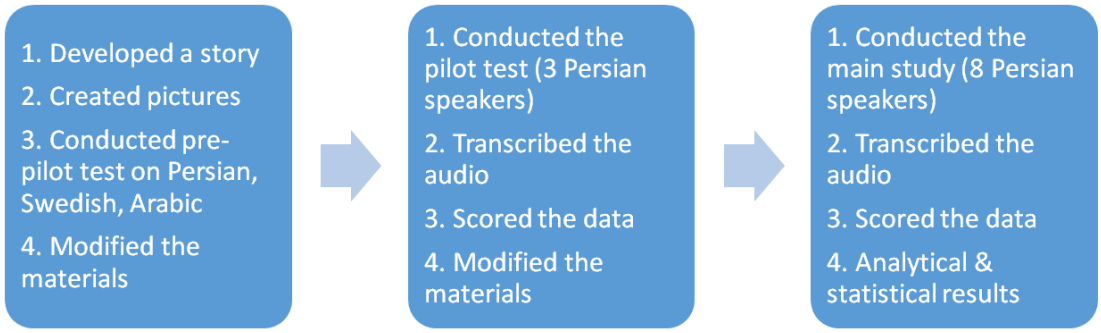


Figure 1: The Three Main Stages

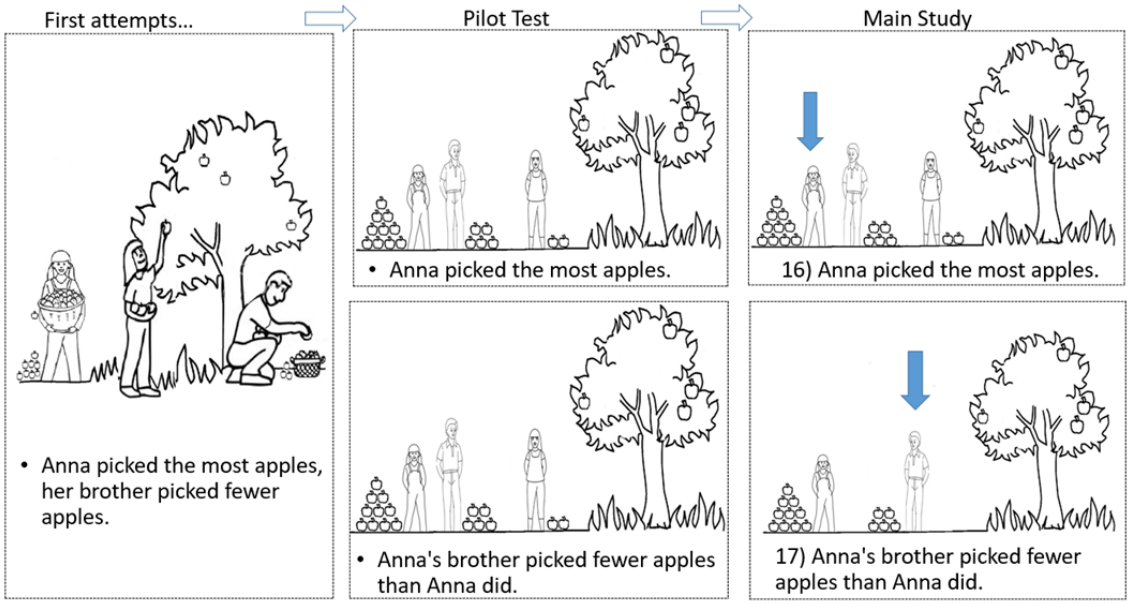


Figure 2: An example showing the changes before and after the pilot test (Images/Sentences 16 and 17 (WM))

1. **First attempts**: A story (the text of the What Matters story (WM)) was developed with the help of the team members in the *Most and more* project[5]. The text of the story, in which three kids compete in different contests, was designed to contain superlatives of quantity and quality, as well as comparatives and quantity words. Then, I created and designed pictures to accompany the sentences. Two versions of the story were created, one with text (for picture-aided translation) and one without text (for the storyboard method). The materials were then tested on native speakers of Swedish, Persian, Arabic, and Swahili to see the possible pitfalls of the images and/or sentences. Finally, the materials and methods were modified based on the results and feedback from the native speakers, in preparation for the second stage: The pilot test.

2. **Pilot test**: The pilot test was conducted on three Persian speakers. The participants and the orders in which they did the tasks are presented in Table 1. The speakers were audio-recorded during the test. The recordings were then transcribed and scored.

[5]Thanks to Elizabeth Coppock and Elizabeth Bogal-Allbritten for their contributions and very helpful comments.

Finally the materials and methods were modified and improved based on the results of the pilot test and feedback from the participants in preparation for the main study.

3. **The main study**: Persian speakers participated in four tasks, in different orders. The participants and the orders in which they did the tasks are presented in Table 3. The speakers were audio-recorded during the test. The recordings were transcribed after each session. The data was then scored and analysed based on the results of the study, and the speakers' comments and feedback.

3.1 Materials

The materials involved two stories including text and pictures, the Bake-off (BK) story and the What matters (WM) story (the goal was to include a story (BK) that already existed and was approved by Lisa Matthewson and test and compare it with the story (WM) developed in this thesis: more details below). These stories are a sequence of slides and were presented to the participants in two different versions, one with text (for picture-aided translation) and one without text (for the storyboard method), yielding four different combinations. These four combinations are presented in the list 3.1 below:

1. The storyboard version of the Bake-off story (BK-SB)
2. The picture-aided translation version of the Bake-off story (BK-PT)
3. The storyboard version of the the What matters story (WM-SB)
4. The picture-aided translation version of the What matters story (WM-PT)

3.1.1 The Bake-Off story (BK)

The *Bake-off* story is a targeted construction storyboard created by TFS Working Group (2011) and is available on-line[6]. The Bake-off storyboard includes 20 pictures that illustrate the story of a baking contest between two people. In another version of this story (which I call BK-PT), every picture is accompanied by a sentence.

[6]www.totemfieldstoryboards.org

3.1.2 The What Matters story (WM)

The sentences of the *What Matters* story were developed by the team members of the *Most and More* project. The story narrates several competitions between three siblings. This story is designed to be fun, to adapt to different cultures, and to elicit superlatives of quantity and quality, as well as comparatives and other quantity words in as many languages as possible. Pictures were created to accompany the text. I tried to make the pictures as illustrative as possible, since the storyboard version (WM-SB) of this story contains only pictures. WM-SB is designed in a way to elicit the target constructions in the object language without the participants seeing the text.

The picture-aided translation version of the What Matters story (WM-PT) includes pictures that are accompanied by text. Since the What Matters story was developed during the writing of this thesis, it was subject to changes, and was modified and improved many times during different stages of the work. Thus, the version used in the pilot test is to some extent different from the version used in the main study. In section 4.1, changes after the pilot test is discussed. The picture-aided translation of the What Matters story (WM-PT) which was used in the main study is presented in Appendix A.

3.2 Participants

3.2.1 Pilot participants

Three Persian speakers participated in the pilot test. This study needed the Persian speakers to be fluent in English, so the participants were chosen based on their the level of education. Demographics of the participants are illustrated in Table 1.

ID	Age	Education	Gender	Order of Tests
P1	61	Medical Doctor	Female	SB-BK SB-WM, PT-BK PT-WM,
P2	31	PhD Student	Male	PT-WM, PT-BK
P3	35	PhD Student	Female	PT-BK SB-BK, PT-WM SB-WM

Table 1: Participants in the pilot study

3.2.2 Main study participants

Eight Persian speakers participated in the main study. The tasks that they participated in are presented in the list 3.1. Being highly educated was the main criterion to choose the participants. Age, gender, and education/status of the participants, as well as the order of the tasks they did are presented in Table 3 in Appendix C.

3.3 Data collection sessions

3.3.1 Pilot test

Data collection sessions for the pilot test were set in a fairly informal setting, and many details of the work were discussed with the participants. Each Persian speaker participated in 4 tasks (*BK-SB, BK-PT, WM-SB, WM-PT*), but the order of the tasks varied across participants. The participants were welcomed to discuss any thing they felt weird, difficult, or noteworthy. They also talked about how they feel about the whole data elicitation session, and how they think the data collection sessions can be improved. The participants were filmed (video and audio-recorded) during the study. Each data collection session took around one and a half hours.

3.3.2 Main study

As most of the participants in the main study were doctoral students and researchers, data collection sessions were set either at the University of Gothenburg or at the Chalmers University of Technology, Gothenburg, Sweden. Each data session took about one hour. The data that the participants provided were only audio-recorded, but selected notes were also taken during the elicitation sessions. At the beginning of the session, the purpose of the study, its contribution to science, and the procedures of the tasks (see the list of tasks in section 3.1) were explained to the participants. This made them more motivated to participate in the study, and more comfortable with what they would be doing during the study.

	MethodOrder	
StoryOrder	SB before PT	PT before SB
WM before BK	SB/WM PT/WM SB/BK PT/BK (2 participants)	PT/WM SB/WM PT/BK SB/BK (2 participants)
BK before WM	SB/BK PT/BK SB/WM PT/WM (2 participants)	PT/BK SB/BK PT/WM SB/WM (2 participants)

Table 2: Order counterbalancing

While conducting this project, I also received data on the 'order' in which the tasks were done; each consultant did both conditions (storyboard, picture-aided translation) for both stories (the What Matters Story, the Bake-off story). The order of the tasks was counter-balanced in order to eliminate any probable effect of order on the results. This gave me a 'bonus' research question, and I could see if order has an effect. A full illustration of MethodOrder and StoryOrder counterbalancing is presented in Table 2. The results of studying the order effect is presented at section 5.1.2.

3.3.3 Ethical issues

All the participants in this study gave consent for their audio, video (belongs with the pilot test participants), and their names to be recorded and published within this thesis.

3.4 Scoring the data

The outcome variable that was measured most systematically was **faithfulness**. Faithfulness is a way of measuring degree of success in eliciting the target construction. The point is that I am not just looking for speakers to use a structural correlate to the structure used in the English prompts (e.g. a superlative morpheme), but I want the speakers to use any structure that is appropriate in their language to express the same truth conditions. For instance, in a language that totally lacks superlative morphemes, a translation would count as faithful as long as the same general truth conditional meaning is conveyed. For each sentence, I scored it as **1** if the translation was faithful, and **0** otherwise. In particular, the data was scored as **0** for any of the following categories:

- Rough idea
- Misinterpretation
- Forgotten

Below I provide some examples of these categories.

3.4.1 Examples of faithful translation

When I show Persian speakers slide (image+sentence) 4 of the WM story which is accompanied by the sentence *So he climbed a shorter tree*, they should give the equivalent comparative form using *-tar* 'CMPR' in Persian. In Example (3), the comparative form *kutah-tar* 'short-CMPR' is constructed using the comparative marker *-tar*. Therefore, example (3) is a faithful translation for sentence 4, and thus it is scored as **1**.

(3) *Pas u az deraxt-e kutah-tar-i bala raft-ø.*
So he from tree-EZ short-CMPR-INDEF up go.PST-3sg
'So, he climbed a shorter tree'

When Persian speakers are presented the image and sentence 8 (*...Let's see who can run the fastest!*) of the WM story, which contains a superlative from in English, producing a superlative form using *-tar az hame* 'CMPR from all' in Persian is acceptable (though like English a Morphological strategy, using a superlative marker, is also available). Example (4) is a faithful translation for sentence 8, and thus it is scored as **1**.

(4) *...be-bin-im ki az hame sari-tar mi-do-e.*
SUBJ-see-1pl who from all fast-CMPR IMFV-run-3sg
'...Let's see who runs faster than all'

I use example (4) to illustrate the notion of faithfulness in more depth. The point is that the construction used in the Persian sentence (*-tar az hame* 'CMPR from all') is not similar to the English one (*the fast-est* 'DEF fast-SPRL', but the same general truth conditional meaning is conveyed. (As presented in chapter 6, in Persian two strategies are used to makes superlatives: a) Morphological [M] and b) Comparative form + a universal quantifier [CMPR+ALL].

3.4.2 Examples of rough idea

In sentence/image 8 of the WM story (...*Let's see who can run the fastest!*), the target construction is *the fastest*. The Persian speakers should use a superlative strategy to translate the English sentence. When a faithful construction is not elicited (i.e. a Persian superlative strategy is not used), but the Persian speaker gives a translation that is somewhat related to the stimuli, it is scored as **0**. An example of a sentence scored as a 'rough idea' is given in (5). The English prompt in this example is *...Let's see who can run the fastest!*. However, as presented below, in the Persian translation a superlative strategy is not used (and the target construction is not elicited) and only a sentence with the same rough idea is produced. Therefore, this translation is scored as **0**.

(5) *...be-bin-im ki barande mi-šav-ad.*
SUBJ-see-1pl who winner IMFV-become.PRES-3sg
'...Let's see who wins'

An example of a faithful translation for sentence/image 8 (WM) is presented above in (4), in which a faithful translation is elicited.

3.4.3 Examples of misinterpretation

Sentence 21 (...Whoever drinks the most juice is the winner...) of the WM story has a relative reading. The Persian speaker is expected to give an equivalent for this sentence using a superlative strategy. There are two ways to give the equivalent for sentence 21 (either of the following):

(6) *Kas-i ke biš-tar az hame abmive be-nush-e*
one-INDEF that much-CMPR from all juice SUBJ-drink.PRES.3sg
barandeh ast-ø.
winner be.PRES-3sg
'The one who drinks more juice than all is the winner!'

(7) *Kas-i ke biš-tar-in abmive ro be-nush-e barandeh*
one-INDEF that much-CMPR-SPRL juice OM SUBJ-eat.PRES.3sg winner
ast-ø.
be.PRES-3sg
'The one who drinks the most juice is the winner!'

However, in example (8) not only a faithful translation is not elicited, but also the Persian speaker has misinterpreted the meaning and what is produced has only a proportional reading in Persian. Therefore, example (8) is scored as **0**.

(8) *Kas-i* *ke* *biš-tar-e* *abmive ro* *be-nush-e* *barandeh*
one-INDEF that much-CMPR-EZ juice OM SUBJ-eat.PRES.3sg winner
ast-ø.
be.PRES-3sg
'The one who drinks most of the juice is the winner!'

3.4.4 Examples of forgotten

There were several cases in which Persian speakers didn't respond to the stimuli or forgot what they were expected to say. This happened mostly with the storyboards (i.e. when there was no text available, and they had to rely only on the picture to be able to produce utterances.). For example pictures 13 and 26 of the WM story, and picture 3 of the BK story were skipped by the participants in a few cases. These cases in which nothing was produced were scored as **0**.

4 Results and discussion 1: Constructing materials

4.1 Results 1a: Changes after the pilot test

Based on the results from the pilot test and comments from the consultants, changes were made to the methods and materials used in the pilot test. Only the What Matters story (which is developed in this thesis) was subject to change. These changes are presented and discussed below.

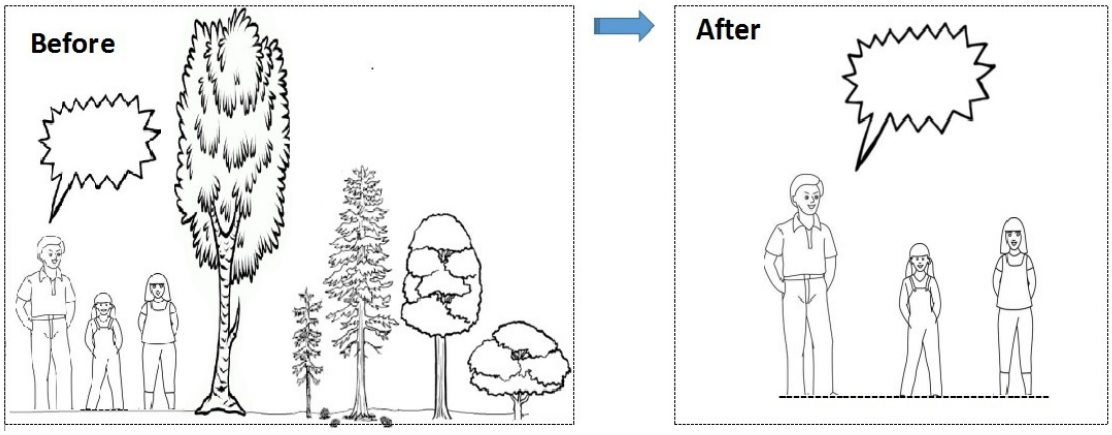


Figure 3: Image 2 (WM) before and after the pilot test.

Image 2 was modified after the pilot test (see Figure 3). In sentence 2, 'whoever climbs the tallest tree...' could have two interpretations: 1) the tallest tree in the garden, or 2) the tallest tree among the trees that the kids climb. In order to decrease misinterpretation and elicit the target construction (the relative reading), I removed the trees so that there is no particular tree to refer to.

Furthermore, **sentence 2** was changed from a to b:

a. Her brother shouted: 'Let's have a contest! Whoever climbs the tallest tree wins!'

b. Her brother shouted: 'Let's have a contest! Whoever climbs the tallest tree is the winner!'

'Whoever climbs the tallest tree is the winner' was changed to 'whoever climbs the tallest tree wins', because the native speakers of Swedish that I consulted[7] said that the latter sounds better with *högst träd* (relative reading) as opposed to *det högsta trädet* (relative or absolute reading).

[7]Swedish speaking consultants participated in the first stage of the work; 'The First Attempts'. The Swedish equivalent for the revised version of sentence 2 would be; Hennes bror ropade: 'Låt oss ha en tävling! Den som klättrar högst träd vinner!'

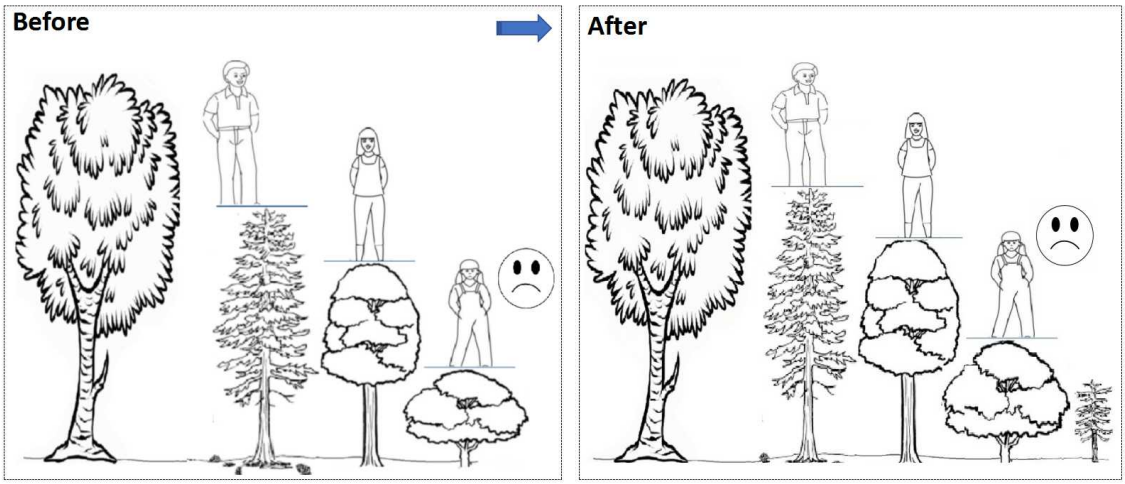


Figure 4: Image 6 (WM) before and after the pilot test.

The target construction in **Image 6** (see Figure 4), was to elicit 'Anna lost because she climbed the shortest tree' (a relative reading), but the picture at left (in Figure 4) which was used in the pilot test was misleading and resulted in two interpretations: 1) the shortest tree in the garden, or 2) the shortest tree among the trees that the kids climb. Therefore, in order to decrease chances of misinterpretation, I modified the picture and added a shorter tree than what Anna climbed to show that the tree that she climbed is not the shortest one in the garden.

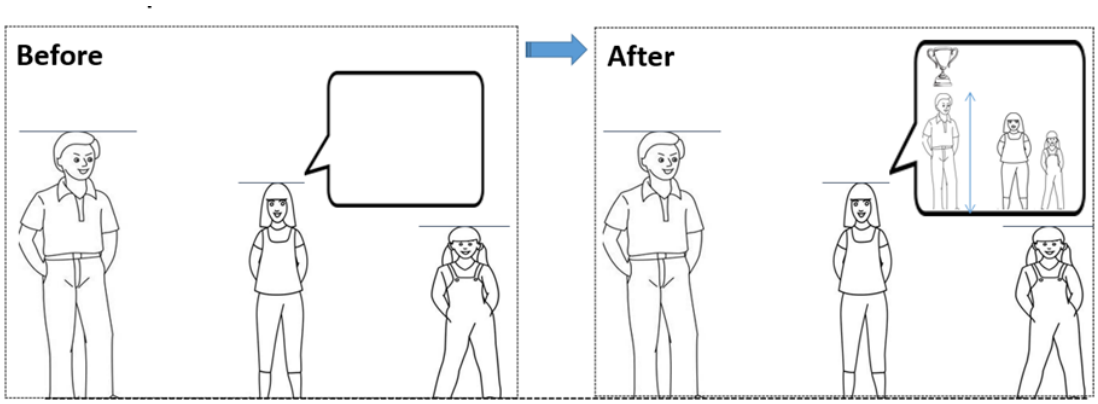


Figure 5: Image 7 (WM) before and after the pilot test.

Image 7 was modified after the pilot test (see Figure 5). There was no clue in the first image to remind the consultant what this character of the story (Anna's sister) is talking about and what the flow of the story was. Therefore in order to decrease forgetfulness and increase faithfulness especially in the Storyboard version of the What Matters story, I drew an illustration of what Anna's sister is saying and put it in the bubble. Furthermore, **sentence 7** was changed from a to b, after the pilot test. Both the Swedish and Persian speakers (who participated in the first attempts and in the pilot test) thought that 'he only won' is difficult to say, and 'the only reason that he won' sounds more natural to them.

a. Anna's sister said to her: 'He only won because he is taller than us...'

b. Anna's sister said to her: 'The only reason that he won is that he is taller than us...'

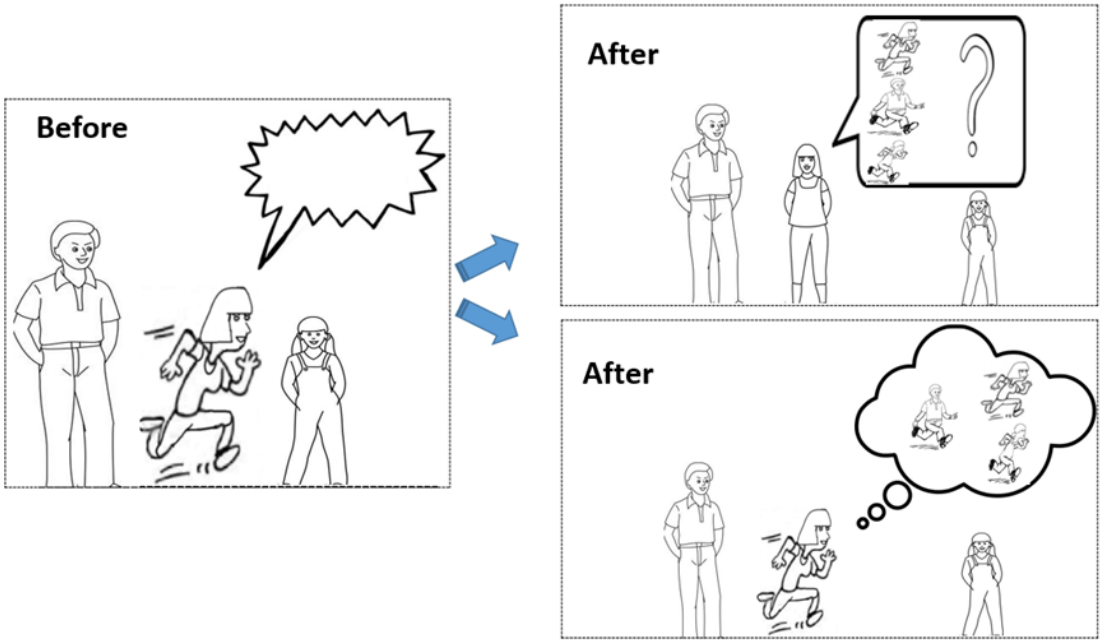


Figure 6: Image 8 and 9 (WM) before and after the pilot test.

Figure 6 shows a picture used in the pilot test that was divided into two pictures with several modifications. This picture was designed to convey/accompany the text *... What Matters is who can run the fastest! I bet we can run faster than he can* in the pilot test. But I was unsuccessful in eliciting the target constructions *the fastest* and *faster* in the pilot test and in the first attempts. Moreover, it was difficult to draw the concept of 'what matters'. Therefore I divided both the picture and the text used in the pilot test into two parts. The text in the pilot test was divided and changed to sentence 8 and 9 shown below.

- **Sentence 8**: ...Let's see who can run the fastest!
- **Sentence 9**: ...I bet we can run faster than he can.

Image 8, (on the top of image 9) in the right hand side of Figure 6, is designed to illustrate the question Anna's sister asks about who can runs the fastest. **Image 9**, shown below image 8 (see Figure 6), illustrates what Anna is telling in the bubble.

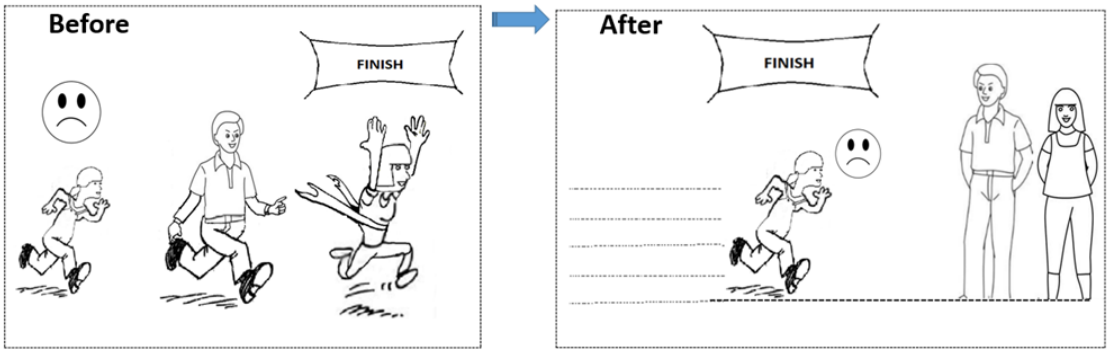


Figure 7: Image 12 (WM) before and after the pilot test.

Image 12 was also changed after the pilot test (see Figure 7). At first, the image did not focus only on the target construction and other sentences were produced by the consultants (especially in the storyboard version). Therefore, I tried to narrow down the possible interpretations of this image and illustrate the story with more emphasis on the 'But Anna finished **last**' part.

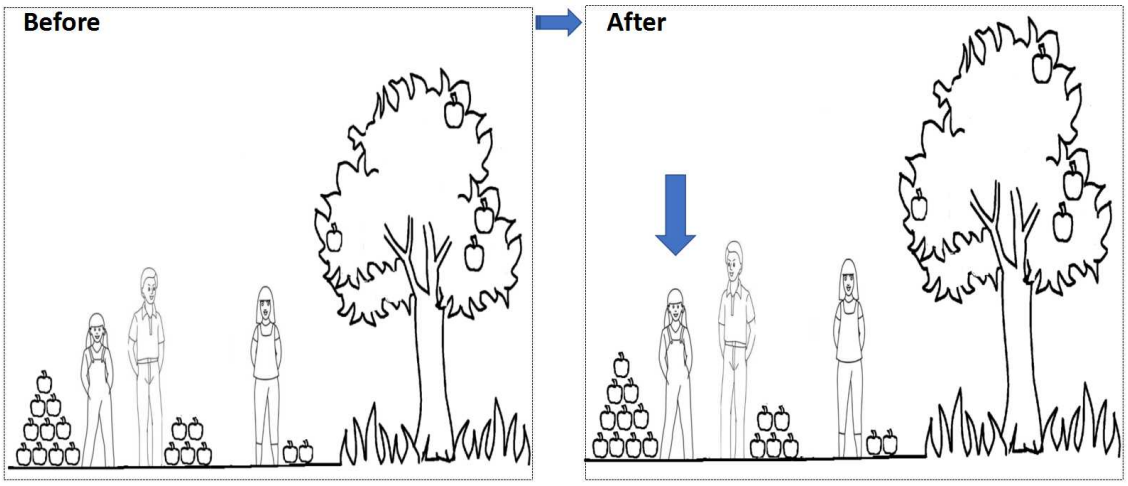


Figure 8: Image 16 (WM) before and after the pilot test.

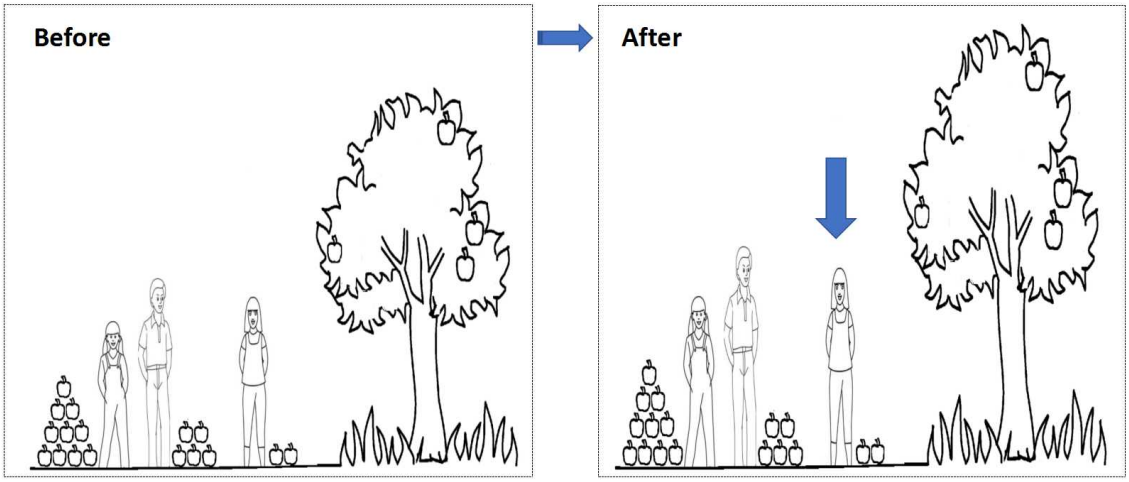


Figure 9: Image 18 (WM) before and after the pilot test.

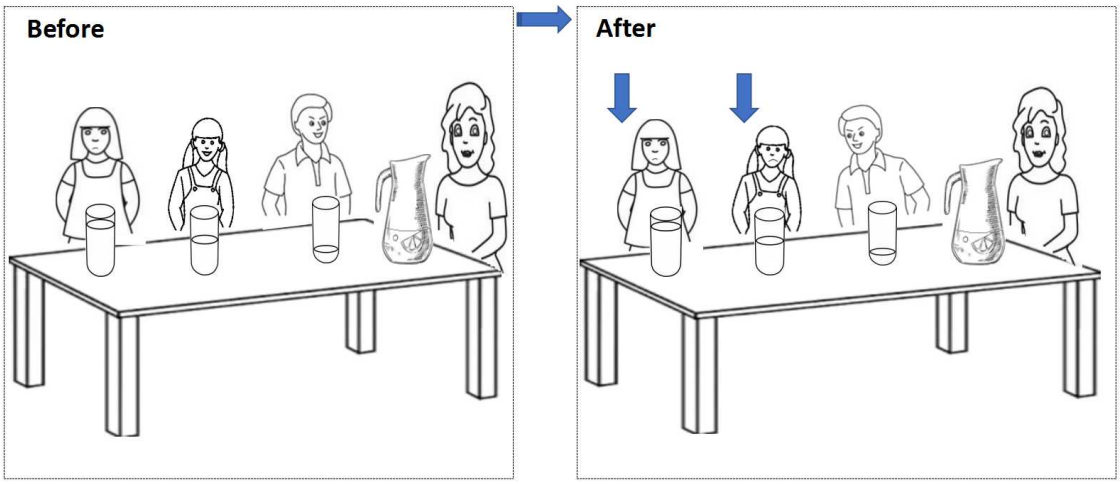


Figure 10: Image 23 (WM) before and after the pilot test.

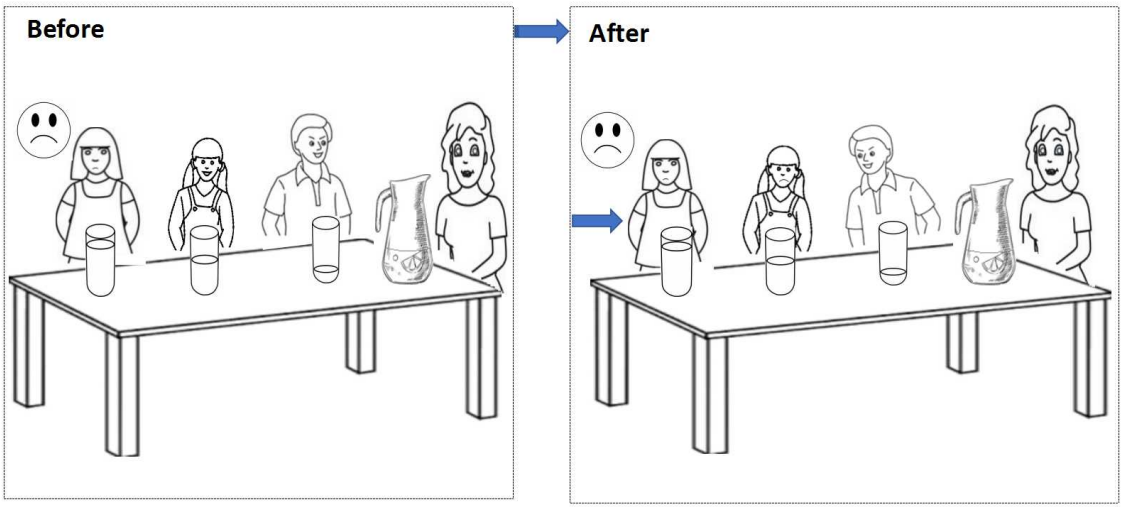


Figure 11: Image 25 (WM) before and after the pilot test.

I also added an arrow pointing to the subject of the sentence/picture. **Image 16** (see Figure 8), **Image 18** (see Figure 9), **Image 23** (see Figure 10), and **Image 25** (see Figure 11), presented above, are modified after the pilot test and an arrow is added to the main [8] character of the picture. It reminds the consultants who/what the story is about in that particular picture and help them remember what to say. This decreases forgetfulness and helps elicit more faithful sentences. (Compare **Image 16** and **Image 18**. **Sentence 16** 'Anna picked the most apples', and **sentence 18** 'Anna's sister picked the fewest apples' that accompany the related pictures in the picture aided translation version of the story. In the storyboard version of the story in which the text is not present, the participants are expected to produce the target constructions 'the most apples' and 'the fewest apples' by looking at the pictures. In the pilot study, the difference between **Image 16** and **Image 18** was not clear and the participants were confused what to say. The arrows pointing to the character in focus helped them a lot in producing the target construction.)

[8] In **Image 23**, two arrows are added to the picture; one arrow pointing to Anna, and one pointing to her sister, as they are both the subject of the sentence.

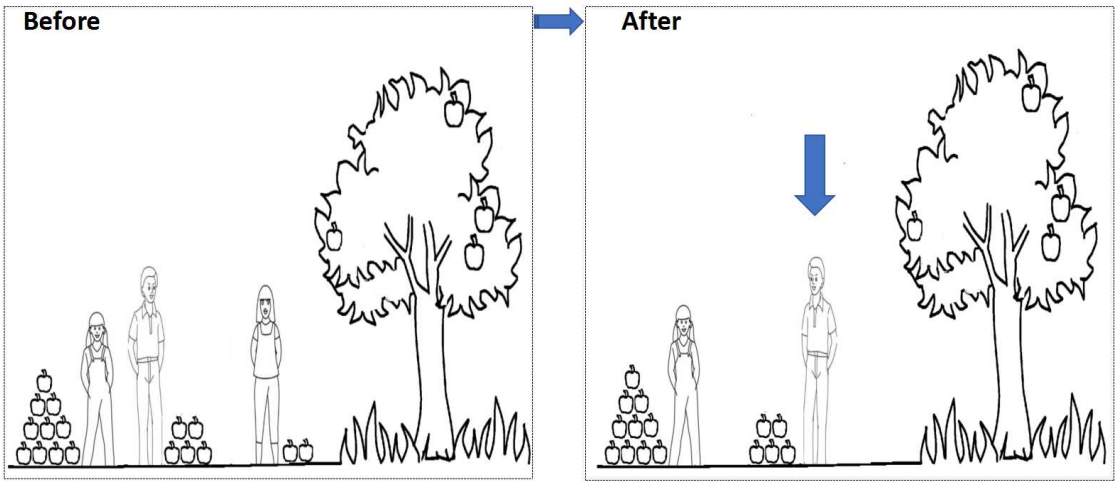


Figure 12: Image 17 (WM) before and after the pilot test.

In addition to adding an arrow to the subject in **Image 17** (see Figure 12), I also removed Anna's sister from the picture as she is not present in **sentence 17**. This helped remind the consultants that **Image 17** illustrates a a comparison between two people, not between three.

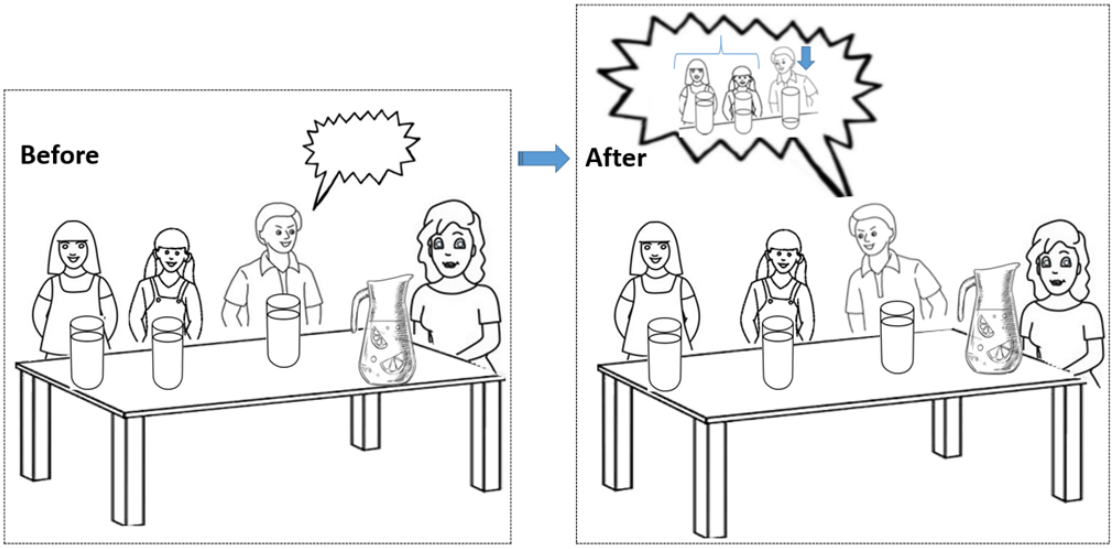


Figure 13: Image 22 (WM) before and after the pilot test.

In the main study, **sentences 21** (When they got home, Anna's brother shouted: 'Let's have another contest! Whoever drinks the most juice is the winner...') and **22** ('...I bet I can drink more juice than both of you...') have separate images, while in the pilot test there was only one image (see the left picture in Figure 13) for 'When they got home, Anna's brother shouted: 'Let's have another contest! Whoever drinks the most juice is the winner. I bet I can drink more juice than both of you!". I broke this long text (of the pilot test) into two separate sentences (21 and 22) for the main study. Separate images were also added to each sentence. Furthermore, the image designed for the pilot test was not illustrative and the consultants forgot what the story was about. Thus, in the bubble above Anna's brother, I added images illustrating what he is talking about. An arrow pointing to Anna's brother was also added to the bubble to emphasize that he is referring to himself ('I bet I can drink more juice than both of you'). I also drew a brace above Anna and her sister to include both and to remind the consultants that the brother is comparing himself to the sisters taken together.

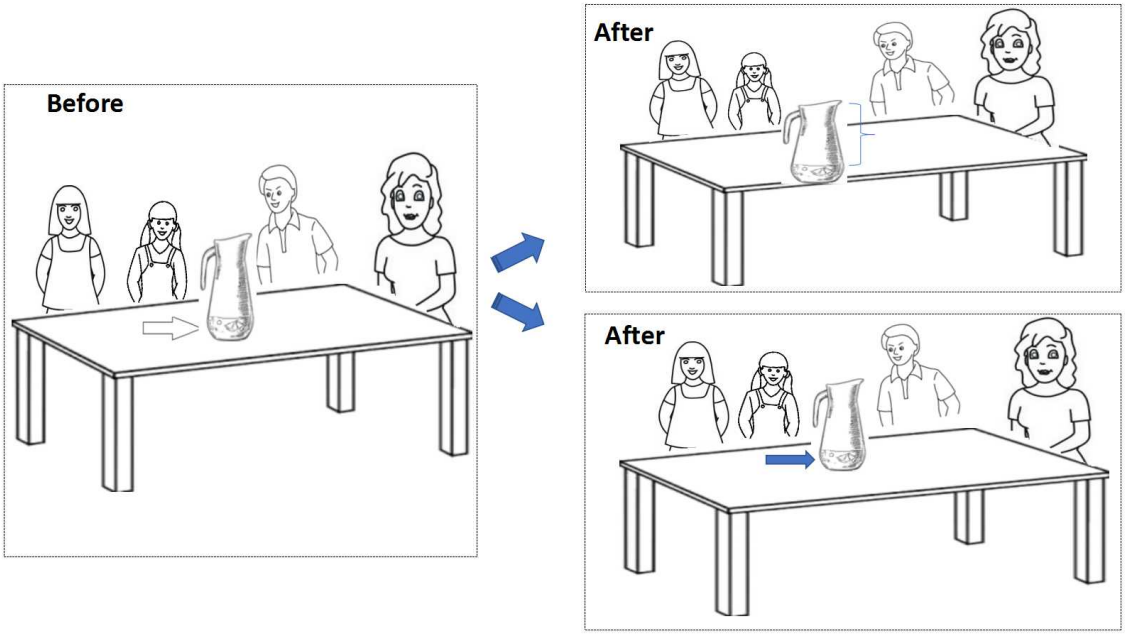


Figure 14: Image 26 and 27 (WM) before and after the pilot test.

The picture at the left in Figure 14 was accompanied with the text 'Together, they drank most of the juice. Only a little bit of it was left.' in the pilot test. But I was unsuccessful in eliciting faithful translations for 'most of the juice' and 'a little'. Two target constructions were included in one slide (containing the picture and the text) and it made it difficult for the consultants to remember what to produce especially in the storyboard version. As there was only one clue to remind the consultants what to produce, I tried to increase the faithfulness level by making the task easier for the consultants. After the pilot test, the picture and the text was divided into two pictures (**Image 26** ad **Image 27**) and two sentences (**Sentence 26** and **Sentence 27**). As illustrated in 14 a brace is added to help elicit the concept of 'most of the juice', and an arrow is added to point to the 'a little bit of' the juice that was left. The text was also divided to: **Sentence 26** 'Together, they drank most of the juice' and **Sentence 27** 'Only a little bit of it was left'.

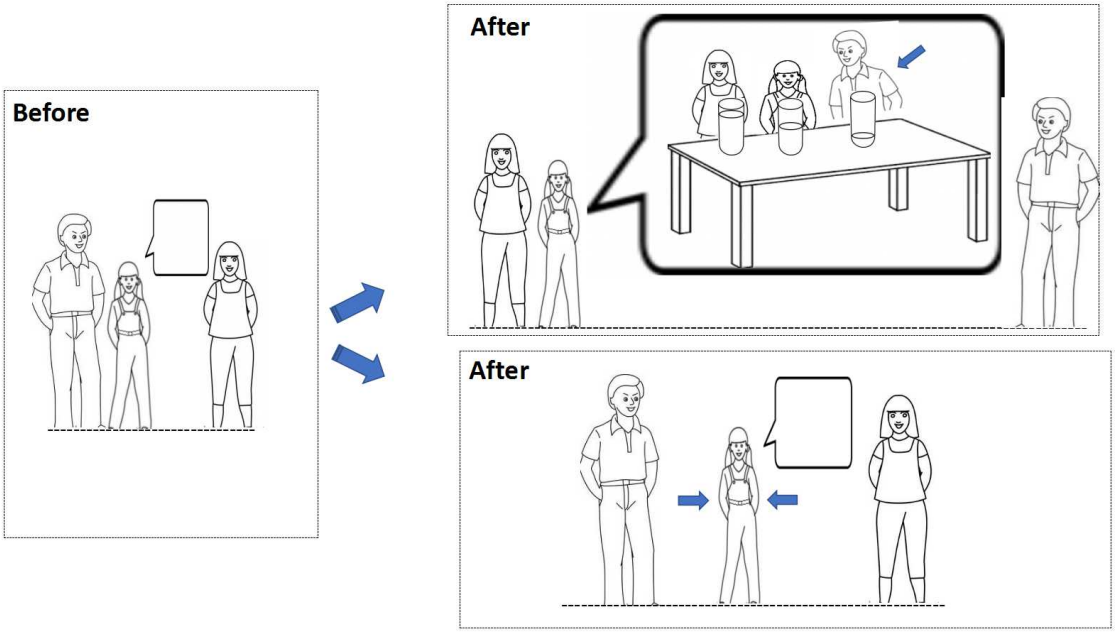


Figure 15: Image 28 and 29 (WM) before and after the pilot test.

The picture at the left in Figure 15 was accompanied with the text 'Anna said to her brother: Well, you drank the most juice, but I'm the one who has the smallest waist!', in the pilot test. It was designed to elicit translations for 'the most juice' and 'the smallest waist'. However, I was not successful in eliciting such expressions as the the text was long and contained two different target constructions. Moreover the picture was not illustrative and the consultants had no idea what Anna is saying, looking at the picture alone. Therefore, I divided the text into two smaller parts and designed separate pictures for each of them. The text was divided to **Sentence 28** (Anna said to her brother: 'Well, you drank the most juice...) and **Sentence 29** (...but I'm the one who has the smallest waist!).

As shown in Figure 15, pictures are modified after the pilot test. In **Image 28**, what Anna is talking about is illustrated in the bubble. This reminds the consultants that Anna is talking about the juice competition. In addition, an arrow pointing to the brother is added to the bubble to convey that he is the subject of what Anna is talking about (i.e. he drank the most juice). And finally in **Image 29**, two arrows are added pointing to Anna's waist (a belt is also added to Anna's clothes) to remind the consultants what Anna is talking about and in order to produce the target construction 'the smallest waist'.

4.2 Discussion 1: Lessons learned

The process of developing the What Matters story and testing it on native speakers of different languages taught us several lessons which are noteworthy for future creation of elicitation materials.

First, it is best to keep stories short and simple, but if you have to develop a long story, divide it up into sections. Also try to make sentences as short as possible. Second, it is good to use arrows that point to main subjects of the story in order to help the participants remember the story. Arrows help participants focus on the main speaker and pay attention to the main point of the image. Thus the target construction would be elicited more often and this would lead to having higher faithfulness. Third, when drawing images, avoid distractions and unnecessary information. make pictures illustrative, informative, fun and simple at the same time. Fourth, put some clues in the pictures to make them informative and help the participants remember the story. This can be done by adding bubbles and braces. An example using bubbles is shown in Figure 6 where illustrations of what the speaker is saying are drawn in the bubbles above her. Without these bubbles, the participant may forget what the speaker is saying (where no text is presented). You can see two example in which braces are used in Figure 13 and Figure 14.

5 Results and Discussion 2: Picture-aided translation vs. Storyboards

5.1 Results 2: Picture-aided Translation vs. Storyboards

A systematic comparison of picture-aided translation and storyboards was conducted in this project. The results from testing picture-aided translation vs. storyboards are presented below.

5.1.1 Faithfulness

As discussed in Section 3.4, the outcome variable that was measured most systematically in this project, was *faithfulness*. The results from comparing picture-aided translation with the storyboards show that **picture-aided translation increases faithfulness**: On

average (per participant), the percentage of sentences faithfully translated increased **20%** using picture-aided translation for the 'What Matters' story. Figure 16 shows the percentage of sentences faithfully translated by each participant in the What Matters story and illustrates the difference between WM-SB and WM-PT. In Figure 16, the vertical axis shows the percentage of sentences faithfully translated, and the horizontal axis shows the eight different consultants.

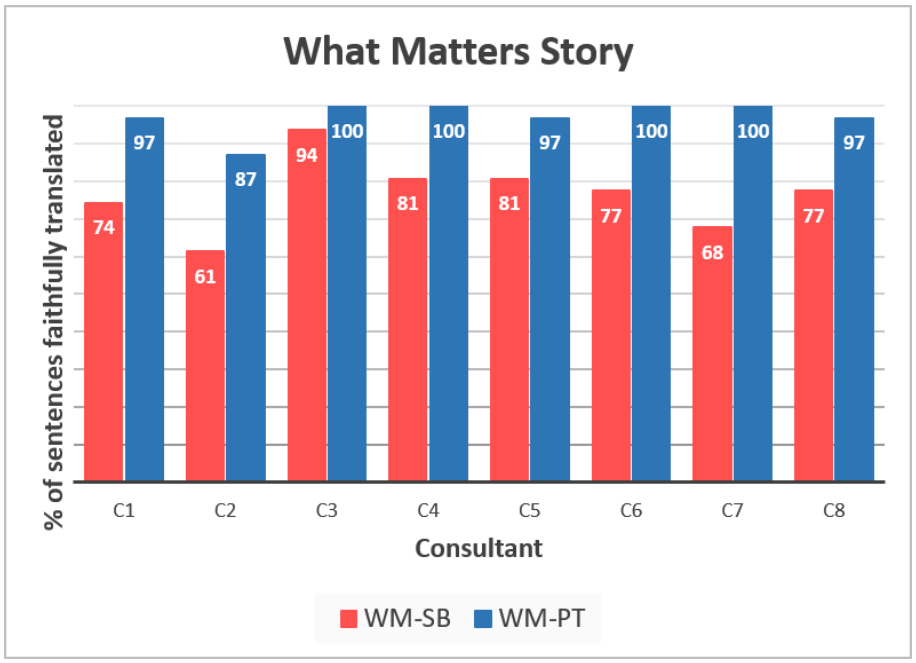


Figure 16: Percent of sentences (constructions of interest) faithfully translated by each participant in the What Matters story. Results for the storyboard method are shown in red; picture-aided translation in blue.

For the Bake-off story, the results from comparing picture-aided translation with the storyboards also show that picture-aided translation increases faithfulness: On average (per participant), the percentage of sentences faithfully translated increased **10%** using picture-aided translation for the 'Bake-off' story. Figure 17 shows percent of sentences faithfully translated by each participant in the Bake-off story and illustrates the difference between BK.SB and BK-PT. In Figure 16, the vertical axes shows the percentage of sentences faithfully translated, and the horizontal axes shows the eight different consultants.

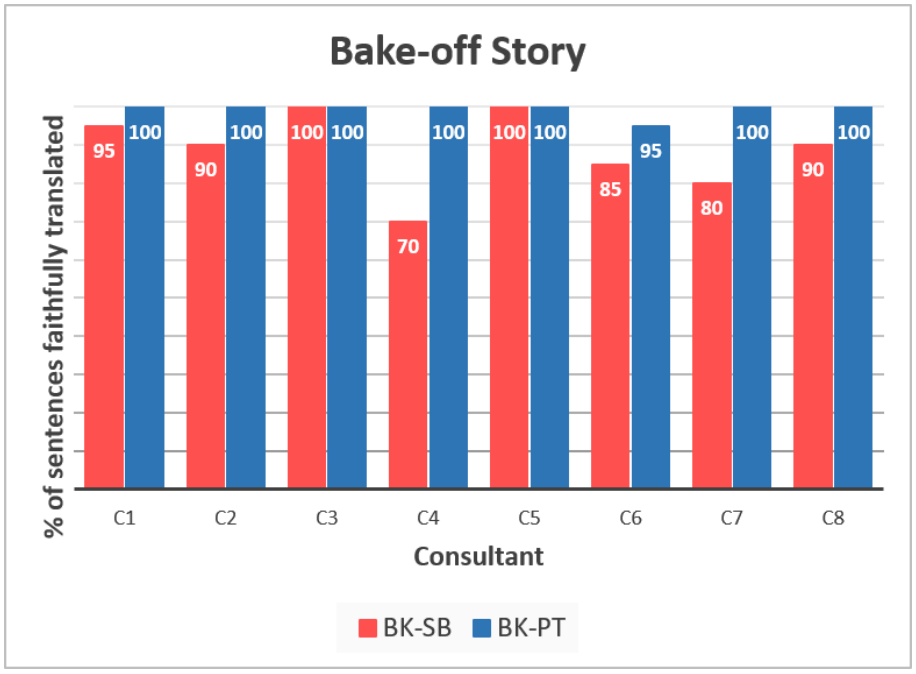


Figure 17: Percent of sentences faithfully translated by each participant in the Bake-off story. Results for the storyboard method are shown in red; picture-aided translation in blue.

We received more faithful translations for the 'Bake-off' story than the 'What Matters' story, possibly due to length of story and sentences and the level of difficulty. The 'Bake-off' story was shorter and simpler.

5.1.2 Statistical analysis with R

In this part I present the results from conducting statistical analysis using Generalized Mixed Model in R[9]. As shown in Figure 18 the fixed effects were Method (PT/SB), story (WM, BK), MethodOrder and StoryOrder. The Random effects were Participant and Item.

The results from statistical analysis with R show that Method (PT/SB) is highly significant and has large effect. The statistical analysis with R confirms that the picture-aided translation method yields higher faithfulness level. Further, the results show that Story (BK/WM) is also significant. The statistical analysis with R confirms that the Bake-off

[9]LME3 package, glmer Mod m1 <- glmer(Faithfulness ~ Method + Story + MethodOrder + StoryOrder + (1|Participant) + (1|Item), family="binomial", data=data)

story yields higher faithfulness level too. Finally, the results show that there is no effect of order.

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	4.6456	0.9375	4.956	7.21e-07	***
MethodSB	-3.0715	0.4429	-6.935	4.06e-12	***
StoryWM	-1.3053	0.5959	-2.190	0.0285	*
MethodOrder	0.3340	0.3531	0.946	0.3442	
StoryOrder	0.6696	0.3421	1.957	0.0503	.

Figure 18: Statistical analysis with R

Statistical analysis with R shows that the Method (PT/SB) that the fieldworker employs is highly significant, and that the picture-aided translation yields higher faithfulness level. It also shows that the Story used in the fieldwork is significant, and that the Bake-off story yields higher faithfulness level than the What-Matters story. Finally, the results from statistical analysis with R shows that the order (MethodOrder and StoryOrder) in which the tasks are conducted has no effect on the faithfulness level.

5.1.3 Comfort and fun

The participants were also asked to answer how fun they thought the tasks were. They were asked to rate how fun it was to participate and do the tasks on a scale from 1 to 5.

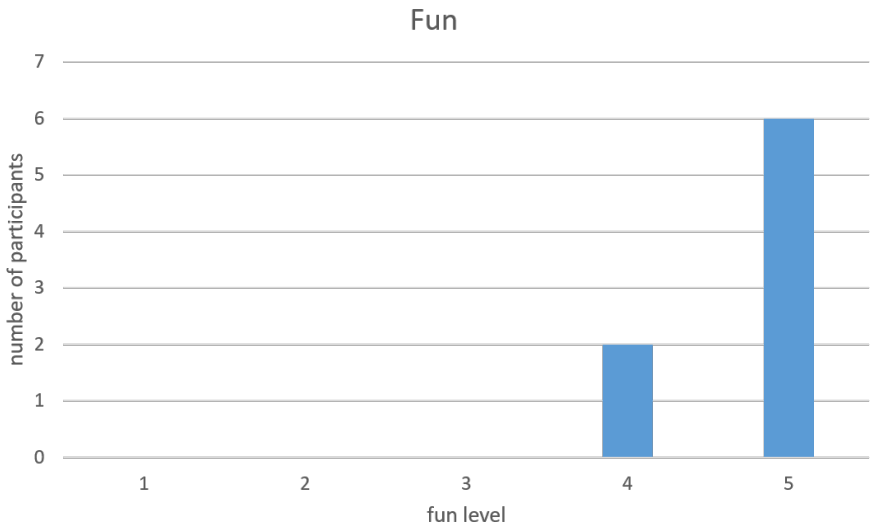


Figure 19: Histogram of 'fun' ratings.

As illustrated in Figure 19 6 participants thought that the whole task was very fun (scored 5 out of 5) and 2 participants thought it was fun (scored 4 out of 5) too.

Likewise, 7 out of 8 participants felt more comfortable when text was present. One participant preferred having no text.

In a follow-up discussion after the tasks, none of the participants mentioned which task was more fun, so the results from fun level applies to both tasks. Moreover, based on observing the participants during doing the tasks, and based on the results from the follow-up discussions after conducting the tasks, it seems that the participants were exited and happy to participate in these experiments.

5.1.4 Naturalness and the impact of meta-language

Storyboards are designed to elicit more natural speech. I did not measure naturalness in this project directly, but there is some evidence that Persian speakers were able to resist the influence of the English text.

Figure 20: Impact of meta-language

Figure 20 shows a picture from the Bake-off story. In this scenario the competition is between the man in the picture and his wife, and the man says: "No, I can clean the fastest!". In the English prompt in this example a superlative strategy ([M]) is used (fast+est), and we might expect that the Persian speakers would produce a sentence with superlative marking as in sentence (9-a).

(9) No, I can clean the fastest!

a. **Na man sari-tar-in tamiz mi-kon-am*
No I fast-CMPR-SPRL clean IPFV-do-1SG
*Ungrammatical

However, none of the Persian speakers used a superlative strategy. The morphological strategy [M] is ungrammatical for adverbial superlatives in Persian. Thus, sentence (9-a) would be ungrammatical in Persian. Persian speakers, instead, used a comparative strategy ([M]) as shown below.

(10) No, I can clean the fastest!

a. *Na, man sari-tar tamiz mi-kon-am*
no I fast-CMPR clean IPFV-do-1SG
'No, I clean faster.' Comparative strategy [M]

The key point is that speakers did not feel pressured to produce sentences that have maximal structural congruence with the meta-language (English) prompt when such a

structure would be ungrammatical in Persian.

In another case (form the Bake-off story) presented below, Persian speakers were not influenced by the tense of the verb 'win' (present tense) in the English prompt, and to say this sentence in Persian almost all of them used the verb in the past tense *bordam/barandeh shodam* 'I won'. In this example, using the past tense of 'win' is the most natural and comfortable way to say this English sentence in Persian.

(11) I win! I baked more than you and cleaned more than you!"

a. *man barande šod-am ham biš-tar az to pokht-am*
1SG winner become.PST-1SG both much-CMPR from 2SG bake.PST-1SG
ham biš-tar tamiz kard-am
both much-CMPR clean do.PST-1SG
'I became winner! I both baked more than you and cleaned more.'

b. *man bord-am chon ham biš-tar pokht-am ham*
1SG win.PST-1SG because both much-CMPR bake.PST-1SG both
biš-tar tamiz kard-am
much-CMPR clean do.PST-1SG
'I won because I both baked more and cleaned more.'

Apparently, Persian speakers were not strongly influenced by English word order and structure. There were cases in which Persian speakers could be influenced by the English word order, structure, and comparison strategies, but they withstood any influence. (For another example in which Persian speakers use comparative strategies while a superlative strategy is used in the English prompt, see also sentence (52) in section 7).

5.2 Discussion 2: Picture-aided Translation vs. Storyboards

There are higher faithfulness scores using picture-aided translation for both the What Matters story and the Bake-off story. The results boost of up to **20%** in faithfulness in the What Matters story, and **10%** in the Bake-off story.

Statistical analysis with R also confirmed that Method (PT/SB) is highly significant and picture-aided translation yields higher faithfulness level.

The Story (WM/BK) is significant too. More faithful translations were received for the 'Bake-off' story, possibly due to length of story and sentences and level of difficulty, suggesting that storyboards should be kept short and simple.

Storyboards are designed to elicit more natural data. But comparing storyboards with picture-aided translations, we observed some cases in which Persian speakers could be influenced by the English language structure (in the PT version), but they resisted the influence.

Both storyboards and picture-aided translations are fun, and participants were happy participating in data collection sessions. However, most of them were more comfortable and preferred the presence of text under the pictures.

6 Results and discussion 4: what we learned about Persian

This part is devoted to the Persian language and presents background on Persian, results from the story-based methods, discussion of the results, further studies, and conclusions on Persian.

6.1 Background on the Persian Language

Farsic languages are categorized as Southwestern Iranian languages within the Indo-Iranian branch of the Indo-European language family (Hammarström et al., 2017). Western Farsi includes dialects (such as Tehrani, Mashadi, Esfahani, Bandari, Shirazi, Yazdi, Kashani, Kermani and etc.) spoken in Iran. Eastern Farsic includes Dari and Tajiki which are official languages in Afghanistan and Tajikistan (Lewis & Fennig, 2015). There are in total 110 million speakers of Farsic (Persian) languages in Iran, Afghanistan, Tajikistan, and some neighbouring countries (Windfuhr & Perry, 2009).

The case study in this project is on the official language of Iran, referred to as 'Western Farsi' (Hammarström et al., 2017), 'Western Persian', 'Iranian Persian', or simply 'Persian'. Throughout the writing of this thesis, I use 'Persian' to refer to the native language of my Iranian consultants. Contemporary Persian has two quite distinct registers: 'Formal' (used in formal correspondence, newspapers, educational and scientific books) and 'informal' (the colloquial and spoken forms used daily in the society and social media).

The canonical word order in Persian is SOV [10] and it is a pro-drop language. Verbs are

[10] Other word orders are also possible, especially in the spoken form of the language. Derivations from the canonical SOV word order are not rare in the formal form. These derivations are due to rhythm or desire to emphasis a term (Lazard, 1992, 208).

marked for tense and aspect and agree with the subject in person and number (Mahootian, 1997, 5).

6.1.1 Comparatives in the Persian Language

Comparative adjectives are made by adding the suffix *-tar* to the positive (bare) form of the adjective. Comparative adjectives follow the noun they modify.

(12) *bahoosh-tar*
smart-CMPR
'smarter'

(13) *pesar-e javan-tar*
son-EZ young-CMPR
'younger son'

As shown in examples (14) and (15), the following four elements are present in Persian comparatives (Mahootian, 1997, 108):

1. The target of comparison; *Mehri* in example (14), and *Tehran* in example (15),
2. The preposition *az* (which literally means 'from'),
3. The standard of comparison; *Badri* in example (14), and *Mashhad* in example (15),
4. The gradable predicate, followed by the suffix *-tar* (morphological comparative marker); *kutah* 'short' in example (14), and *bozorg* 'big' in example (15).

(14) *Mehri az Badri kutah-tar-e*
Mehri from Badri short-CMPR-is
'Mehri is shorter than Badri' (Mahootian, 1997, 108)

(15) *Tehran az Mashhad bozorg-tar-e*
Tehran from Mashhad big-CMPR-is
'Tehran is biger than Mashhad.'

Bobaljik (2012) categorizes the CMPR TYP for Persian as 'STND', since the standard of comparison is integrated into the comparative clause via the particular morphosyntax *az* 'from'. He categorizes the CMPR for persian as 'M', since the comparative suffix *-tar* attaches to the adjective to make it comparative.

6.1.2 Superlatives in the Persian Language

In Persian, superlative adjectives are generally attributive and precede the noun. Superlative adjectives are made by adding the form '*-tarin*' to the positive (bare) adjective (Mahootian, 1997, 260) and (Lazard, 1992, 87). Bobaljik (2012, 31) introduces the *Containment hypothesis*[11] based on which superlatives structurally contain comparatives, and writes that the superlative suffix *-tarin* is made of and contains the comparative marker *-tar*. He writes that Persian has a transparent containment such that the comparative marker *-tar* is nested in the superlative marker *-tarin* (Bobaljik, 2012, 59). Windfuhr & Perry (2009, 433) also write that 'the superlative degree is marked by *-tar-in*. However (Mace, 2003, 53) writes that it is the suffix *-in* that is added to the comparative ending *-tar*. Throughout this thesis, *-tar* is glossed as the comparative marker, and *-in* is glossed as the superlative marker.

(16) *mofid-tar-in* *pishnahad*
useful-CMPR-SPRL proposal
'the most useful proposal' (Mace, 2003, 53)

(17) *boland-tar-in* *kuh*
high-CMPL-SPRL mountain
'The highest mountain' (Windfuhr & Perry, 2009, 434)

The superlative strategy is used in contexts where more than two things are compared. The superlative adjectives that are made through adding *tar-in* to the positive (bare) adjective precede the noun they modify (Mahootian, 1997).

(18) *ma qašang-tar-in* *šahr-ha-ye* *Iran ra* *did-e* *im*
1pl beautiful-CMPR-SPRL city-PL-EZ Iran OM see.PST-pp 1pl
'We have seen the most beautiful cities of Iran.' (Mace, 2003, 53)

(19) *arzan-tar-in* *ra* *be-bin-im*
cheap-CMPR-SPRL OM SUBJ-see-1pl
'let's see the cheapest!' (Mace, 2003, 54)

Superlative adjectives made through suffixing *tar-in* to the positive (bare) adjective cannot be used predicatively; therefore, another strategy is used in Persian to express a predicative superlative meaning. For this purpose, the comparative strategy is employed together

[11] As a general rule, Bobaljik (2012) believes that if X is an adjectival root, then the comparative would be 'X-tar' and the superlative would be 'X-tar-in'.

with a universal quantifier as the standard of comparison. The standard of comparison is usually: *hame* 'all, everyone else', or 'hame-ye ma/šoma/una' (all of us/you/them) (Mahootian 1997, 261, Windfuhr & Perry 2009, 434, Lazard 1992, 88).

(20) *in bozorg-tar az hame ast*
this big-CMPR from all is
'This is bigger than all' (This is the biggest) (Lazard, 1992, 88)

(21) *in kuh az hame boland-tar ast*
this mountain from all high-CMPR is
'This mountain is higher than all' (This is the highest mountain) (Windfuhr & Perry, 2009, 434)

(22) *Mahin az hame xošgel-tar-e*
Mahin from all pretty-CMPR-3sg
'Mahin is prettier than everyone else' (Mahin is the prettiest.) (Mahootian, 1997, 261)

Thus Persian has two major strategies for expressing superlative meaning. Bobaljik (2012) categorizes the SPRL for Persian as 'M', since the superlative suffix '-tar-in' attaches to the adjective. However, in addition to the superlative strategy mentioned by Bobaljik (2012), another strategy is also possible in Persian; superlatives can be expressed predicatively with the comparative strategy plus the universal quantifier *hame* 'all'.

6.1.3 *Ezafe* in the Persian language

Ezafe is used very frequently in Persian and it also shows up in superlative adjectives (as in example (31)), therefore in this section it is briefly introduced. Ezafe literally means addition, and is an unstressed vowel (-e or -ye) that is often regarded as a polysemous item that has different functions. The nature of Ezafe and its categorizations has long been argued about by different scholars,[12] but for this thesis I present a short and general description of Ezafe from Mahootian's (1997) grammar of Persian.

Mahootian (1997, 66) writes that the Ezafe construction is a very productive means for modifying nouns as well as linking other nonverbal heads and their complements. She writes that *the Ezafe links a head noun to an adjective (phrase), noun (phrase), adverb*

[12]See Sami'ian 1983, 60-65; Karimi 1989, 83-84; Lazard 1992; Parsafar 2010 for very good discussions on syntax and semantics of Ezafe.

(phrase), prepositional phrase or infinitive. The Ezafe can also link adjective, quantifier and prepositional heads to their complements. Through the following examples, she further demonstrates that the Ezafe can link the modifier to the modified in a genitive, attributive, and appositive relationship (Mahootian, 1997, 68).

(23) *kafš-e Firouz*
shoe-EZ Firouz
'Firouz's shoe' Ezafe in the noun phrase: Genitive ezafe

(24) *omid-e man*
hope-EZ 1SG
'my hope' Ezafe in the noun phrase: Genitive ezafe

(25) *ketab-e tarix*
book-EZ history
'a history book' Ezafe in the noun phrase: Attributive ezafe

(26) *ketab-e jaleb*
book-EZ interesting
'an interesting book' Ezafe in the noun phrase: Attributive ezafe

(27) *ketab-e zir-e sandali*
book-EZ under-EZ chair
'the book under the table' Ezafe in the noun phrase: Attributive ezafe

(28) *vaqht-e raftan*
time-EZ go
'time to go' Ezafe in the noun phrase: Attributive ezafe

(29) *kuh-e Alborz*
mountain-EZ Alborz
'The Alborz mountain' Ezafe in the noun phrase: Appositive ezafe

According to Mahootian (1997, 66) Ezafe can also be used to link/join the preceding first name to the following family name. An example would be any person's given name plus Ezafe followed by that person's family name. She further illustrates more usages of Ezafe in the adjective phrase, in the quantifier phrase, and in the prepositional phrase, which are presented below.

(30) *negarn-e baradar-am*
worried-EZ brother-1SG
'worried about my brother' Ezafe in the adjective phrase

(31) *boland-tar-in-e doxtar-a*
tall-CPMR-SPRL-EZ girl-PL
'The tallest of the girls' Ezafe in the adjective phrase

(32) *amade-ye harchi*
ready-EZ anything
'ready for anything' Ezafe in the adjective phrase

(33) *tamam-e bache-ha*
all-EZ child-PL
'all of the children' Ezafe in the quantifier phrase

(34) *hichkodum-e bache-ha*
non-EZ child-PL
'none of the children' Ezafe in the quantifier phrase

(35) *pošt-e deraxt*
none-EZ tree
'behind the tree' Ezafe in the prepositional phrase

(36) *kenar-e rudxune*
beside-EZ river
'beside the river' Ezafe in the prepositional phrase

6.2 Formation and interpretation of quality superlatives

It was expected to have 16 Persian equivalents for each English sentence, throughout the whole study, since 8 Persian speakers participated and did both versions of the stories (PT and SB). However, in some cases there were not exactly 16 Persian sentences to an English sentence and some English prompt sentences have fewer Persian equivalents (the Persian equivalents range from 9 to 16), because sometimes the participants forgot to translate a sentence, misinterpreted or didn't produce a faithful translation.

6.2.1 Quality relative

The English sentences in both the What Matters story and the Bake-off story which contain quality relative are presented below together with their Persian equivalents. For sentence (37), the [M] strategy *boland-tar-in* is the most frequent (13/16 times) strategy used in Persian. Only in one case ((37-b)) a comparative strategy *boland-tar* accompanying the indefiniteness marker *'i'* is used.

(37) Her brother shouted: 'Let's have a contest! Whoever climbs the tallest tree wins!'

a. *baradar-esh faryad zad-ø bi-(y)a-yn ye mosabeqe*
brother-3SG shout hit-3SG SUBJ-come.PRES-3PL one contest
be-dim har ki az ***boland-tar-in*** *deraxt bala*
SUBJ-give.3PL any one from **tall-CMPR-SUPR** tree up
be-re barande ast-ø
SUBJ-go.3SG winner be.PRES-3SG
[M]

b. *baradar-esh faryad zad-ø bi-(y)a-yn ye mosabeqe*
brother-3SG shout hit-3SG SUBJ-come.PRES-3PL one contest
be-dim har ki az deraxt-e ***boland-tar-i*** *bala*
SUBJ-give.3PL any one from tree-EZ **tall-CMPR-INDEF** up
be-re barande ast-ø
SUBJ-go.3SG winner be.PRES-3SG
lit. '...whoever climbs a taller tree...' [the comparative form]

For sentence (38),the morphological strategy [M] *boland-tar-in* is the most frequent strategy (14/16 times). Only in one case was the comparative strategy *boland-tar* involving the indefiniteness marker *'i'* used ((38-b)).

(38) Among the three kids, he was the one who climbed the tallest tree, so he won the contest.

a. *bein-e se ta bache un barande shod-ø chon un*
among-EZ three CL kid 3SG winner become.PST-3SG because 3SG
az ***boland-tar-in*** *deraxt bala raft-ø*
from **tall-CMPR-SPRL** tree up go.PST-3SG
[M]

b. *bein-e se ta bache un barande shod-ø chon un*
among-EZ three CL kid 3SG winner become.PST-3SG because 3SG
az deraxt-EZ ***boland-tar-i*** *bala raft-ø*
from tree-EZ **tall-CMPR-INDEF** up go.PST-3SG
[the comparative form]

For sentence (39), the morphological strategy [M] *kutah-tar-in* is the most frequent strategy used in Persian (14/16 times). Only in one case ((39-b)) was the comparative strategy *kutah-tar* accompanying the indefiniteness marker *'i'* used.

(39) Anna lost because she climbed the shortest tree.

a. *Anna baxt-ø chon un az* ***kutah-tar-in*** *deraxt bala*
Anna lose.PST-3SG because 3SG from **short-CMPR-SPRL** tree up

raft-ø
go.PST-3SG

[M]

b. *Anna baxt-ø chon un az deraxt-e* ***kutah-tar-i***
Anna lose.PST-3SG because 3SG from tree **short-CMPR-INDEF**
bala raft-ø
up go.PST-3SG
lit. '...she climbed a shorter tree...' [the comparative form]

Also for sentence (40), the [M] strategy is the most frequent strategy in Persian (used (8/16 times). Three different versions of the [M] strategy are shown in (40-a), (40-b), and (40-c). The [CMPR+ALL] strategy is also used 5/16 times. Different versions of the [CMPR+ALL] strategy are shown in (40-d), (40-e), (40-f) and (40-g). In one case ((40-h)), the comparative form *laqar-tar* is used alone.

(40) "...but I'm the one who has the smallest waist!"

a. *vali man un kas-i-am ke* ***kuchik-tar-in*** *(dor-e)*
but 1SG that one-INDEF-1SG that **small-CMPR-SPRL** (around-EZ)
kamar-o dar-am
waist-OM have.PRES-1SG

[M]

b. *vali man kas-i-am ke* ***barikt-tar-in*** *kamar-o*
but 1SG one-INDEF-1SG that **thin-CMPR-SPRL** waist-OM
dar-am
have.PRES-1SG

[M]

c. *vali man* ***kamar barikt-tar-in-am***
but 1SG **waist thin-CMPR-SPRL-1SG**

[M]

d. *vali man dore-e kamar-am* ***az hame kuchik-tar-e***
but 1SG around-EZ waist-1SG **from all small-CMPR-3SG**

[CMPR+ALL]

e. *vali man* ***az hame laqar-tar-am***
but 1SG **from all thin-CMPR-1SG**

[CMPR+ALL]

f. *vali man* ***az hame kamar-barik-tar-am***
but 1SG **from all waist-thin-CMPR-1SG**

[CMPR+ALL]

g. *vali kamar-e man* ***az shoma barik-tar-e***
but waist-EZ 1SG **from 2PL thin-CMPR-3SG**

[CMPR+ALL]

h. *vali man kamar-am* ***laqar-tar-e***
but 1SG waist-1SG **thin-CMPR-3SG**
[the comparative form]

For sentence (41), the morphological strategy [M] is the most frequent strategy used to translate this sentence to Persian (used 9/16 times). Two examples of the [M] strategy are shown in (41-a) and (41-b). Other strategies that the participants used to say sentence (41) in Persian involve the following: Using the [CMPR] strategy (4/16 times) as shown in examples (41-c) and (41-e), and using the comparative form (2/16 times) as shown in example (41-d).

(41) '...The winner is the one who has the biggest heart.'

a. *barande kas-i-e ke* ***bozorg-tar-in*** *qalb-o*
winner one-INDEF-EZ that **big-CMPR-SPRL** heart-OM
dar-e
have.PRES-3SG
[M]

b. *barande kas-i-e ke qalb-esh* ***bozorg-tar-in*** *bashe*
winner one-INDEF-EZ that heart-3SG **big-CMPR-SPRL** be.PRES-3SG
[M]

c. *barande un-i-e ke qalb-e* ***bozorg-tar-i***
winner that-INDEF-EZ that heart-EZ **big-CMPR-INDEF**
dar-e
have.PRES.3SG
[the comparative form]

d. *barande un-i-e ke* ***az hame*** *qalb-e* ***bozorg-tar-i***
winner that-INDEF-EZ that **from all** heart-EZ **big-CMPR-INDEF**
dar-e
have.PRES.3SG
[CMPR+ALL]

e. *barande un-i-e ke qalb-esh* ***bozorg-tar-e***
winner that-INDEF-EZ that heart-3SG **big-CMPR-be.PRES.3SG**
[the comparative form]

6.2.2 Quality absolute

For *quality absolute*, only the [M] strategy is observed (14/16 times) in the Persian data. To say sentence (42) in Persian, *boland-tar-in deraxt-e baq* is used 9/16 times, and *boland-tar-in deraxt* is used 5/16 times.

(42) First he tried to climb the tallest tree in the garden, but it was too tall.

a. *un aval say kard-ø az* ***boland-tar-in*** *deraxt-e baq bala*
3SG first effort do.PST-3SG from **tall-CMPR-SPRL** tree-EZ garden up
be-re vali un xeili boland bud-ø
SUBJ-go.3SG but 3SG very tall be.PST-3SG
[M]

6.2.3 Quality adverbial

For quality adverbials in Persian the [M] strategy is never used. Instead, the [CMPR+ALL] strategy and using the comparative form are dominant. In the Persian translations for sentence (43), the [CMPR+ALL] strategy is used 8/16 times in total. A closer look at this strategy shows that it can be divided into two categories; 1) Where the *az hame* 'from all' comes first, and then the comparative form follows (as in (43-a)); 2) Where the comparative comes first, and then the *az hame* 'from all' follows (as in (43-b)). The first strategy [ALL+CMPR] is used 6/16 times and is more common in comparison to the second strategy [CMPR+ALL] which is only used two times. However, having [ALL] before or after the [CMPR] doesn't really affect the meaning, and I suppose it is more related to the scrambling[13] and the word order pattern in Persian. Therefore, I continue to put examples of both under the [CMPR+ALL] category. Using the comparative form (without a universal quantifier) is also observed 6/times and an example is shown in (43-c)

(43) ...Let's see who can run the fastest!

a. *...be-bin-im ki* ***az hame sari-tar*** *mi-do-e*
SUBJ-see-1PL who **from all fast-CMPR** IMFV-run.PRES-3SG
lit. '...Let's see who from all faster runs...' [CMPR+ALL]

b. *...be-bin-im ki* ***sari-tar az hame*** *mi-do-e*
SUBJ-see-1PL who **fast-CMPR from all** IMFV-run.PRES-3SG
lit. '...Let's see who faster from all runs...' [CMPR+ALL]

c. *...be-bin-im ki mi-tun-e* ***sari-tar***
SUBJ-see-1PL who IMFV-can.PRES-SG **fast-CMPR**
be-do-e
SUBJ-run.PRES-3SG
lit. '...Let's see who can faster runs?' [the comparative form]

[13] See (Karimi, 2003) for word order and scrambling in Persian.

Here is another example from the Bake-off (BK) story. In sentence (44) an adverbial superlative *the fastest* is used. As mentioned above, in Persian the M strategy is ungrammatical for adverbial superlatives and this is further shown in the results for sentence (44). In 14 out of 16 sentences ((44-a), (44-b), (44-c)) the comparative strategy is used. Patterns similar to sentence ((44-a) (i.e. using *sari-tar*) were the most dominant patterns to translate the English prompt to Persian and were used 10/16 times. One speaker used *sari-tar az to* (see sentence (44-b)) in both PT and SB version of the story. There were also 2/16 cases (presented in sentence (44-c)) in which the speakers used other words instead of *fast-er*. In sentence (44-d) one speaker (who speaks both Persian and Azeri as native languages) changed the verb *tamiz kardan* 'to clean' to an adjective *tamiz-kon* 'cleaner, a person who cleans' and then used the 'fastest' before the adjective 'cleaner' and made a new construction: *sari-tar-in tamiz-kon* 'the fastest cleaner' .

(44) No, I can clean the fastest!

a. *na, man* ***sari-tar*** *tamiz mi-kon-am*
NEG 1SG **fast-CMPR** clean IMFV-do.PRES-1SG
[the comparative form]

b. *na, man* ***sari-tar*** *az to tamiz mi-kon-am*
NEG 1SG **fast-CMPR** from 2SG clean IMFV-do.PRES-1SG
[the comparative form]

c. *na, man* ***beh-tar o zood-tar/biš-tar*** *tamiz*
NEG 1SG **good-CMPR and soon-CMRL/much-CMPR** clean
mi-kon-am
IMFV-do.PRES-1SG
[the comparative form]

d. *na, man* ***sari-tar-in*** *tamizkon-am*
NEG 1SG **fast-CMPR-SPRL** cleaner- be.PRES-1SG
lit. 'I am the fastest cleaner' [M]

6.2.4 Discussion

The morphological strategy [M] is the most common strategy used to make quality relatives (as well as quantity relatives). The other strategy is the [CMPR+ALL] strategy, that is to use the comparative form of the adjective plus a universal quantifier.

A third strategy is also available for quality superlatives (like in quantity relatives): The comparative form is used without a universal quantifier in some cases. One perspective

to take is that the universal quantifier is omitted because its presence can be understood from the context. In such cases, the comparative form is used alone, but it can still have a superlative interpretation (based on the context). The comparative form is used both with and without the addition of the indefiniteness marker *-i*.

For absolute-reading quality superlatives, only the morphological strategy [M] is observed. Since there is only one English example with fourteen Persian equivalents available in this study, it cannot for sure be said that the morphological strategy is the only strategy used in Persian for quality absolutes. What probable strategies other than the Morphological strategy [M] Persian speakers use for quality absolutes need to be studied further. However, it can be concluded that the morphological strategy is the most dominant way to make quality absolutes.

An interesting point about Persian is that the morphological strategy [M] is NEVER used for quality adverbials. Using superlatives of quality together with a verb makes the sentence ungrammatical and weird. For quality adverbials, the [CMPR+ALL] strategy and the comparative form are dominant. This is true for quantity adverbials as well. As shown in example (45) a comparative construction, or the [CMPR+ALL] strategy are used for quantity adverbials. Using the morphological strategy [M] (such as using *biš-tar-in* 'much-CMPR-SPRL' makes the following sentences ungrammatical and wired.

(45) I run the most.

a. *man biš-tar az hame mi-do-am*
1SG much-CMPR from all IMPV-run.PRES-1SG
'I run more than all' [CMPR+ALL]

b. *man biš-tar mi-do-am*
1SG much-CMPR IMPV-run.PRES-1SG
'I run more (than all/anything else)' [The comparative form]

6.3 Formation and interpretation of quantity superlatives (relative reading) VS. proportional reading

6.3.1 Quantity relative

The English sentences in both the What Matters story and the Bake-off story which contain quantity relatives are presented below together with their Persian equivalents (only rep-

resentative data from Persian is selected and presented here). In the Persian translations for sentence (46), *biš-tar-in tedad-e sib* 'much-CMPR-SPRL number-EZ apple' was used 7/16 times and is the most frequent strategy to say this sentence in Persian. *Biš-tar-in sib* (*tedad* is omitted) was used 3/16 times. And *Biš-tar-in sib-a* was used 2/16 times. The latter is an interesting case in which *sib* 'apple' is made plural by the addition of the plural marker *-a*. As shown in sentence (97) the plural marking in this case implies definiteness.[14] In total, in 14/16 cases the morphological strategy [M] (*biš-tar-in* 'much-CMPR-SPRL') was used while the [CMPR+ALL] strategy (*az hame biš-tar* or *biš-tar az hame*) was only used 2/16 times.

(46) Anna picked the most apples.

a. *Anna **biš-tar-in** (tedad-e) sib ro chid-ø*
Anna **much-CMPR-SPRL** (number-EZ) apple OM pick.PST-3SG
[M]

b. *Anna **biš-tar-in** sib-a ro chid-ø*
Anna **much-CMPR-SPRL** apple-PL_{DEF} OM pick.PST-3SG
[M]

c. *Anna **az hame biš-tar** sib chid-ø*
Anna **from all much-CMPR** apple pick.PST-3SG
lit. 'Anna from all more apples picked' [CMPR+ALL]

In the Persian equivalents for sentence (47), *kam-tar-in tedad-e sib* 'few-CMPR-SPRL number/amount-EZ apple' was used 6/16 times and is the most frequent strategy to translate this sentence in Persian. *Kam-tar-in sib* (*tedad* is omitted) was also used 4/16 times. *Kam-tar-in meqdar-e sib* and *kam-tar-in mizan-e sib* and *kam-tar-in sib-a* were used once each. In total, in 13/16 cases the morphological strategy [M] (*kam-tar-in* 'few-CMPR-SPRL') was used while the [CMPR+ALL] strategy (*az hame kam-tar*) was only used 2/16 times.

(47) Anna's sister picked the fewest apples.

[14] Unlike English, nouns are not made plural directly after cardinals in Persian. Nomoto (2013) categorizes Persian as an optional classifier language. Mahootian (1997) writes that using a classifier is optional in the written form, but preferred in the colloquial form. *Three books* in English can be translated as 'se ketab (three book), 'se ta ketab' (three CL book), and se ta ketab-ha' (three CL book-PL) Nomoto (2013, 96). The last construction se ta ketab-ha' is not used so commonly. The plural marker '-ha' in the last construction 'se ta ketab-ha' is assumed to imply definiteness in the colloquial Persian as discussed in section (97).

a. *xahar-e Anna* ***kam-tar-in*** *(tedad/meqdar/mizan-e) sib*
sister-EZ Anna **few-CMPR-SPRL** (number/amount/measure-EZ) apple
ro chid
OM picked
[M]

b. *xahar-e Anna* ***az hame kam-tar*** *sib chid*
siter-EZ Anna **from all few-CMPR** apple picked
lit. 'Anna's sister from all fewer apples picked' [CMPR+ALL]

In the Persian translations for sentence (48), *biš-tar-in tedad-e sib* was used 6/16 times and is the most frequent strategy to say this sentence in Persian. *Biš-tar-in sib* (*tedad* is omitted) was used 4/16 times. *Biš-tar-in sib-a* and *Biš-tar-in tedad-e sib-a* were used once each. In total, in 12/16 cases the morphological strategy [M] (*biš-tar-in* 'much-CMPR-SPRL') was used while the [CMPR+ALL] strategy (*az hame biš-tar*) was only used once (notice that the consultant has used the verb 'pick' to say this sentence in Persian).

(48) Anna said: 'I won! I have the most apples!'.

a. *Anna goft-ø man barandeh šod-am man*
Anna say-PST-3SG 1SG winner become.PST-1SG 1SG
biš-tar-in *(tedad-e) sib ro dar-am*
much-CMPR-SPRL (number-EZ) apple OM have.PRES-1sg
[M]

b. *Anna goft-ø man barandeh šod-am man*
Anna say-PST-3SG 1SG winner become.PST-1SG 1SG
az hame biš-tar *sib chid-am*
from all much-CMPR apple chid.PST-1SG
lit. 'Anna said: I became winner! I from all more apples picked' [CMPR+ALL]

In the Persian equivalents for sentence (49), *biš-tar-in abmive* was used 7/16 times and thus is the most frequent strategy to say this sentence in Persian. *Biš-tar-in meqdar-e abmive* was also used 2/16 times. Totally, in 9/16 cases the morphological strategy [M] (*biš-tar-in* 'much-CMPR-SPRL') was used.

Other strategies that the participants used to translate sentence (49) to Persian involve the [CMPR+ALL] strategy and the comparative form. Sometimes, the comparative form *biš-tar* is used without a universal quantifier. In (49-b), the comparative form plus indefiniteness marker is used. The comparative form accompanying an indefiniteness marker is used 3/16 times for sentence (49). The comparative form without an indefiniteness marker is also use 3/16 times as illustrated in (49-c) and (49-d). The reason that a [CMPR] strat-

egy is observed here could be due to the fact that the presence of a universal quantifier can be understood from the context despite that it is not morphologically present.

(49) When they got home, Anna's brother shouted: 'Let's have another contest! Whoever drinks the most juice is the winner...'

a. *vaghti resid-an* *xune* *baradar-e* *Anna faryad zad-ø*
when arrive.PST-3PL home brother-EZ Anna shout hit-3SG
bi-ya-yn *ye* *mosabeqe-ye* *dige* *be-dim* *har ki*
SUBJ-come.PRES-3PL one contest-EZ another SUBJ-3PL any one
biš-tar-in *(meqdar-e)* *abmive-ro* *bo-xor-e* *un*
much-CMPR-SPRL (amount-EZ) juice-OM SUBJ-eat.PRES-3SG 3SG
barande ast-ø
winner be.PRES-3SG
[M]

b. *vaghti residan* *xune* *baradar-e* *Anna faryad zad-ø*
when arrive.PST-3PL home brother-EZ Anna shout hit-3SG
bi-ya-yn *ye* *mosabeqe-ye* *dige* *be-dim* *har ki*
SUBJ-come.PRES-3PL one contest-EZ another SUBJ-3PL any one
abmive-ye ***biš-tar-i*** *bo-xor-e* *barande ast-ø*
juice-EZ **much-CMPR-i** SUBJ-eat.PRES-3SG winner be.PRES-3SG
lit. '...anyone who drinks a more juice is winner' The comparative form

c. *vaghti residan* *xune* *baradar-e* *Anna faryad zad-ø*
when arrive.PST-3PL home brother-EZ Anna shout hit-3SG
bi-ya-yn *ye* *mosabeqe-ye* *dige* *be-dim* *har ki*
SUBJ-come.PRES-3PL one contest-EZ another SUBJ-3PL any one
biš-tar *abmive* *be-nush-e* *barande ast-ø*
much-CMPR juice SUBJ-drink.PRES-3SG winner be.PRES-3SG
lit. '...anyone who drinks more juice is winner' [The comparative form]

d. *vaghti residan* *xune* *baradar-e* *Anna faryad zad-ø*
when arrive.PST-3PL home brother-EZ Anna shout hit-3SG
bi-ya-yn *ye* *mosabeqe-ye* *dige* *be-dim*
SUBJ-come.PRES-3PL one contest-EZ another SUBJ-give.3PL
be-bin-im *ki* *mi-tun-e* ***biš-tar*** *abmive*
SUBJ-see.PRES-3PL who IMFV-can.PRES-3SG **much-CMPR** juice
bo-xor-e
SUBJ-eat.PRES-3SG
lit. '...let's see who can more juice eats (drinks)' [the comparative form]

e. *vaghti residan* *xune* *baradar-e* *Anna faryad zad-ø*
when arrive.PST-3PL home brother-EZ Anna shout hit-3SG
bi-ya-yn *ye* *mosabeqe-ye* *dige* *be-dim*
SUBJ-come.PRES-3PL one contest-EZ another SUBJ-give.3PL
be-bin-im *ki* *mi-tun-e* ***az hame biš-tar***
SUBJ-see.PRES-3PL who IMFV-can.PRES-3SG **from all much-CMPR**

abmive bo-xor-e
juice SUBJ-eat.PRES-3SG
lit. '...let's see who can from all more juice eats (drinks)' [CMPR+ALL]

In the Persian translations for sentence (50), *kam-tar-in abmive* was used 8/16 times and *kam-tar-in meqdar-e abmive* was used 4/16 times. In total, the [M] strategy was used 12/16 times and thus is the most frequent strategy to say sentence (50) in Persian. The [CMPR+ALL] strategy (*az hame kam-tar* and *kam-tar az hame*) was only used 2/16 times.

(50) Anna's sister drank the least juice, so she lost.

a. *xahar-e Anna* ***kamt-tar-in*** *(meqdar-e) abmive-ro xord-ø*
sister-EZ Anna **few-CMPR-SPRL** (amount-EZ) juice-OM eat.PST-3SG
bara-ye hamin un baxt-ø
for-EZ this 3SG lose.PST-3SG
[M]

b. *xahar-e Anna* ***az hame kamt-tar*** *abmive xord-ø bara-ye hamin*
sister-EZ Anna **from all few-CMPR** juice eat.PST-3SG for-EZ this
un baxt-ø
3SG lose.PST-3SG
lit. 'sister of Anna from all less juice ate (drank), for this she lost' [CMPR+ALL]

For sentence (51) *biš-tar-in abmive* was used 5/16 times and thus is the most frequent strategy to say this sentence in Persian. *Biš-tar-in meqdar-e abmive* was also used 3/16 times. Totally, in 8/16 cases the morphological strategy [M] (*biš-tar-in* 'much-CMPR-SPRL') was used. The [CMPR+ALL] strategy *az hame biš-tar* or *biš-tar az hame* or *biš-tar az ma* was used 4/16 times. Other strategies that the participants used to say sentence (51) in Persian involve using the comparative form *biš-tar* without a universal quantifier: In (51-b), the comparative form plus indefiniteness marker is used. The comparative form accompanying an indefiniteness marker is used 3/16 times and is used once without the indefiniteness marker for sentence (51).

(51) Anna said to her brother, 'Well, you drank the most juice,...'

a. *Anna be baradar-esh goft-ø khob to* ***biš-tar-in***
Anna to brother-3SG tell.PST-3SG well 2SG **much-CMPR-SPRL**
(meqdar-e) abmive ro nushid-i
(amount-EZ) juice OM drink.PST-2SG
[M]

b. *Anna be baradar-esh goft-ø khob to abmive-ye*
Anna to brother-3SG tell.PST-3SG well 2SG juice-EZ
biš-tar-i *nushid-i*
much-CMPR-INDEF drink.PST-2SG
lit. '...you a more juice drank' [the comparative form]

c. *Anna be baradar-esh goft-ø khob to*
Anna to brother-3SG tell.PST-3SG well 2SG
az hame/ma biš-tar *abmive nushid-i*
from all/1PL much-CMPR juice drink.PST-2SG
lit. '...you from all/us more juice drank' [CMPR+ALL]

Sentence (52), below, is an example from the Bake-off story. In this sentence, a superlative strategy is used in the English prompt. However, as shown in sentence (52-a) the comparative form (*biš-tar*) is used 10/16 times (3 of which involves using the indefiniteness marker *-i* as in biš-tar-i) to say sentence (52) in Persian. This is an interesting case which shows that even when the English prompt has a superlative structure, Persian speakers mostly used a comparative strategy, which can be due to the fact that in the picture (in the context) it is shown that the comparison is between two people. the morphological strategy [M] (using the superlative marker *-tar-in*) is also used 5/16 times to make a superlative construction (see example (52-c)).

(52) No, I can bake the most pies!.

a. *na, man mi-tun-am* ***biš-tar*** *(az to) paay*
Neg 1SG IMPV-able.PRES-1SG **much-CMPR** from 2sg pie
be-paz-am
SUBJ-bake.PRES-1SG
[the comparative form]

b. *na, man mi-tun-am paay-e* ***biš-tar-i*** *dorost*
Neg 1SG IMPV-able.PRES-1SG pie-EZ **much-CMPR-INDEF** ready
kon-am
do.PRES-1SG
[the comparative form]

c. *na, man mi-tun-am* ***biš-tar-in*** *(tedad) paay ro*
Neg 1SG IMPV-able.PRES-1SG **much-CMPR-SPRL** (number) pie OM
dorost kon-am
ready do.PRES-1SG
[M]

6.3.2 Quantity proportional

Like English, a superlative strategy is used in Persian to convey a relative reading, but in contrast to English, Persian does not use a superlative strategy to convey a proportional reading. Instead, Persian uses *biš-tar-e* (much-CMPR-EZ), the comparative form of 'much/many' plus 'Ezafe'[15] to convey a proportional interpretation.

(53) "...But we are a good team, because together we picked most of the apples in the tree."

a. *...vali ma team-e khoob-i hast-im chon ma ba-ham.dige*
but we team-EZ good-INDF be.PRES-1PL because 1PL with-each.other
biš-tar-e *sib-a-ye ru deraxt-o chid-im*
much-CMPR-EZ apple-PL-EZ on tree-OM pick.PST-1PL
Quantity-proportional

(54) Together, they drank most of the juice.

a. *una ba.ham.dige* ***biš-tar-e*** *abmiva-ro noošid-an(d)*
they together **much-CMPR-EZ** juice-OM drink.PST-3pl
'They together drank most of the juice.' Quantity-proportional

To check whether the strategy used for relative readings could be used to express a proportional interpretation, follow up questions were made (in the *Most and more* project) based on the answers received from the consultants. The Persian speakers were asked to answer the following.

Suppose you are home alone one weekend and you bake a batch of 10 cookies. When they come out of the oven, you are extremely hungry, so you eat 7 of them. Only three are left. Would it be appropriate to admit what you did by saying either of the following? Which sentence is appropriate to be used in this context?

(55) *man biš-tar-in cookie ra khord-am*
1SG much-CMPR-SPRL kooki OM ate-1SG
'I ate the most cookies.'

(56) *man biš-tar-e cookie-ha ra khord-am*
1SG much-CMPR-EZ kooki-PL OM ate-1SG

[15] Ezafe is introduced in section 6.1.3

'I ate most of the cookies.'

While sentence (55) is grammatical, it cannot be used in this context, and this shows that 'bištarin' does not have a proportional reading. Sentence (56) is completely appropriate in this context since 'bištare' has proportional reading in Persian.

6.3.3 Discussion

According to the results of the study, Persian has two major strategies to make quantity relatives: [M] and [CMPR+ALL] strategies. The first and the most common way is the morphological strategy [M], and that is to use *bištarin*. *Bištarin* is a superlative form and is composed of *biš* 'much' + *-tar* (comparative marker) + *-in* (a superlative marker when attached to *-tar* or the comparative root).[16]

The second way to make superlatives of quantity is to use a [CMPR+ALL] strategy, and that is to use *bištar az hame* (the comparative form of *biš* plus *az* 'from') plus a universal quantifier (such as *hame* 'all'). These findings (using a morphological ([M]) and a [CMPR+ALL] startegy to make superlatives) are in accordance with what Mahootian (1997, 261), Windfuhr & Perry (2009, 434), and Lazard (1992, 88) write about the common strategies to make superlatives in general in Persian (presented in section 6.1.2).

A third strategy was also observed to make quantity relatives in a few cases. In this strategy, the comparative form *biš-tar* 'much+CMPR' was used when a superlative strategy was expected. *Bištar* was used both with and without the indefiniteness marker *-i*. It is surprising that the Morphological strategy [M] for making superlatives and using a comparative form (when superlatives are expected) coexist. A possible view to take would be that Persian speakers do not maintain a superlative meaning when they translate with the comparative form. The other perspective would be that the comparative form was meant to be the [CMPR+ALL] strategy, but the universal quantifier is omitted because it can be understood from the context. This raises the larger question of how distinct [CMPR] (using the comparative form for superlatives) is from the [CMPR+ALL] strategy.

For a proportional interpretation, Persian does NOT use a superlative form (unlike

[16]The superlative suffix *-tar+in* or *-tarin* contains the comparative marker *-tar* (see Bobaljik's Containment hypothesis discussed in section 6.1.2) and is added to the adjectival root. Persian very transparently reflects Bobaljik's Containment hypothesis according to which superlatives structurally contain comparatives.

English that uses *most*, the superlative form of *many*, in order to convey a proportional reading). Instead, Persian uses *biš+tar+e* which is composed of the comparative form *biš+tar* 'much+CMPR' plus *-e* (Ezafe[17]). It is obligatory to use *-e* after *biš+tar* to convey a proportional interpretation. This is in accordance with what Mahootian (1997, 69) and Parsafar (2010, 642) write. Mahootian (1997, 69) writes that partitives are made through preceding the noun with the quantifier and joining the quantifier and the noun with the Ezafe (*-e*) (see examples (32) and (33). Parsafar (2010, 642) also writes that quantifiers that occur in partitative structures take *Ezafe* obligatory.

(57) *hame-ye doxtar-ha*
all-EZ girl-PL
'all the girls' (Parsafar, 2010, 642)

(58) *nesfe-e chayi*
half-EZ tea
'half of the tea' (Parsafar, 2010, 642)

6.4 Comparatives and the use of the indefiniteness marker

The following examples show that a morphological ([M]) strategy is used to make comparatives in Persian. As shown below, the comparative is made by adding the suffix *-tar* to the positive (bare) form of the adjective (or adverb in some cases). The Morphological strategy [M] is the dominant strategy to make comparatives in Persian. This finding is in accordance with what was presented in section 6.1.1 on comparatives in Persian. What is new and noticeable in these results is that in some cases an indefiniteness marker (*-i*) follows the suffix *-tar*. Examples of this kind are shown in (59-a), (62-a), (62-b), (64-c), and (65-b).

(59) So he climbed a shorter tree.

a. *pas un az deraxt-e* ***kutah-tar-i*** *bala raft-ø*
so 3sg from tree-EZ **short-CMPR-INDEF** up go.PST-3SG
[M]

b. *pas un az ye deraxt-e* ***kutah-tar*** *bala raft-ø*
so 3sg from one tree-EZ **short-CMPR** up go.PST-3SG
[M]

[17] *Ezafe* is introduced in section 6.1.3

(60) "...The only reason that he won is that he is taller than us..."

a. *tanha dalil-i ke un az ma bord-ø in-e ke*
only reason-INDEF that 3SG from us win.PST-3SG this-be.PRES that
un az ma ***boland-tar****-e*
3SH from us **tall-CMPR** be.PST-3SG

[M]

(61) "...I bet we can run faster than he can."

a. *shart mi-band-am ke ma az un* ***sari-tar***
bet IMPV-fasten-1SG that 3PL from 3SG **fast-CMPR**
mi-do-im
IMPV-run.PRES-3PL

[M]

(62) Anna's brother picked fewer apples than Anna did.

a. *baradr-e Anna tedad sib-e* ***kam-tar-i*** *chid-ø*
brother-EZ Anna number apple-EZ **few-CMPR-INDEF** pick.PST-3SG
lit. '...brother of Anna number apple of fewer picked...' [M]

b. *baradr-e Anna tedad-e* ***kam-tar-i*** *sib chid-ø*
brother-EZ Anna number-EZ **few-CMPR-INDEF** apple pick.PST-3SG
lit. '...brother of Anna number of apple fewer picked...' [M]

c. *baradr-e Anna kam-tar (az Anna) sib chid-ø*
brother-EZ Anna **few-CMPR** from Anna apple pick.PST-3SG
lit. '...brother of Anna fewer apple picked...' [M]

(63) "...I bet I can drink more juice than both of you."

a. *shart mi-band-am ke man az har do-ye shoma* ***biš-tar***
bet IMPV-fasten-1SG that 1SG from every two-EZ 2PL **much-CMPR**
mi-tun-am abmive be-nush-am
IMFV-can.PRES-1SG juice SUBJ-drink.PRES-1SG

[M]

(64) Anna and her sister drank less juice than he did.

a. *Anna o khahar-esh* ***kam-tar*** *abmive xord-an az un*
Anna and sister-3SG **few-CMPR** juice eat.PST-3PL from 3SG

[M]

b. *Anna o khahar-esh* ***kam-tar*** *az un abmive xord-an*
Anna and sister-3SG **few-CMPR** from 3SG juice eat.PST-3PL

[M]

c. *Anna o khahar-esh abmive-ye* ***kam-tar-i*** *xord-an*
Anna and sister-3SG juice-EZ **few-CMPR-INDEF** eat.PST-3PL

[M]

Here are more examples form the Bake-off story. To say sentence (65) in Persian, the Morphological strategy [M] is used by adding the comparative marker *-tar* in 14/16 cases. In 7/16 sentences *az to* 'than you' is used, and in the rest of the sentences it is not used. This may suggest that using *az* 'than' is not obligatory in the colloquial Persian and it may be eliminated when it is conveyed in the context. To translate sentence (66) to Persian, the [M] strategy is used in all cases (16/16). In 9/16 sentences *az to* 'than you' is used, and in the rest of the sentences it is not used.

Sentences are categorized based on the frequency of their production by the participants. Sentences having constructions similar to (65-a) are used 9/16 times, (65-b) 4/16 times, and (65-c) only 3/16 times. As shown in sentence (65-c), a superlative strategy (the Morphological strategy for superlatives of quantity: *biš-tar-in*), is used when a comparative structure is used in English. This speaker used this structure in both picture-aided translation and storyboard versions of the story. One more participant used *biš-tar-in* in only the storyboard version of the story. However, using a superlative strategy for comparatives is rare in Persian, and it is not entirely clear to me why these two participants used a superlative strategy for comparatives. One explanation could be that they were confused by the high frequency of superlative constructions in the four tasks they did.

In sentence (66) only the comparative strategy (by adding the comparative marker *-tar*) is used; sentences having constructions similar to (66-a) are used 14/16 times, and (66-b) only 2/16 times. In sentence (67) almost all the participants used the comparative strategy for Persian (by adding the comparative marker *-tar*). The comparative construction plus indefiniteness marker (*biš-tar-i*), and a quantity superlative (*biš-tar-in*) were used only once.

(65) I bet I can bake more pies than you can.

a. *shart mi-band-am ke man* ***biš-tar*** *(az to) paay*
bet IMPV-bind-1SG that 1sg **much-CMPR** from 2sg pie
mi-paz-am
IMFV-bake.PRES-1SG
[M]

b. *shart mi-band-am ke man mi-tun-am paay(-ha)-ye*
bet IMPV-bind-1SG that 1sg IMPV-able.PRES-1SG pie(-PL)-EZ
biš-tar-i *(az to) be-paz-am*
much-CMPR-INDEF from 2sg SUBJ-bake.PRES-1SG

[M]

c. *man shart mi-band-am ke mi-tun-am*
1SG bet IMFV-bind.PRES-1sg that IMPV-able.PRES-1SG
biš-tar-in *(meqdar/te'dad) paay ro be-paz-am*
much-CMPR-SPRL (quantity/number) pie OM SUBJ-bake.PRES-1SG
[M]

(66) I bet I can clean faster than you can.

a. *shart mi-band-am ke man* ***sari-tar*** *(az to) tamiz*
bet IMPV-bind-1SG that 1sg **fast-CMPR** from 2SG clean
mi-kon-am
IMFV-do.PRES-1SG
[M]

b. *shart mi-band-am ke man*
bet IMPV-bind-1SG that 1sg
beh-tar o zood-tar/biš-tar *tamiz*
good-CMPR and soon-CMPR/much-CMPR clean
mi-kon-am
IMFV-do.PRES-1SG
[M]

(67) I win! I baked more than you and cleaned more than you!"

a. *man barandeh shod-am!* *ham* ***biš-tar*** *(az to)*
1SG winner become.PST-1SG both/likewise **much-CMPR** from 2SG
poxt-am, ham ***biš-tar*** *(az to) tamiz kard-am*
bake.PST-1SG both **much-CMPR** from 2SG clean do.PST-1SG
lit. 'I became winner! Both I cooked more than you, and (likewise) I cleaned more than you!' [M]

6.4.1 Discussion

This study confirms that a morphological [M] strategy is used to make comparatives in Persian. This is compatible with what Mahootian (1997, 108) writes about comparatives and how Bobaljik (2012) categorizes the comparatives in Persian (presented in section 6.1.1). Comparatives are made through adding the comparative marker *-tar* to the positive (bare) form of the adjective or some adverbs.

The results of this study show that in some cases the indefiniteness marker *-i* is added to the comparative form. These cases are presented in sentences (59-a), (62-a), (62-b), and (64-c). In all these cases (*kutah-tar-i* 'short-CMPR-INDEF' *kam-tar-i* 'few-CMPR-

INDEF', *biš-tar-i* 'much-CMPR-INDEF') how much the speaker/tree is taller/shorter, or how many more/fewer apples she has can remain unresolved since it is not the point of the conversation. And this could be the reason why an indefiniteness marker is used after the comparative form.

6.5 Count

(68) "...Let's see how many apples we can pick!"

a. *bi-ya-yn* *be-bin-im* *che-qadr* *sib*
SUBJ-come.PRES.3PL SUBJ-see.PRES.3PL what-amount apple
mi-tun-im *be-chin-im*
IMPV-can.PRES-3PL SUBJ-pick.PRES.3PL

b. *bi-ya-yn* *be-bin-im* *che-tedad* *sib*
SUBJ-come.PRES.3PL SUBJ-see.PRES.3PL what-number apple
mi-tun-im *be-chin-im*
IMPV-can.PRES-3PL SUBJ-pick.PRES.3PL

It seems that there is no agreement in the literature on the distinction between count and mass in Persian. I couldn't find a Persian grammar with a reference to count/mass distinction.[18]

Count nouns and mass nouns (such as water, electricity, snow, ice, etc.) in some circumstances can be made plural in Persian. See examples (69), (70), (71) below for instances in which mass nouns are made plural, and see section (95) to read more on numbers/plurality and definiteness in Persian. The most common[19] way to construct a plural noun is through adding the suffix *-ha* (or *-a* after the consonants in the spoken form) to the end of the word (Mahootian, 1997, 190-193).

(69) *ab-a* *qat-e*
water-PL_{DEF} cut-be.PPRES.3SG
'The water is shut off' (Ghaniabadi, 2012, 117)

(70) *barf-a* *ab* *šod-ø*
snow-PL_{DEF} water become.PST-3SG
'The snow melted' (Ghaniabadi, 2012, 117)

[18]To read more on count/mass, numerals and plurality in Persian see Ghomeshi (2003), Ghaniabadi (2012) and Hamedani (2011).

[19]Adding '-an' (or -yan) to the end of the word is another way to make plurals in Persian: doxtar-an (girl-PL). There are also some other methods to make plurals that are borrowed form Arabic which are not as common as the original Persian ones.

(71) *ru mase-ha chi nevešt-i?*
on sand-PL_{DEF} what write.PST-2SG
'What did you write on the sand(s)?' (Ghaniabadi, 2012, 118)

As shown in sentence (68), for *how many apples* in the English prompt, both *che-qadr* 'what-amount/magnitude' and *che-tedad* 'what-number' are used before the count noun *sib* 'apple'. Both of them can be used with the count nouns. *che-qadr* 'what-amount/magnitude' can usually be used with both the mass and count nouns, but *che-tedad* 'what-number' can only be used with the count nouns as it refers to the number/quantity of the object. However *che-tedad* 'what-number' or its equivalent *chand-ta*[20] 'what/several-CL' can also be used with the mass nouns when the mass noun is divided into units, or the speaker has the units in mind. Examples of such are presented below. In these examples *che-tedad* 'what-number' and *chand-ta* 'what/several-CL' are used with mass nouns when the speaker has the units in mind.

(72) *chand-ta šir xarid-i? do ta.*
what-CL milk buy.PST-2SG two CL
'how many milk you bought? Two.' [The speakers have the bottles of milk in mind]

(73) *che.tedad berenj dar maqaze dar-i? panjah kise.*
what-number rice in store have.PRS-2SG fifty bag
'how many rice you have in (the) store? Fifty bag(s).' [The speakers have the bags of rice in mind]

As shown in examples (69), (70), and (71) *definiteness is bundled with number* in Persian Ghaniabadi (2012, 113). Therefore, as throughout this thesis we encounter topics on number, plurality, as well as definiteness in the colloquial Persian, a brief review of definiteness in Persian is presented at Appendix B.

6.6 Conclusions on findings on Persian

Results from this project confirm that a morphological (M) strategy is used to make comparatives in Persian (see section 6.1.1 for background on comparatives in Persian). In addition, the results show/confirm that two main strategies are used in Persian to make

[20]'chand-ta' can both mean 'how many' or 'several' depending on whether it is used in an interrogative or declarative sentence.

quality and quantity superlatives: 1) Morphological (M) strategy, and 2) CMPR+ALL strategy (see section 6.1.2 for background on superlatives in Persian). However, the results suggest that a third category can be added to the superlative strategies in Persian. A [CMPR] strategy is used even when the comparison is made between more than two objects.

A superlative strategy using *bištarin*, *bištar az hame*, or *bištar* implies a relative reading, while a comparative form plus *Ezafe* (*bištare*) triggers a proportional reading.

The morphological strategy [M] cannot be used for quality adverbials, while for quality absolutes only the morphological strategy [M] was observed and it is probably the dominant way to make quality absolutes in Persian.

For count and mass noun distinction, it seems that there is no agreement in the literature, and mass nouns like *water*, *snow*, and *sand* can commonly be made plural. *che-qadr* 'how much' can be used with both mass and count nouns, while *che-tedad* 'how many' can only be used with count nouns. Persian is an (optional) classifier language and nouns are not made plural after cardinals in the standard written Persian. Definiteness is implied in three ways (through no morphological marking, demonstrative, 'the postposition *-ra*') in written Persian, and in two ways (the postposition *-e* and plural marking) in the colloquial Persian.

7 General Conclusion

7.1 Summary of findings

Comparing Picture-aided Translation and Storyboards: The primary goal of this thesis was to compare picture-based methods for conducting semantic fieldwork. Having tested the storyboards and the translation tasks, a picture-based method that eliminated the disadvantages of storyboards and translation tasks and brought together their advantages was developed. This picture-based method which we referred to as picture-aided translation methodology was tested and systematically compared to the storyboard methodology. The comparison between the picture-aided translation and the storyboard methodologies was conducted on two different stories; the What Matters story (developed by us) and the Bake-off story (developed by Totem filed methods).

The picture-aided translation and the storyboard versions of the two stories were presented to the consultants within the three main stages of the project: the first attempts, the pilot test, and the main study. The consultants were audio-recorded, and the data was transcribed and scored based on *faithfulness*. Method and the materials were modified after each stage based on the scores from results, comments and the feedback from the consultants.

The results from comparing the picture-aided translation with the storyboard showed that there were higher faithfulness scores using the picture-aided translation method for both the What Matters story and the Bake-off story. The results boosted off up to **20%** in faithfulness in the What Matters story, and **10%** in the Bake-off story. In other words, the risk of misinterpretation, forgetfulness and providing only rough idea was minimized in the picture-aided translation methodology and more target constructions were elicited in this method in comparison to the storyboard methodology. Statistical analysis using Generalized Mixed Model in R also showed that: the method was highly significant and had highly significant effect on the results; in other words the picture-aided translation method yields higher faithfulness level than the storyboard.

When there was an ambiguity in the context, having two sources to look at (picture and text) helped the consultants better understand the context. One stimulus helped resolve the ambiguity in the other one. As it was not always easy to draw illustrative pictures and include/show the target constructions in them, having a text that included the target construction presented below the picture, made it easier to elicit the target construction. When seeing the target construction presented in the text, the consultants were reminded to try to convey that concept when telling the story in their native languages.

More faithful translations were received for the 'Bake-off' story than the 'What Matters' story, possibly due to length of story and sentences and the level of difficulty, which suggested that storyboards should be kept short and simple. Statistical analysis using Generalized Mixed Model in R also showed that the story has a significant effect; in other words the Bake-off story yields higher faithfulness level than the What Matters story.

The picture-aided translation and the storyboard methodologies were both equally fun for the consultants, however most of them felt more comfortable having/seeing the text below the picture. Statistical analysis using Generalized Mixed Model in R also showed

that there was no effect of the order, and it didn't matter which method/story was tested first/last.

Though naturalness was not measured systematically in this thesis, with some evidence from Persian it was shown that the Persian speakers produced natural sentences where they could be totally influenced by the structure of the English prompt, suggesting that picture-aided translation can also contribute to having natural data.

Contributions to semantic fieldwork: The process of developing both the picture-aided translation and the storyboard versions of the What Matters story and testing it on the native speakers, contributed to noteworthy implications for any future semantic fieldwork. It taught us to; keep the story and the sentences informative and fun, but short and simple, and divide them up to sections if the story has to be long; use arrows to point to the main subject of the study; avoid distractions or too many objects in the picture; and to put clues such as bubbles and braces in the picture to help the consultants get/remember the point of that picture. Some tips for semantic fieldworkers are presented in section 7.2.

Findings on Persian: Results confirmed that comparatives are made through a Morphological strategy [M], by adding the comparative marker *-tar* to the positive (bare) adjective. If *x* is the positive form of the adjective, the comparative form would be *x+tar*. The results from the case study on Persian showed that another construction, *x+tar+i*, which is made through combining the comparative form plus the indefinite marker *-i* was also observed a few times, specially in cases when the quantity/quality was ambiguous or not the main point.

Superlatives are also made through a Morphological strategy [M], by adding the superlative marker *-in* to the comparative form of the adjective (or by adding *-tarin* to the positive adjective, as Mahootian (1997, 260) and Lazard (1992, 87) write). If *x* is the positive form of the adjective, the superlative form would be *x+tar+in*. Superlative adjectives (the *x+tar+in* form) are used attributively and precede the noun, but Persian has two other strategies to use superlatives predicatively; the [CMPR+ALL] strategy in which the comparative form of the adjective is used with a universal quantifier as the

standard of comparison, and using a comparative form (comparative forms were observed to make quantity and quality relatives in a few cases where a superlative strategy like [M] or [CMPR+ALL] was expected. The comparative form of the adjective was observed with or without the indefiniteness marker *-i* (such as *Bištar*). It is surprising that the Morphological strategy [M] and using a comparative form where superlatives are expected coexist. A possible view to take would be that Persian speakers do not maintain a superlative meaning when they translate with the comparative form. The other perspective would be that it was originally the [CMPR+ALL] strategy, but the universal quantifier is omitted because it can be understood from the context. This raises the larger question of how distinct [CMPR] (using a comparative form for superlatives) is from [CMPR+ALL]. The results of the study showed that the [M] and the [CMPR+ALL] strategies are the two primary strategies to make superlatives of both quantity and quality in Persian. Persian primarily uses two strategies to make quantity relatives: a Morphological [M] strategy by using the superlative form *biš-tar-in* 'much-CMPR-SPRL', and a [CMPR+ALL] strategy by using *biš-tar az hame*[21] 'much-CMPR from all'.

The results from studying the comparison strategies in Persian were in accordance with what Mahootian (1997, 260), Lazard (1992, 87), and Windfuhr & Perry (2009, 434) present for superlatives in Persian in general, and transparently reflected Bobaljik's (2012, 31) containment hypothesis according to which superlatives structurally contain comparatives.

The results also showed that unlike English, Persian does not use the superlative of *many* to convey a proportional reading. Contradictory to the Hackl's (2009) prediction that *many+est* should be available in any give language for both the proportional and the relative readings, Persian uses *biš+tar+e* which is composed of the comparative form *biš+tar+e* 'much+CMPR' plus *-e* (Ezafe) for a proportional reading. Moreover, in line with Parsafar's (2010, 642) and Mahootian's (1997, 69) arguments on the construction of partitives in Persian, it was observed that for a proportional reading using *-e* (Ezafe) is obligatory after *biš+tar*. In a follow up study on Persian, it was further confirmed that the quantity superlative *biš+tar+in* can only be used for a relative reading, and not a proportional reading. For a proportional reading, the comparative form *biš+tar* + *-e* can

[21]Or its other form: *az hame bištar*. The universal quantifier *hame* 'all' can also be replaced by Persian words with meanings such as 'others, them, everyone else'

only be used.

It was also observed that the Morphological strategy [M] is not used for quality and quantity adverbials. Instead, the comparative construction *x+tar*, or the [CMPR+ALL] strategy are used. Using the Morphological strategy [M] for quantity and quality adverbials is ungrammatical and sounds weird in Persian. For quality absolutes, only the Morphological strategy [M] was used and it seems that the Morphological strategy [M] is the dominant strategy to make quality absolutes in Persian.

The distinction between count and mass nouns has been a controversial issue in Persian linguistics. In addition to count nouns, mass nouns like water, snow, sand and etc. can commonly be made plural. The results of this study showed that as a general rule, *che-tedad* 'what-number; how many' can only be used with count nouns[22], while *che-qadr* 'what-amount/magnitude; how much' can usually be used with both count and mass nouns.

As mass nouns can sometimes be made plural in Persian, and as plural count/mass nouns can imply definiteness (see section (95), this work presented a brief review of the literature on definiteness in Persian. Definiteness in Persian is implied in five ways: through no morphological marking, demonstratives, and the postposition *-ra* in written Persian, and through the postposition *-e* and plural marking (see (46-b)) in the colloquial Persian.

7.2 Some tips

The findings of this project implies that **translation, especially picture-aided translation, may suit your purposes as a fieldworker**. In this section, I provide the lessons that I learned meanwhile creating, experimenting, and modifying the elicitation materials which contributed to the progression of the work and improved the results. The following tips would be helpful to data collection for linguists and fieldworkers who are willing to design stimulus including pictures and text.

1. Try to conduct a pilot test.

2. Make clear and concise instructions.

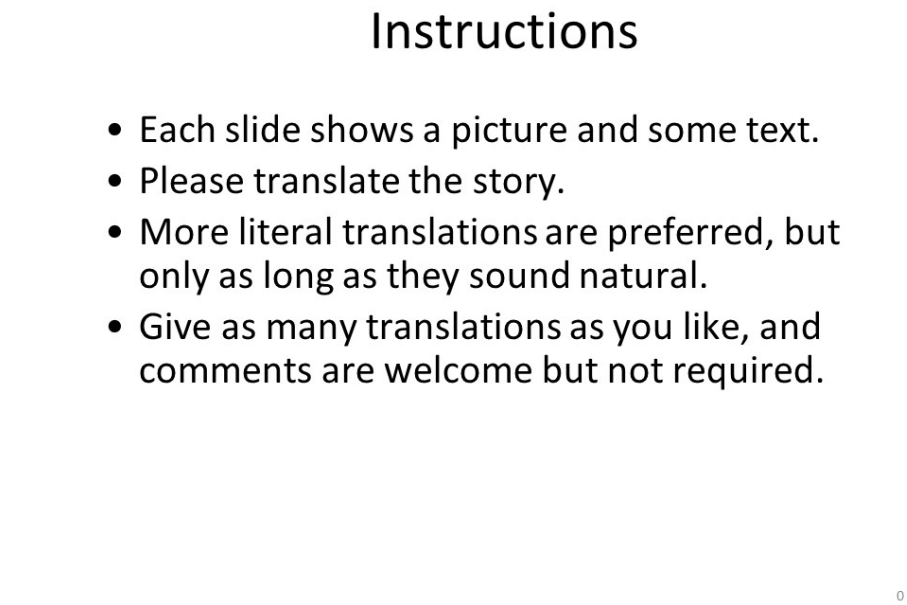
3. Put one sentence per image.

[22] See examples (72) and (73) for exceptions

4. Put one target construction per sentence.
5. Number the sentences.
6. Make images realistic and fun, but not distracting.
7. Keep the story short and simple, especially for story boards.
8. For longer stories divide them up to sections.
9. Place an arrow on the subject of the sentence.
10. Hide participants that are not in the sentence.

A Version of 'What Matters' used for main study

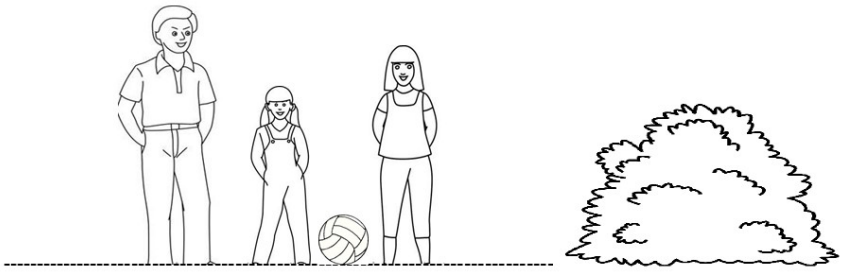
Here is the picture-aided translation task (WM-PT) that was developed and used in the main study.



Section 1

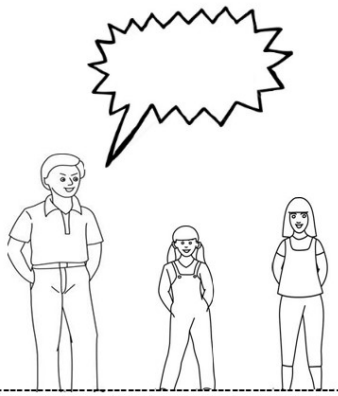
Climbing Competition

1

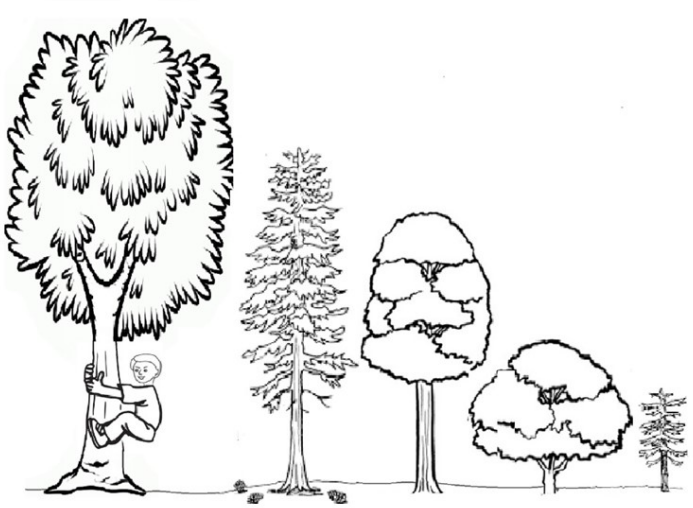


1) Yesterday, Anna was playing outside with her brother and her sister.

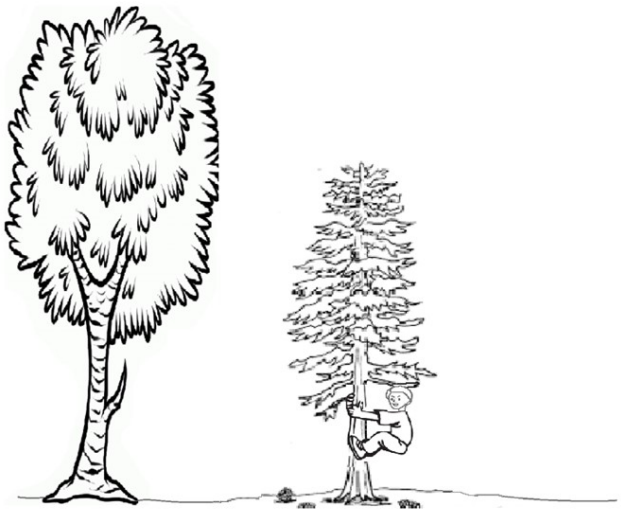
→



2) Her brother shouted:
“Let's have a contest! Whoever climbs the tallest tree wins!”
→

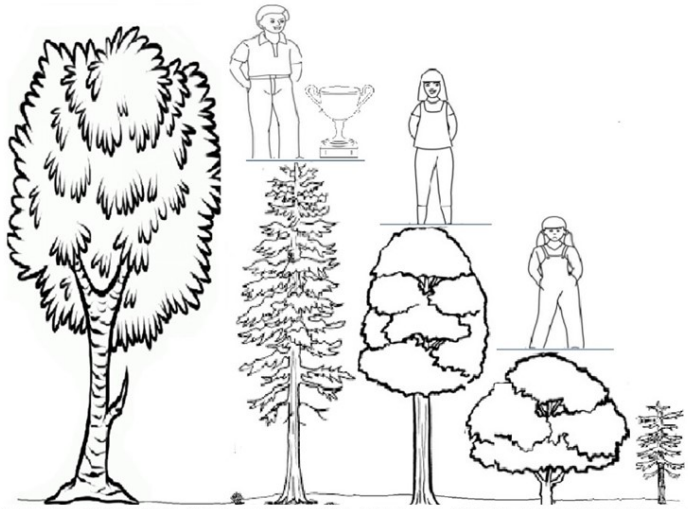


3) First he tried to climb the tallest tree in the garden,
but it was too tall.
→



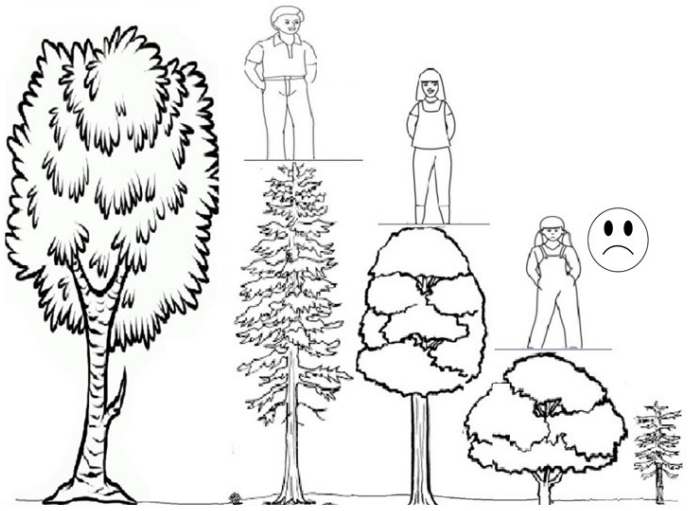
4) So he climbed a shorter tree.

→



5) Among the three kids, he was the one who climbed the tallest tree, so he won the contest.

→



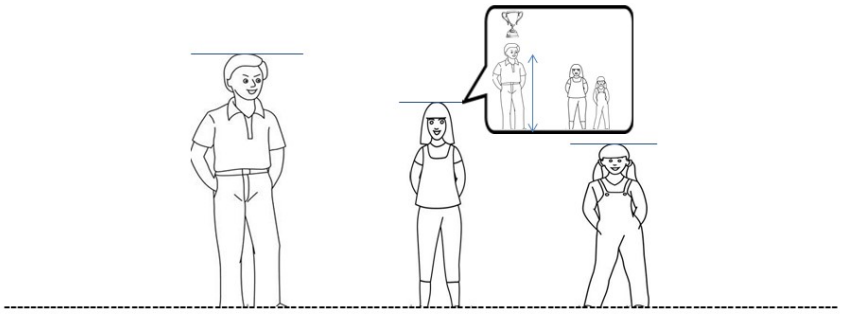
6) Anna lost because she climbed the shortest tree.

→

Section 2

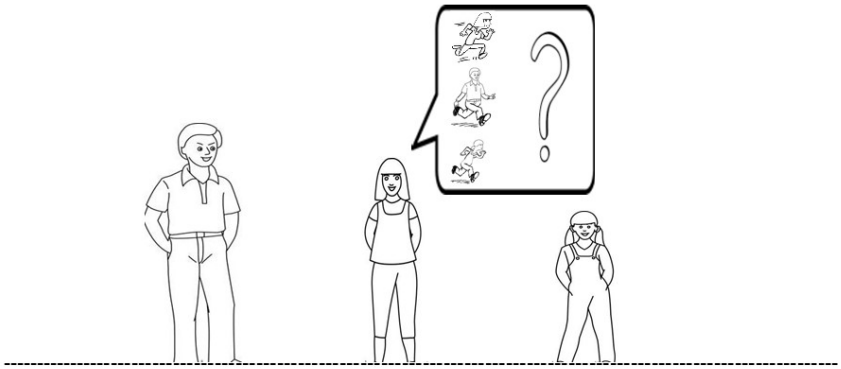
Running Competition

8



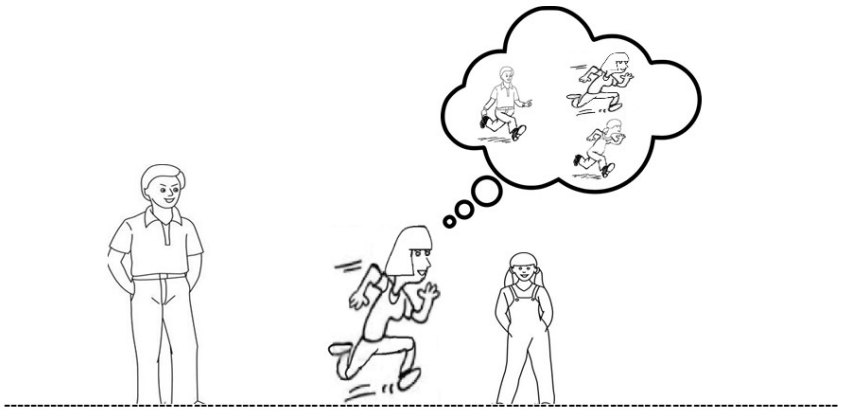
7) Anna's sister said to her, "The only reason that he won is that he is taller than us...

→



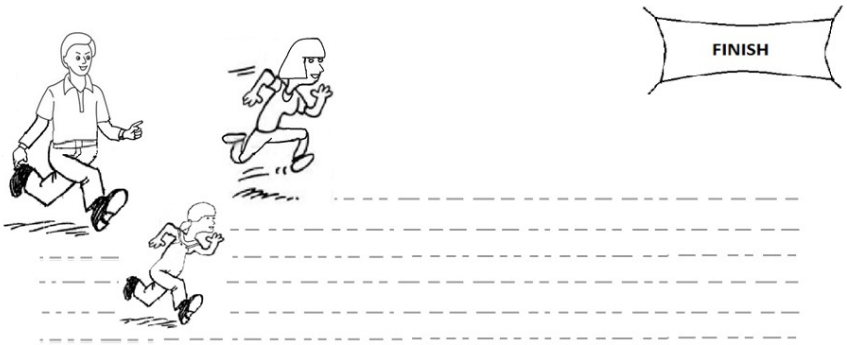
8) ...Let's see who can run the fastest!

→



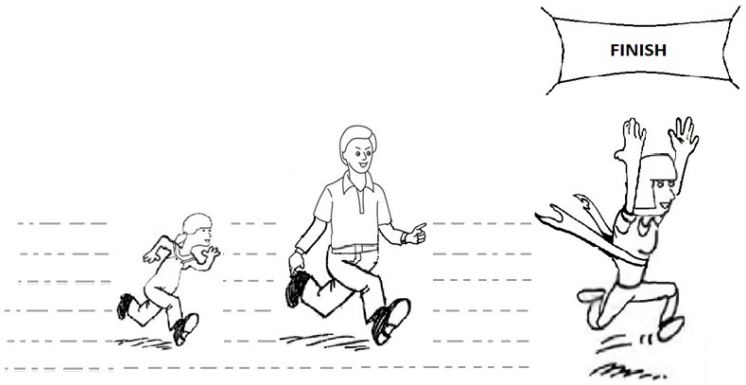
9) ...I bet we can run faster than he can."

→



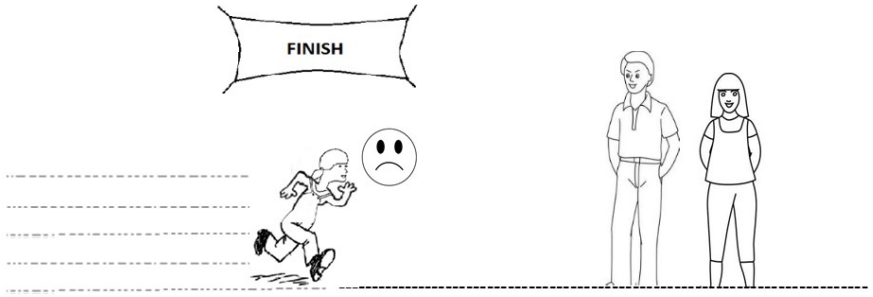
10) So they had a race.

→



11) Anna's sister crossed the finish line first

→



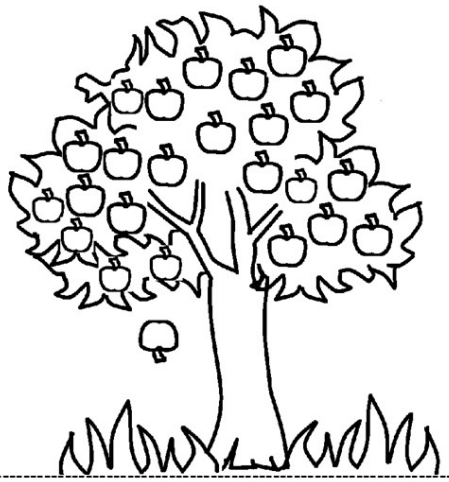
12) But Anna finished last.

→

Section 3

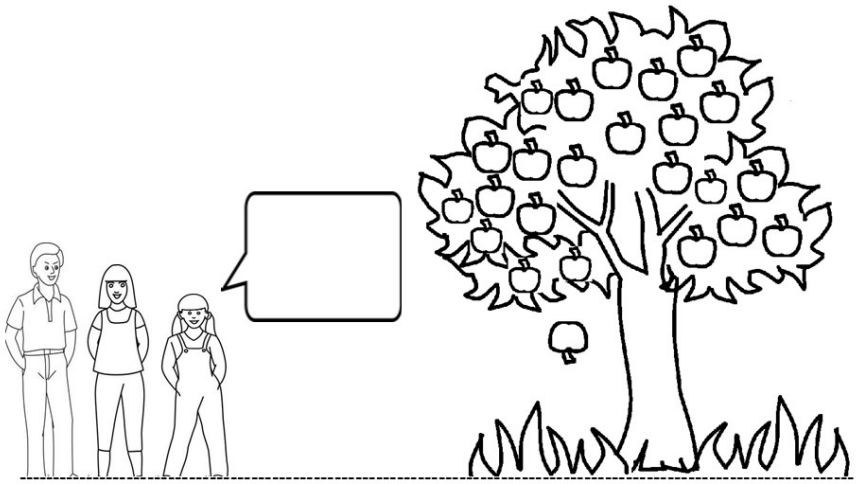
Apple picking competition

15



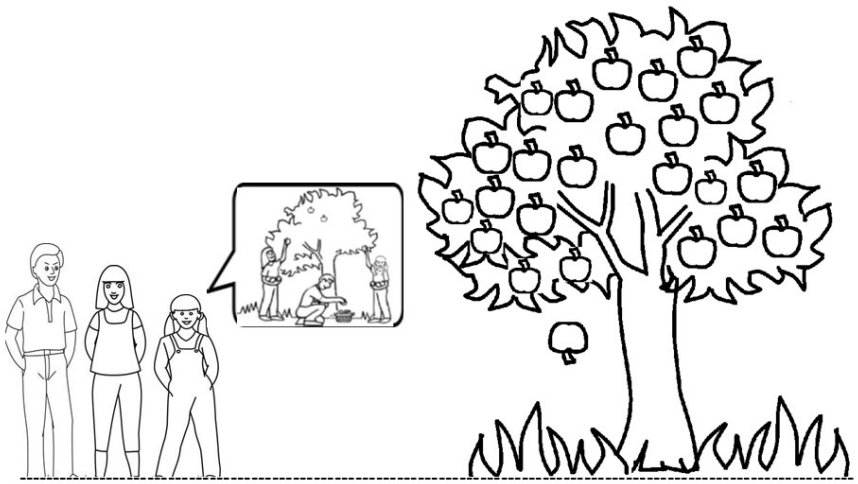
13) There was an apple tree in the garden,
and many of the apples in the tree were ripe.

→



14) Anna said, “It’s not important how fast you can run.

→

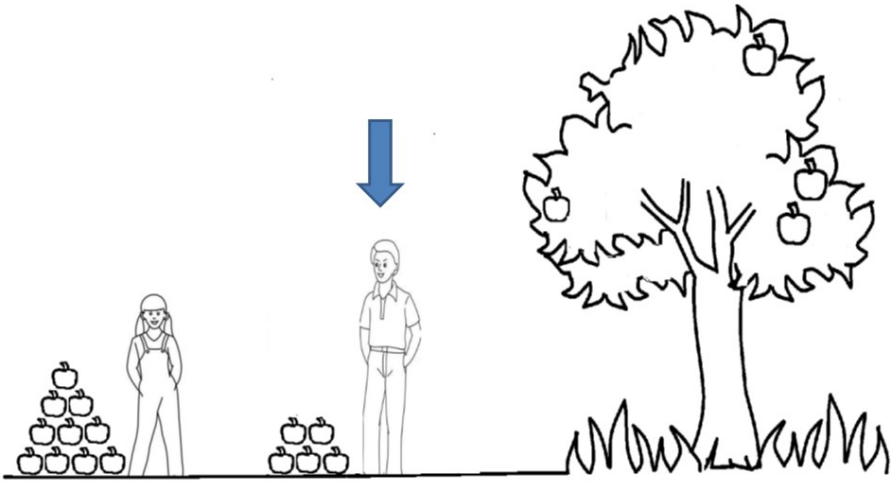


15) ...Let's see how many apples we can pick!”

→

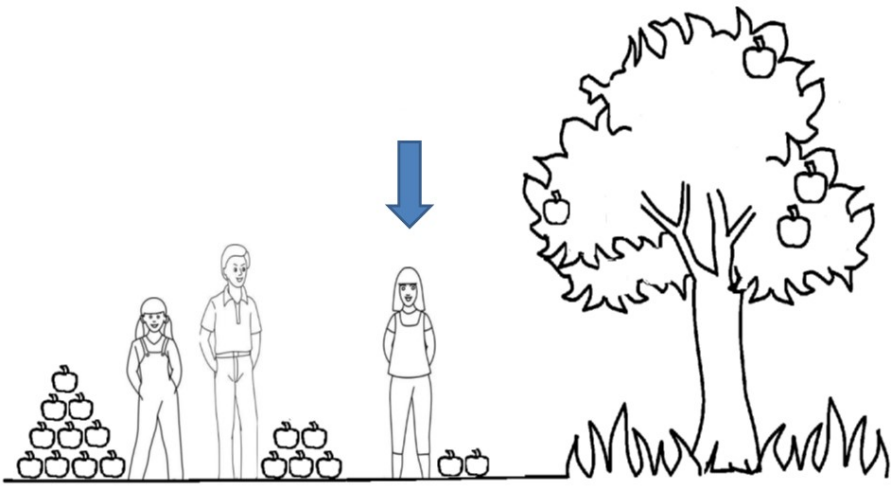
16) Anna picked the most apples.

→



17) Anna's brother picked fewer apples than Anna did.

→



18) Anna's sister picked the fewest apples.

→

19) Anna said, "I won! I have the most apples! ...

→

20) ...But we are a good team, because together we picked most of the apples in the tree."

→

Section 4

Juice Competition

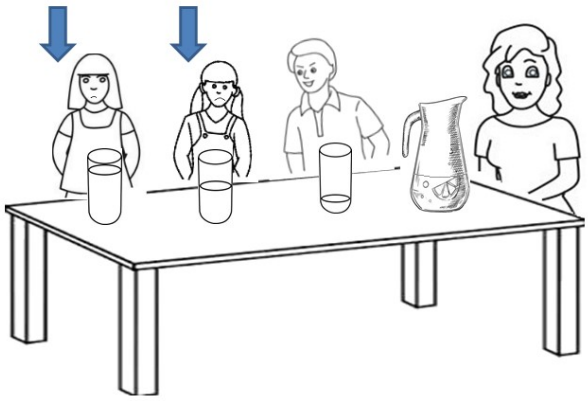
24

21) When they got home, Anna's brother shouted: “Let's have another contest! Whoever drinks the most juice is the winner...

→

22) ...I bet I can drink more juice than both of you.”

→



23) He was right.
24) Anna and her sister drank less juice than he did.

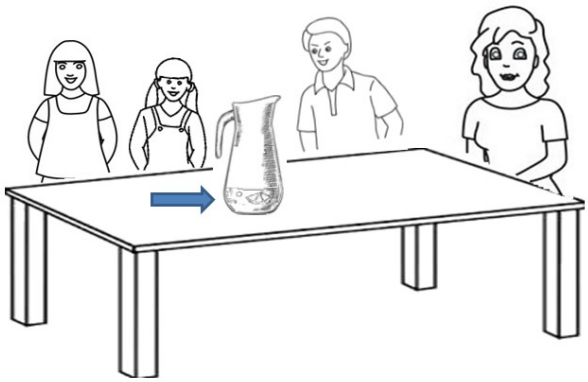
→

25) Anna's sister drank the least juice, so she lost.

→

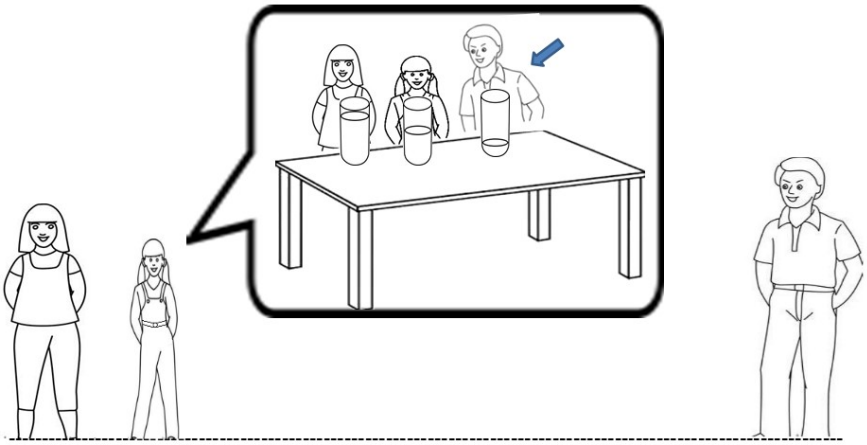
26) Together, they drank most of the juice.

→



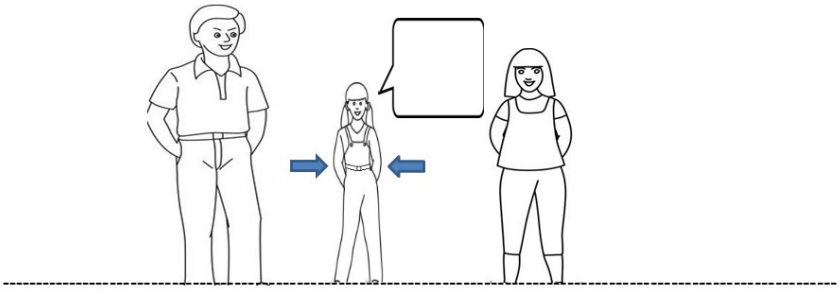
27) Only a little bit of it was left.

→



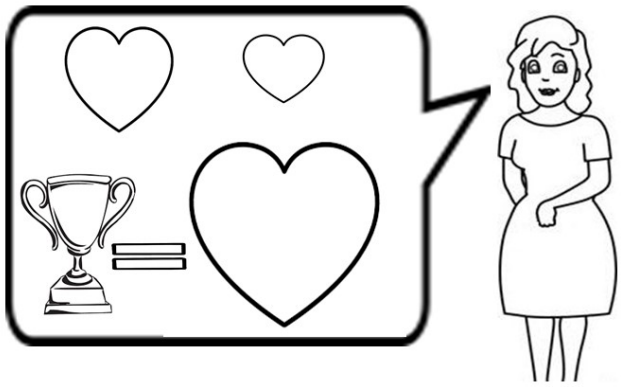
28) Anna said to her brother, “Well, you drank the most juice,...

→



29) ...but I’m the one who has the smallest waist!”

→



30) Their mother said,
"It doesn't matter how thin you are.
31) The winner is the one who has the biggest heart."

→

B Definiteness in Persian

Mahootian (1997, 196) describes 'definiteness' as a feature of the NP that indicates reference to a specific entity which is known to both the speaker and the audience. She believes that there are several ways to indicate definiteness in Persian: 1) no morphological marking can indicate definiteness; 2) demonstratives can be indicators of definiteness; 3) the object marker *-ra* (*-ro, -o*) can imply definiteness; and 4) the suffix *-e* (*-æ* or *-he*) attached to the singular noun in the subject or object position, in the colloquial Persian, implies definiteness. These strategies to indicate definiteness are described below.

1) No morphological marker: NPs in the subject or indirect object positions that are not modified and have no specific markers for definiteness are typically considered as definite, and sometimes as generic (Mahootian, 1997, 196). See examples (74) and (75) in which the NPs are interpreted as definite, and example (76) which is interpreted as generic.

(74) *mašin tu garaj-e*
car in garage-be.PRES.3SG
'The car is in the garage.' (Mahootian, 1997, 196)

(75) *dad-ø-eš* *be moalem*
give.PST-3SG-3SG.PC to teacher

'She/he gave it to the teacher.' (Mahootian, 1997, 196)

(76) *varzeš bara-ye behbudi lazem-e*
exercise for-EZ health necessary-be.PRES.3SG
'exercise is necessary for health' (Mahootian, 1997, 196)

2) Demonstratives: According to Mahootian (1997, 196) Persian has inherent definites which include demonstrative pronouns, personal pronouns, and proper names, as well as demonstrative adjectives, superlatives and ordinals that occur with nouns and force a definite reading of the NP. Examples of such definites are presented below (taken from Mahootian (1997, 196-198) .

(77) *un bošqab*
that plate
'that plate'

(78) *mohem-tar-in nevisande*
important-CMPR-SPRL writer
'the most important writer'

(79) *mohem-tar-in nevisande*
important-CMPR-SPRL
'the most important writer'

(80) *avalin ša'er*
first poet
'the first poet'

(81) *in otaq xeili kuchik-e*
this room very small-be.PRES.3SG
'This room is very small'

(82) *in-a fayde na-dar-e*
this-PL use NEG-have.PRES.3SG
'these are useless'

(83) *un-a ba ma mi-ya-n*
that-PL with 1PL DRU-come-PRES.3PL
'They're coming with us'

3) The postposition *-ra*: The object marker *-ra* (and its phonological variants *-ro* and *-o*) has long been debated and various arguments have been presented for its function. Traditionally, *-ra* has been regarded as a marker of accusative case and a definite direct

object marker. Karimi (1990) agues against viewing *-ra* as an accusative case marker and suggests that *-ra* is a marker of *specificity* (Karimi, 1990; Karimi, 2003). Dabir-Moghaddam (1992) believes that *-ra* is a marker of *secondary topic*, while Mahootian (1997, 200) believes that the primary function of *-ra* is marking a *definite* direct object. Ghomeshi (1996) discusses that *-ra* case-marks presupposed noun phrases that are adjoined to VP, and Jasbi (2014) suggests that the main semantic factor in Persian differential object marking is 'definiteness' rather than 'specificity', and believes that *-ra* 'triggers an existential presupposition on the object NP' (Jasbi, 2015). Finally, based on the discussion by Mahootian (1997, 200) it can be concluded that if we consider *'object noun phrases on a scale of most definite to least definite, -ra marks object NPs toward the higher, more definite end of the scale'*.

(84) *Bahram man-o bord-ø madrese*
Bahram 1SG-OM take.PST-3SG school
'Bahram took me to school' (Mahootian, 1997, 200)

(85) *mašin-o dar-eš-o bast-am*
car-OM door-3SG.PC-OM close.PST-1SG
'As for the car, I closed its door' (Karimi, 1990, 143)

(86) *serke šir-ra mi-bor-ad*
vinegar milk-OM DUR-curdle-3SG
'Vinegar curdles milk' (Dabir-Moghaddam, 1992, 557)

(87) *man golabi-ro xord-am*
1SG pear-OM eat.PST-1SG
'I ate the pear' (Jasbi, 2015)

(88) *man ye golabi-ro xord-am*
1SG one pear-OM eat.PST-1SGl
'I ate one of the pears', 'I ate a (certain) pear', etc. (Jasbi, 2015)

4) The postposition *-e*: In the colloquial Persian, singular nouns can optionally be marked with the stressed vowel *-e* or *-æ* (before consonants) and *-he* (after consonants) to indicate definiteness (Mahootian 1997, 201; Ghomeshi 2003, 67; Ghaniabadi 2012, 120; Jahani 2015). The definite marker *-e* (or *-æ*) is used as a discourse device when both the speaker and hearer have mutual knowledge about the marked NP through recent mention, and it can attach to any singular proper or common NP, direct/indirect object and other

cases (Mahootian, 1997, 201).

(89) *gonješk(-e) parid-ø ru deraxt*
sparrow(-SG_{DEF}) fly.PST-3SG on tree
'The sparrow flew on the tree' (Ghaniabadi, 2012, 121)

(90) *gonješk(-æ)-ro did-am*
sparrow(-SG_{DEF})-OM see.PST-1SG
'I saw the sparow' (Ghaniabadi, 2012, 121)

(91) *zan-e be man goft-ø*
woman-DEF to 1SG say.PST-1SG
'The woman told to me' (Mahootian, 1997, 201)

(92) *doxtar-e amad-ø*
girl(-SG_{DEF}) come.PST-3SG
'The girl came' (Ghomeshi, 2003, 68)

(93) *ketab-o be doxtar-e dad-am*
book-OM to girl(-SG_{DEF}) give.PST-1SG
'I gave the book to the girl' (Ghomeshi, 2003, 68)

The definite marker *-e* (or *-æ*) occurs only in the colloquial Persian, and as Mahootian (1997, 201) writes it can even be attached to singular proper nouns contrary to English where the definite marker cannot be attached to singular proper nouns. However, the possibility of having the definite marker *-e* (or *-æ*) on singular proper nouns in Persian is controversial. Ghomeshi (2003, 68) and Hamedani (2011) believe that adding the definite marker '-e' (or '-æ') to singular proper nouns is impossible, but Afzali (2012) and Nikravan (2014) follow Xorasani (1950) and believe that this combination can be observed in the colloquial form (in constructions such as *Hossein-e* 'The Hossein mentioned'). As discussed by a Persian speaker and based on my own Persian intuition, I provide examples in which the definite marker *-e* (or *-æ*) can occur with singular proper nouns.

(94) *in Araš-e tazegi xeili darsxun šode-ø*
this Arash-DEF recently very studious become.PTCP-3SG
'Arash has become so studious (very hard-working) recently'

(95) *Navid-æ-ro zad-am*
Navid-DEF-OM hit.PST-1SG
'I hit Navid'

Plural marking and definiteness: Besides the main 4 strategies mentioned by Mahootian (1997) to indicate definiteness, there is another strategy to indicate definiteness in the colloquial Persian and can be added to the list above. Mahootian (1997, 196) and Ghomeshi (2003, 57) believe that plural marking on a noun phase renders a definite interpretation for the noun to which it is attached. Ghomeshi (2003, 57) writes that for a noun phrase containing a numeral to be interpreted as definite, the presence of the plural marker is obligatory.

(96) *se-ta ketab ru-ye miz bud-ø*
three-CL book on-EZ table be.PST-3SG
'Three books were on the table' Ghomeshi (2003, 59)

(97) *se-ta ketab-a ru-ye miz bud-and*
three-CL book-PL_{DEF} on-EZ table be.PST-3PL
'The three books were on the table' (Ghomeshi, 2003, 59)

Ghaniabadi (2012, 113) also claims that plural inflection on mass[23] nouns and nouns with numerals triggers definite readings since *definiteness is bundled with number* in Persian. Ghaniabadi (2012, 112) furtehr argues that the plural inflection on a noun phrase in Persian can encode both definiteness and cardinality.

(98) *ketab-a ru-ye miz-e*
book-PL_{DEF} on-EZ table-be.PPRES.3SG
'The books are on the table' (Ghaniabadi, 2012, 114)

(99) *ab-a qat-e*
water-PL_{DEF} cut-be.PPRES.3SG
'The water is shut off' (Ghaniabadi, 2012, 117)

(100) *barf-a ab šod-ø*
snow-PL_{DEF} water become.PST-3SG
'The snow melted' (Ghaniabadi, 2012, 117)

(101) *ru mase-ha chi nevešt-i?*
on sand-PL_{DEF} what write.PST-2SG
'What did you write on the sand(s)?' (Ghaniabadi, 2012, 118)

[23]Mass nouns such as electricity, ice, water, snow, sand, fog are commonly used with the plural marker '-ha'.

C The Main study participants

The participants are color-coded according to the order in which they completed the tasks. As illustrated in Table 3, *C1 and C6, C2 and C5, C3 and C7, C4 and C8* participated in the same tasks with similar orders.

ID	Age	Education	Gender	Order of Tests
C1	32	PhD Student	Female	SB-WM PT-WM, SB-BK PT-BK
C2	42	DMD (Dentist)	Female	PT-WM SB-WM, PT-BK SB-BK
C3	34	Post-doctoral Researcher	Male	PT-BK SB-BK, PT-WM SB-WM
C4	31	Research Assistant	Male	SB-BK PT-BK, SB-WM PT-WM
C5	30	PhD Student	Female	PT-WM SB-WM, PT-BK SB-BK
C6	32	PhD Student	Male	SB-WM PT-WM, SB-BK PT-BK
C7	30	PhD Student	Male	PT-BK SB-BK, PT-WM SB-WM
C8	36	Post-doctoral Researcher	Male	SB-BK PT-BK, SB-WM PT-WM

Table 3: Participants in the main study

D Translation questionnaire

Instructions Please translate the sentences below into your native language. More literal translations are preferred, but only as long as they sound natural. Give as many translations as you like, and comments are welcome but not required. (No need to translate the parts in parentheses; they are just supposed to help explain what is meant.)

1. Most of the kids who go to my school like to play music. (For example, there are 100 kids in my school, and 65 of them like to play music.)
2. Of all the kids in my school, I'm the one who plays the most instruments. (For example, I play 7 instruments, two of my friends play 6 instruments, and lots of people play one or two instruments, but nobody else plays more than 4.)
3. I don't like most of the music they play on the radio.
4. My brother Hans also plays many instruments, but not more than me.
5. The member of my family who plays fewest instruments is my sister Karin.
6. During most of the summer we have played music every day.

7. I don't know how much coffee we've drunk and how many cookies we've eaten during the summer.

8. But it is probably Hans who has drunk the most coffee. (For example, Hans drank three cups every day, and the rest of us drink one or two cups every day.)

9. Mom says that he ought to drink less coffee.

10. I am the one who drinks the least coffee.

11. But I am also the member of our family who eats the most cookies. (For example, I eat on average 5 cookies per day, and other members of my family eat on average 4 or fewer cookies per day.)

12. Mom baked cookies yesterday and I ate most of them. (For example, she baked 20 cookies and I ate 14.)

13. I drank most of the milk too. (For example, there were two liters of milk and I drank 1.5 liters.)

14. I'm not the one in the family with the thinnest waist.

15. I ought to eat fewer cookies.

16. But it's hard since mom bakes the yummiest cookies in the whole world.

17. Many try, but few can resist mom's cookies!

References

Afzali, Parichehr. 2012. *Marking definiteness in farsi and english by farsi speaking efl learners.* Linköping University MA thesis.

Andersen, Paul Kent. 1983. *Word order typology and comparative constructions*, vol. 25 IV. Amsterdam/Philadelphia: John Benjamins Publishing.

Barwise, Jon & Robin Cooper. 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 4. 159–219.

Beck, Sigrid, Sveta Krasikova, Daniel Fleischer, Remus Gergel, Stefan Hofstetter, Christiane Svaelsberg, John Venderelst & Elisabeth Villalta. 2010. Crosslinguistic variation in comparison constructions. In Jeroen van Craenenbroeck & Johan Rooryck (eds.), *Linguistic variation yearbook*, 1–66. Amsterdam: John Benjamins.

Bobaljik, Jonathan David. 2012. *Universals in comparative morphology: Suppletion, superlatives, and the structure of words*. Cambridge, MA: MIT Press.

Bochnak, Ryan. 2015. The degree semantics parameter and cross-linguistic variation. *Semantics & Pragmatics* 8(6). 1–46.

Burton, Strang & Lisa Matthewson. 2015. Targeted construction storyboards in semantic fieldwork. In M. Ryan Bochnak & Lisa Matthewson (eds.), *Methodologies in semantic fieldwork*, 135–156. Oxford: Oxford University Press.

Coppock, Elizabeth, Elizabeth Bogal-Allbritten & Golsa Nouri-Hosseini. submitted. Universals in superlative semantics. Manuscript, Boston University and University of Gothenburg.

Coppock, Elizabeth, Golsa Nouri-Hosseini, Elizabeth Bogal-Allbritten & Saskia Stiefeling. 2017. Proportional implies relative: A typological universal. *Proceedings of the Linguistics Society of America* 2(12). 1–15.

Dabir-Moghaddam, Mohammad. 1992. *Cooperating with texts. the pragmatics and comprehension of written texts* chap. On the (in)dependence of syntax and pragmatics: Evidence from the postposition -ra in Persian, 549–574. Berlin, New York: De Gruyter Mouton.

Farkas, Donka & Katalin É. Kiss. 2000. On the comparative and absolute readings of superlatives. *Natural Language and Linguistic Theory* 18. 417–455.

Ghaniabadi, Saeed. 2012. *Count and Mass Across Languages* chap. Plural marking beyond count nouns, 112–128. Oxford University Press 1st edn.

Ghomeshi, Jila. 1996. *Projection and inflection: A study of Persian phrase structure*: University of Toronto dissertation.

Ghomeshi, Jila. 2003. Plural marking, indefiniteness, and the noun phrase. *Studia Linguistica* 57. 47–74.

Gorshenin, Maksym. 2012. The crosslinguistics of the superlative. In Cornelia Stroh (ed.), *Neues aus der bremer linguistikwerkstatt – aktuelle themen und projekte*, 55–159. Bremen: Brockmeyer.

Hackl, Martin. 2009. On the grammar and processing of proportional quantifiers: *most* vs. *more than half*. *Natural Language Semantics* 17. 63–98.

Hamedani, Ladan. 2011. *The function of number in Persian*: University of Ottawa dissertation.

Hammarström, Harald, Robert Forkel & Martin Haspelmath. 2017. Glottolog 3.0. Jena: Max Planck Institute for the Science of Human History. `http://glottolog.org`.

Heim, Irene. 1999. Notes on superlatives. Ms., MIT.

Heine, Bernd. 1997. *Cognitive foundation of grammar*. New York: Oxford University Press.

Jahani, Carina. 2015. On the definite marker in modern spoken Persian. Uppsala University, Disciplinary Domain of Humanities and Social Sciences, Faculty of Languages, Department of Linguistics and Philology. (Iranian languages). Conference paper, Oral presentation with published abstract, International Conference on Iranian Linguistics, 6, Tbilisi. `http://uu.diva-portal.org/smash/record.jsf?pid=diva2%3A905558&dswid=-2696#`.

Jasbi, Masoud. 2014. The semantics of differential object marking in Persian. Qualifying paper, Department of Linguistics, Standford University. `https://web.stanford.edu/~masoudj/persian_dom_semantics_draft.pdf`.

Jasbi, Masoud. 2015. The semantics of differential object marking in persian. Presented at the 2015 LSA Annual Meeting.

Karimi, Simin. 1989. *Aspect of Persian Syntax, Specificity, and Theory of Grammar*: University of Washington dissertation.

Karimi, Simin. 1990. Obliqueness, Specificity, and Discourse Functions: Ra in Persian. *Linguistic Analysis* 20. 139–191.

Karimi, Simin. 2003. *Word Order and Scrambling* chap. On object Positions, Specificity, and Scrambling in Persian, 91–124. Oxford, UK: Blackwell Publishing Ltd.

Labov, William. 1972. Some principles of linguistic methodology. *Language in Society* 1(1). 97–120.

Lazard, Gilbert. 1992. *A grammar of contemporary persian* 14. Costa Mesa, California and New York: Mazda Publishers.

Lewis, Gary F. Simons, M. Paul & Charles D. Fennig. 2015. Ethnologue: Languages of the world (persian). `http://www.ethnologue.com/18/subgroups/persian-0/`.

Mace, John. 2003. *Persian grammar*. London: RoutledgeCurzon.

Mahootian, Shahrzad. 1997. *Persian. (descriptive grammars.)*. London: Routledge.

Matthewson, Lisa. 2004. On the methodology of semantic fieldwork. *International Journal of American Linguistics* 70(4). 369–415.

Mosel, Ulrike. 2012. Morphosyntactic analysis in the field: A guide to the guides. In Nicholas Thieberger (ed.), *Oxford handbook of linguistic -fieldwork*, 77–89. Oxford: Oxford University Press.

Nikravan, Pegah. 2014. *Semantics and processing of weak and strong definites in colloquial persian: Evidence from an offline questionnaire*. Carleton University, Ottawa, Ontario MA thesis.

Nomoto, Hiroki. 2013. *Number in classifier languages*: The University of Minnesota dissertation.

Parsafar, Parviz. 2010. Syntax, Morphology, and the Semantics of Ezafe. *Iranian Studies* 43. 637–666.

Sami'ian, Vida. 1983. *Structure of Phrasal Categories in Persian: an X-Bar Analysis*: UCLA dissertation.

Sharvit, Yael & Penka Stateva. 2002. Superlative expressions, context, and focus. *Linguistics and Philosophy* 25. 453–505.

Stassen, Leon. 1985. *Comparison and universal grammar.* Oxford: Blackwell.

Szabolcsi, Anna. 1986. Comparative superlatives. In Naoki Fukui, Tova Rapoport & Elizabeth Sagey (eds.), *Papers in theoretical linguistics*, 245–265. Cambridge, MA: MITWPL.

TFS Working Group. 2011. Bake-off. Retrieved from http://www.totemfieldstoryboards.org on Jul 12, 2017.

Windfuhr, Gernot & John R. Perry. 2009. *The iranian languages* chap. 8, 418. Routledge.

Xorasani, Ahmad. 1950. Nesane-ye ma'refe va nakere (definite and indefinite markers). *Daneš* 2(13). 37–53.